



HPC Procurement, Energy Efficiency and Sustainability *Discussion*

June 23, 2026

BOF at ISC'26

Gert Svensson, NAISS & KTH

Discussion Question 1

- How long do you expect HPC systems to remain economical to operate today?
 - 2 - 3 years
 - 4 - 5 years
 - 6 – 7 years

Discussion Question 2

- What factors have increased or decreased the system's lifetime? Which factors are the most important today?
 - Performance development
 - Power efficiency
 - New architectures
 - Memory costs
 - Higher competition amongst centres
 - Higher cost of power and cooling
 - Lack of power
 - Political pressure for lower CO2 or other sustainability KPIs

Discussion Question 3

- Where does sustainability actually enter your procurement process today
 - at specification,
 - evaluation, or
 - after deployment?

Discussion Question 4

- Who is using Total Cost of Ownership (TCO) methods in procurements?
- TCO = Provide the system with the best performance for a hard-limited TCO.
- Needs a performance measure.
- Needs to calculate or estimate the “total cost”

Discussion Question 5

- What is included in your TCO, or taken into account by limits?
 - CAPEX + Maintenance + Power + Cooling
 - Operational CO2 (cost estimate)
 - Manufacturing of system CO2 (standard?)
 - Manufacturing of facilities CO2 (standard? + long term planning)
 - Water use (cost estimate)
 - Staff costs (different system – more or fewer staff)
 - Heat re-use return
 - Recycling at the end of operation

Discussion Question 6 & 7

- What procurement requirement has most strongly shaped system design, even if it wasn't intended to?
- Which metric is currently most misleading in procurement decisions?
Examples:
 - PUE
 - work/watt
 - TCO excluding important costs, for example carbon pricing
 - others

Discussion Question 8 & 9

- Looking back, what has changed in procurements over the last few generations?
 - CPU -> GPU
 - Energy efficiency
 - Power capping
 - Total liquid cooling with higher temperatures
- What will change in the coming generations?

Discussion Question 10

- What is one procurement requirement that does not exist today but that would fundamentally change system design and should be mandatory?
 - recyclable liquid cooling fluids requirement
 - embedded carbon accounting and enforceable carbon-budget limits
 - runtime power and energy enforcement guarantees
 - lifecycle recycling requirements
 - dynamic electricity pricing integration into system operations
 - workload-aware energy optimisation and carbon-aware scheduling
 - other ideas