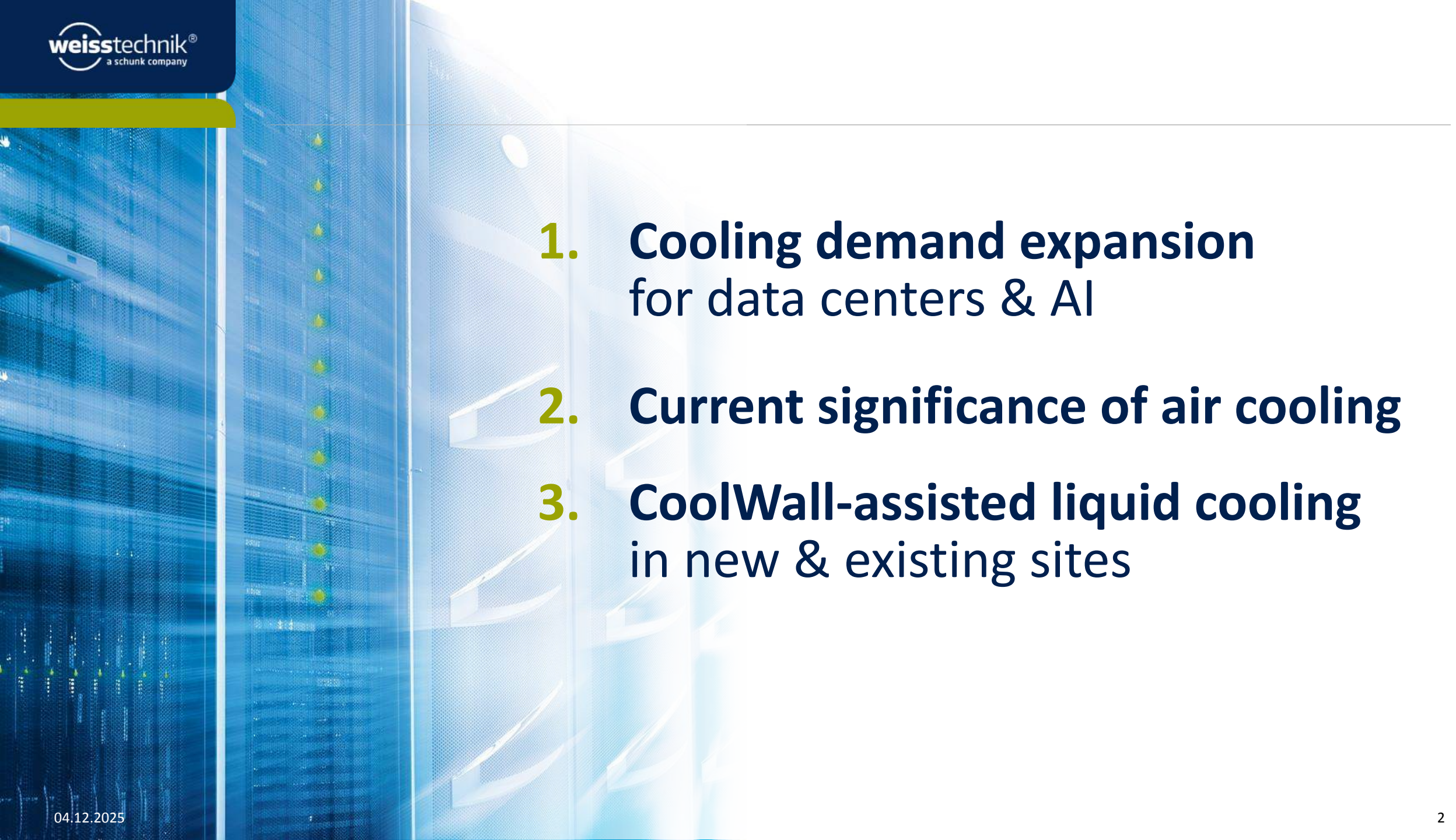
Beyond FanWall: The Future of Room-Based Cooling in AI Datacenters – Greenfield & Brownfield.

Datacenter Forum, Stockholm | Mathias Köster & Christoph Löhner



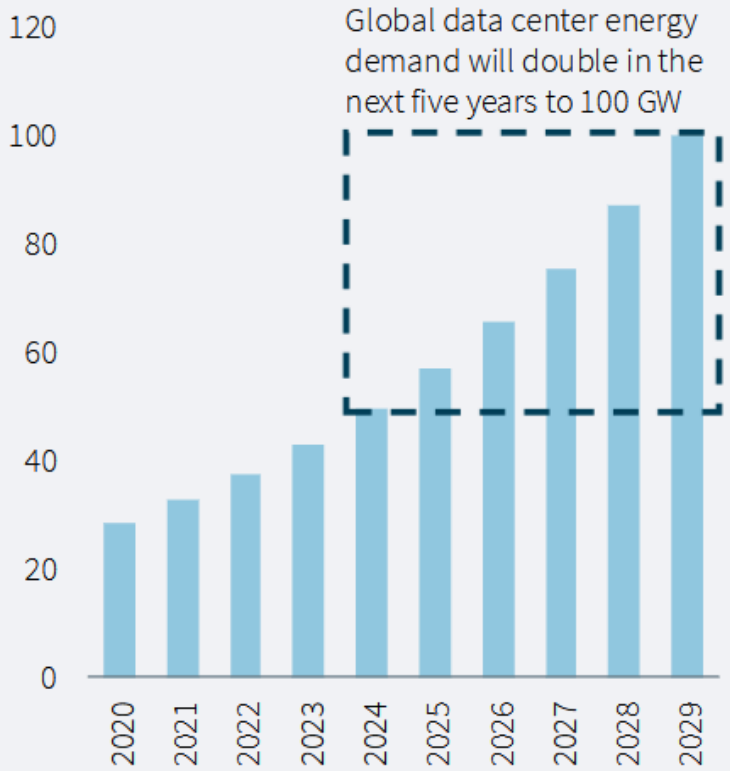
1. **Cooling demand expansion**
   for data centers & AI
2. **Current significance of air cooling**
3. **CoolWall-assisted liquid cooling**
   in new & existing sites

Ever-increasing need for computing power

Cooling demand expansion

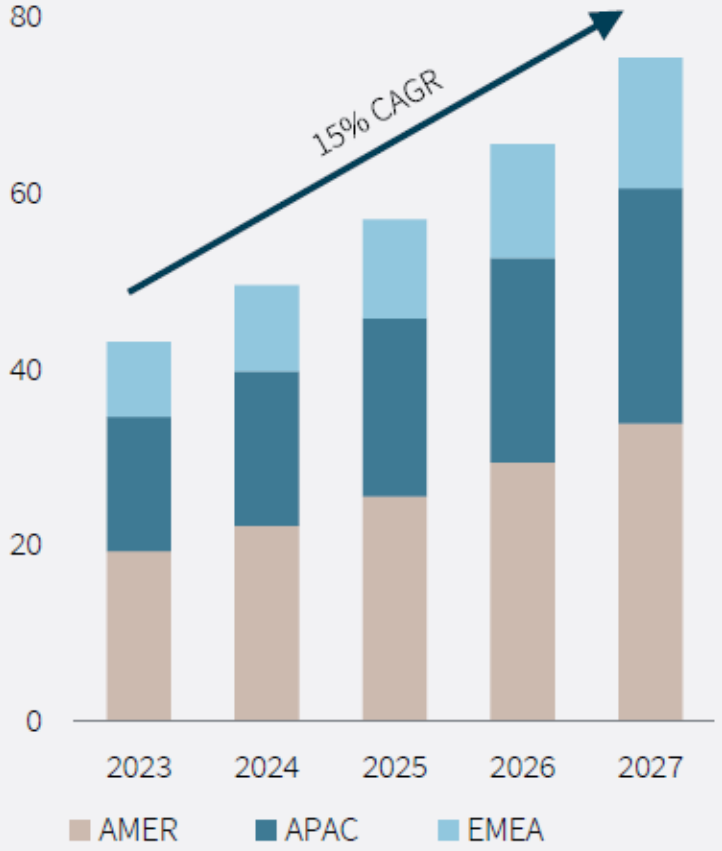
DC capacity demand will double by 2030

Global data center energy demand (GW)



Sources: JLL Research, Structure Research
Note: Capacity includes hyperscale and colocation.

Global data center capacity (GW)



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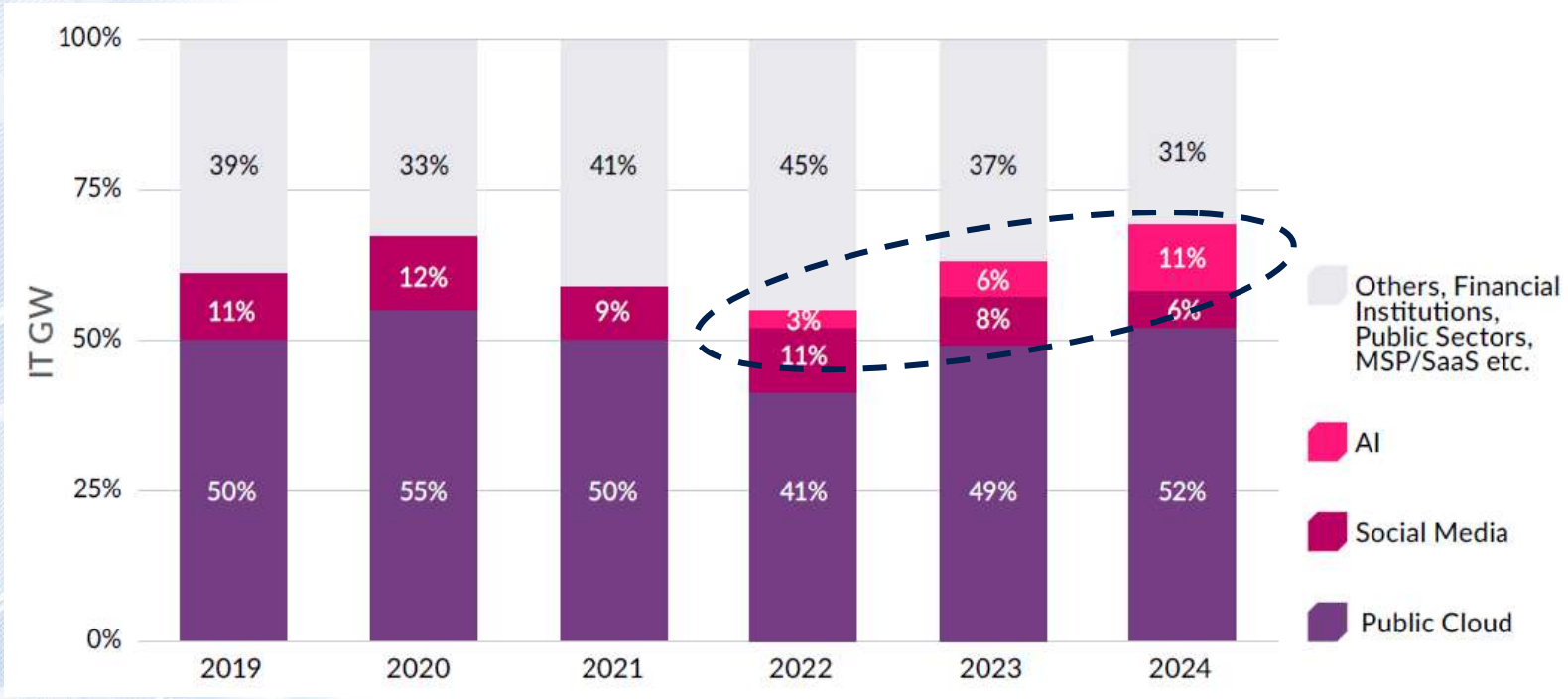
Top three uses of global data center demand

Cooling demand expansion

AI is the key growth accelerator

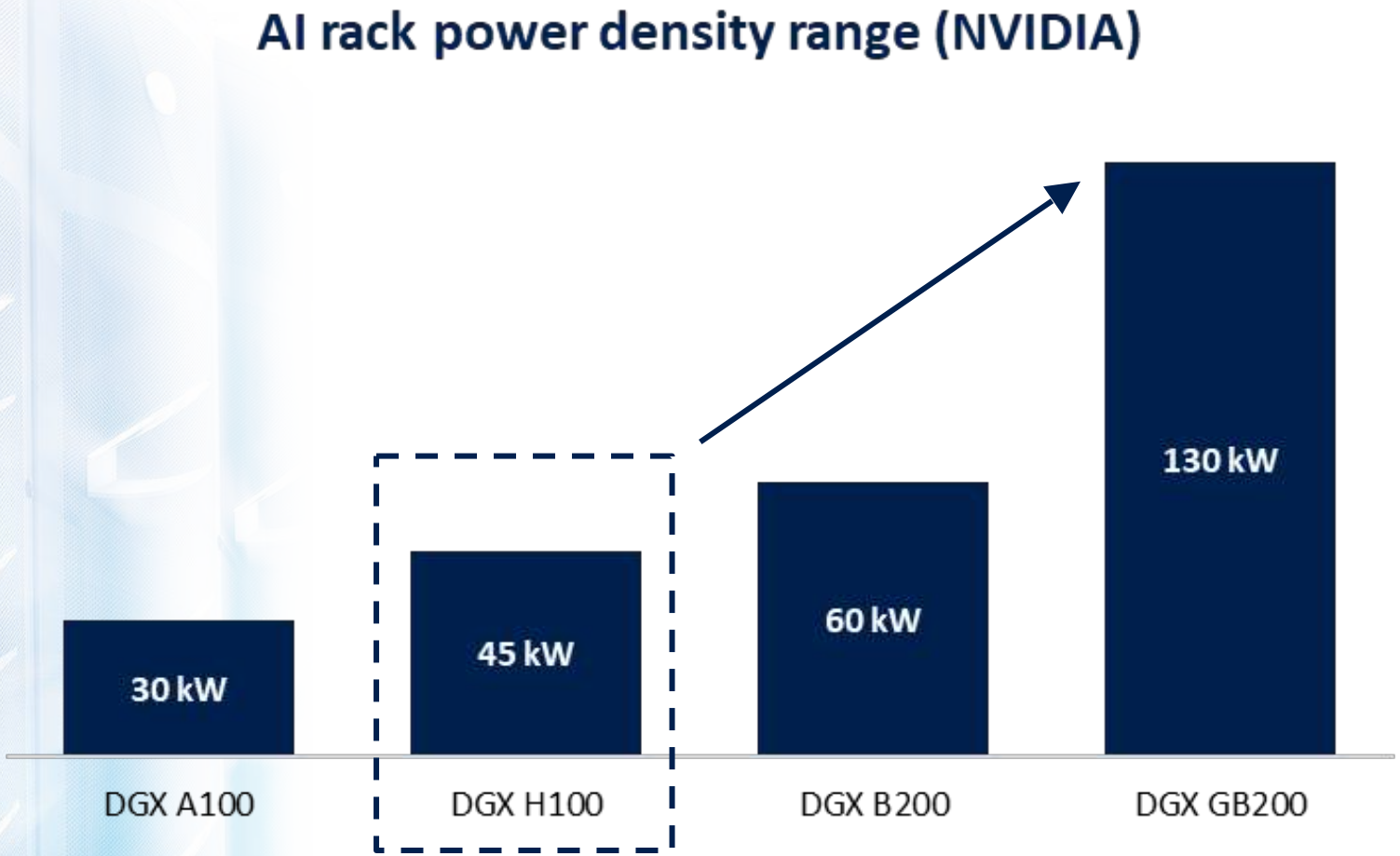


Source: DC Byte

AI workloads are increasing rack density

Cooling demand expansion

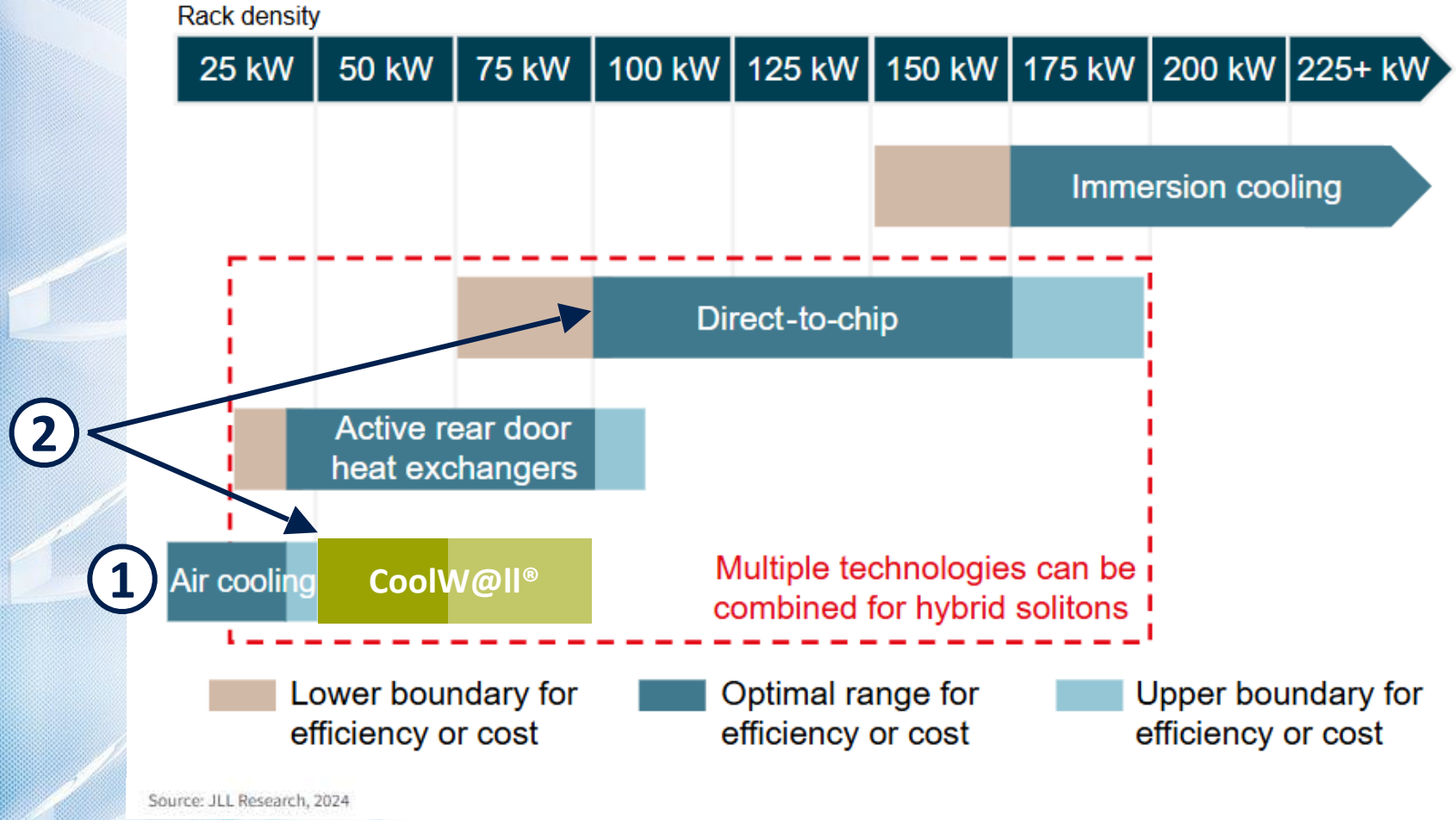
The AI data center market is moving towards greater rack densities



Applicable cooling technologies by rack density

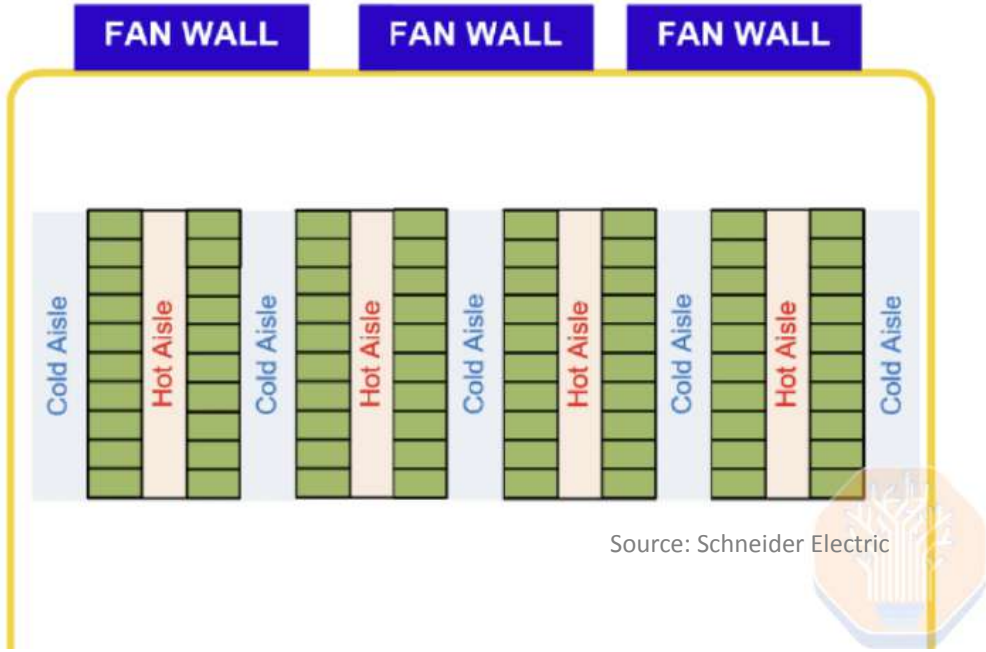
Current significance of air cooling

Air cooling systems are coming to its limits

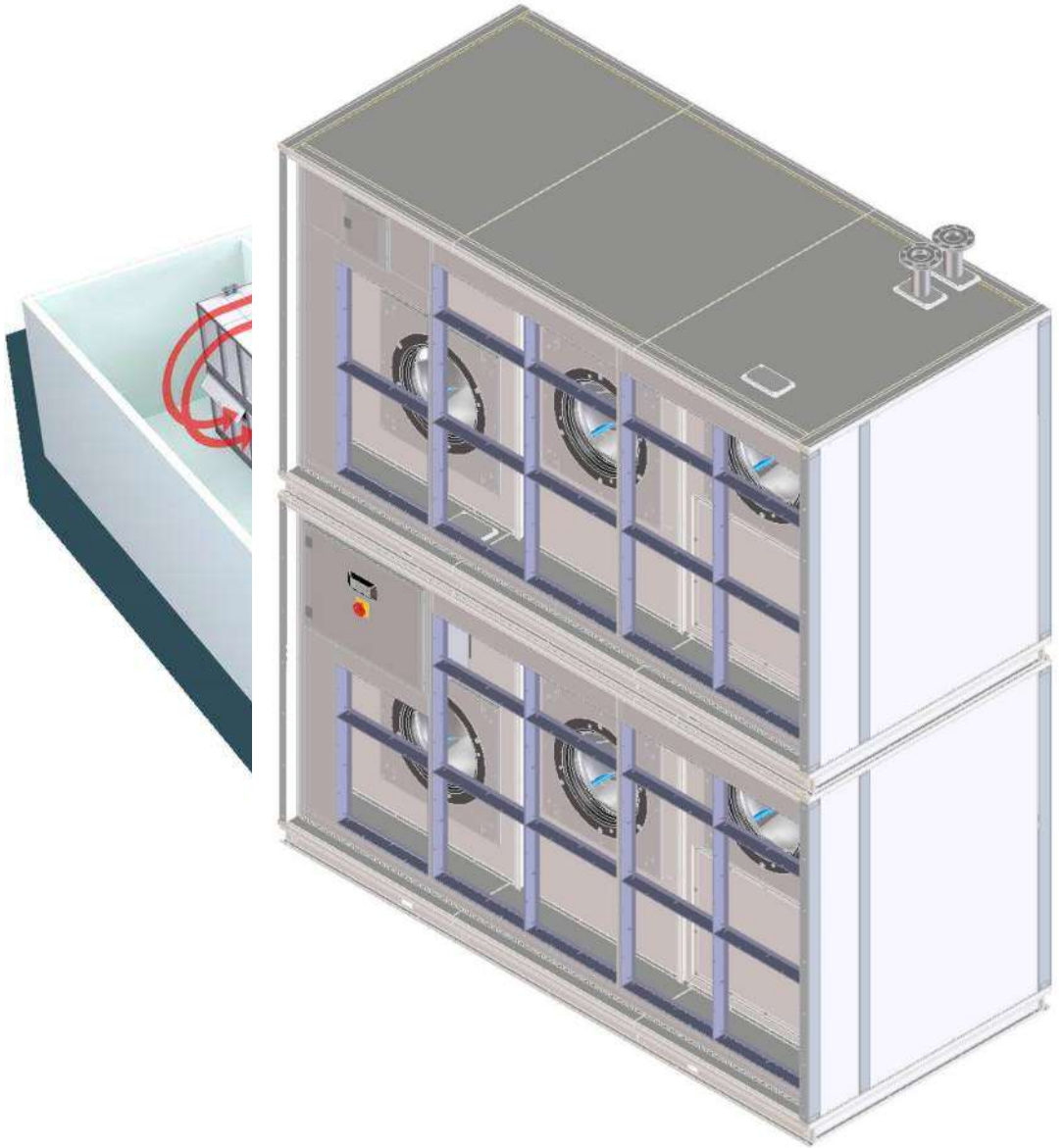


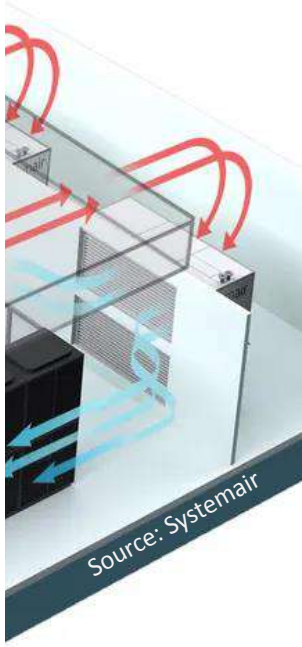
FanWalls: the copy-and-paste solution nobody questions

Current significance of air cooling



Source: Schneider Electric





For good reasons:

- Low CAPEX compared to multiple RDHx
- Clear separation from IT allows easier maintenance
- Reduced energy consumption

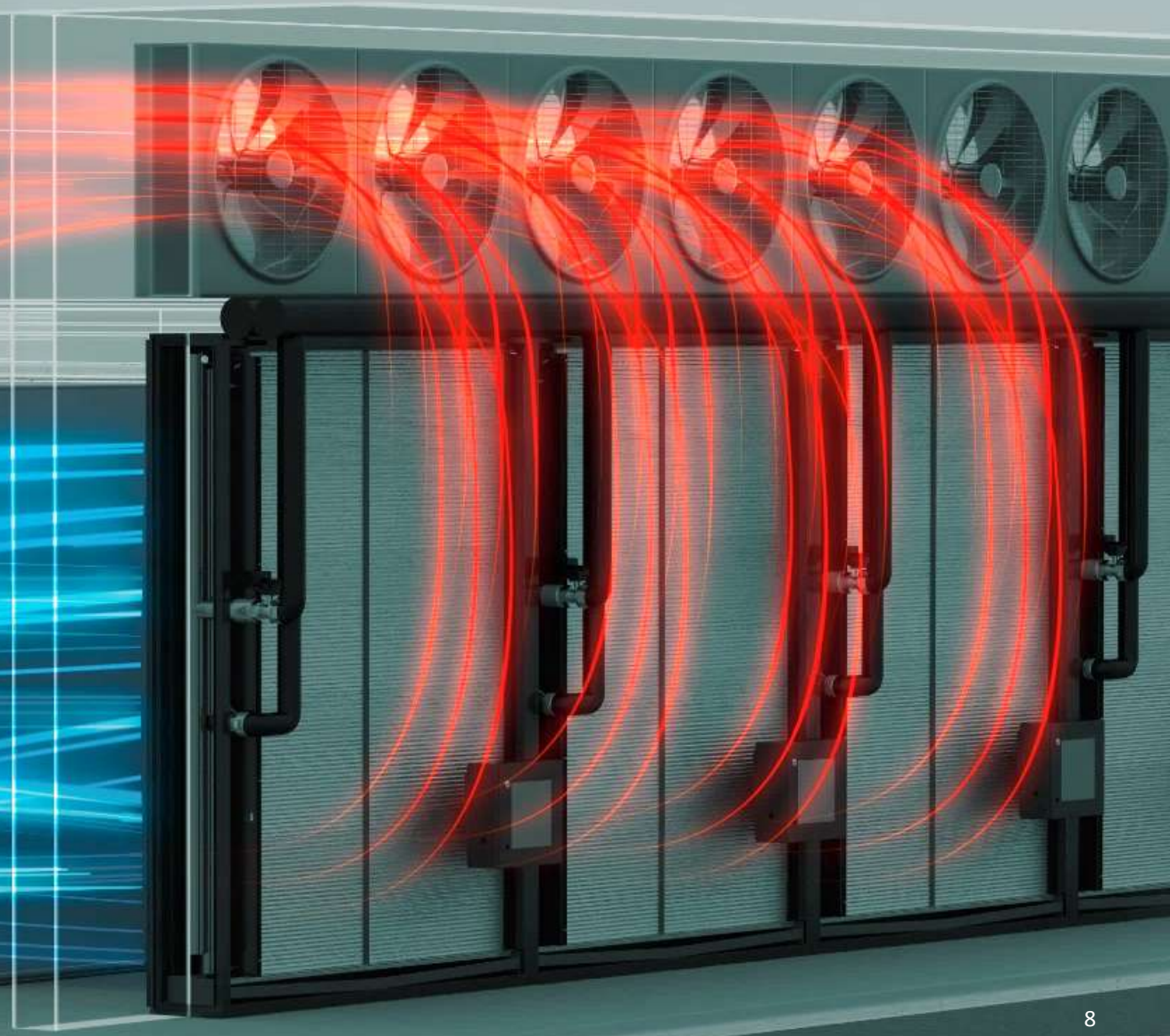
Efficient cooling redefined: Vindur® CoolW@ll®

Current significance of air cooling

Built-in solution that maximizes cooling potential

- Utilizing almost the entire room height/width
- Transform service corridors into a walk-in cooling chambers
  - Enlarged coil and filter surfaces
  - Reduced internal pressure losses
  - Minimized floor space requirements

Highest capacity per footprint with minimal power consumption!



HPC cooling for a data center in Norway
Current significance of air cooling

The challenge

- Air-condition state-of-the-art data halls Kristiansand
- Manage heat loads of 32 kW per rack in a limited space

The solution

- CTS Nordics selected Weiss Technik's CoolWall technology
- 48 CoolWall kits were implemented and have been successfully operating since 2023

150 MW deployed across Europe

Minimizing the technical corridor width

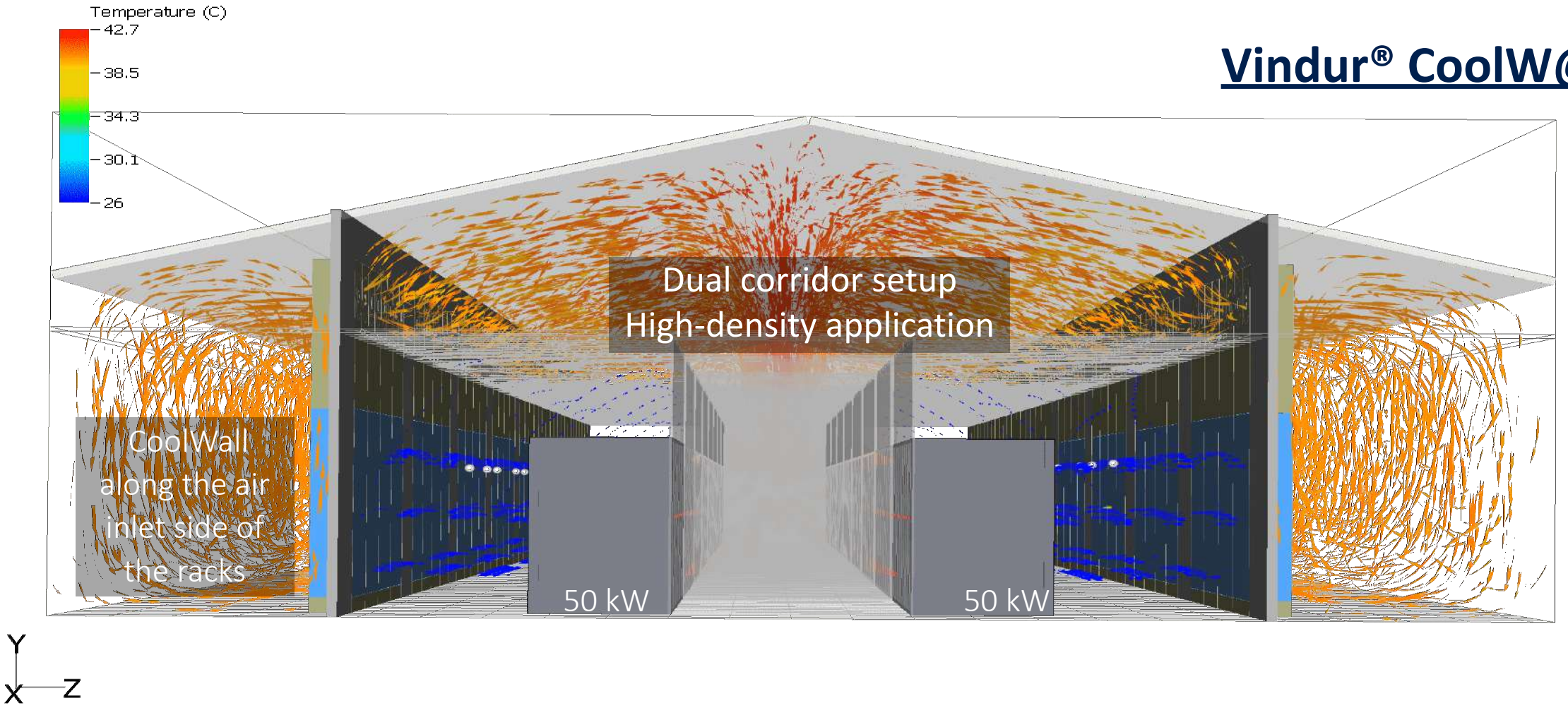
Current significance of air cooling

Possible space saving for two dual-corridor rooms (side by side): 10 meters

Pushing the boundaries of air cooling to the limits

Current significance of air cooling

Vindur® CoolW@ll®



The future for AI data centers is hybrid

CoolWall-assisted liquid cooling

Source: NVIDIA

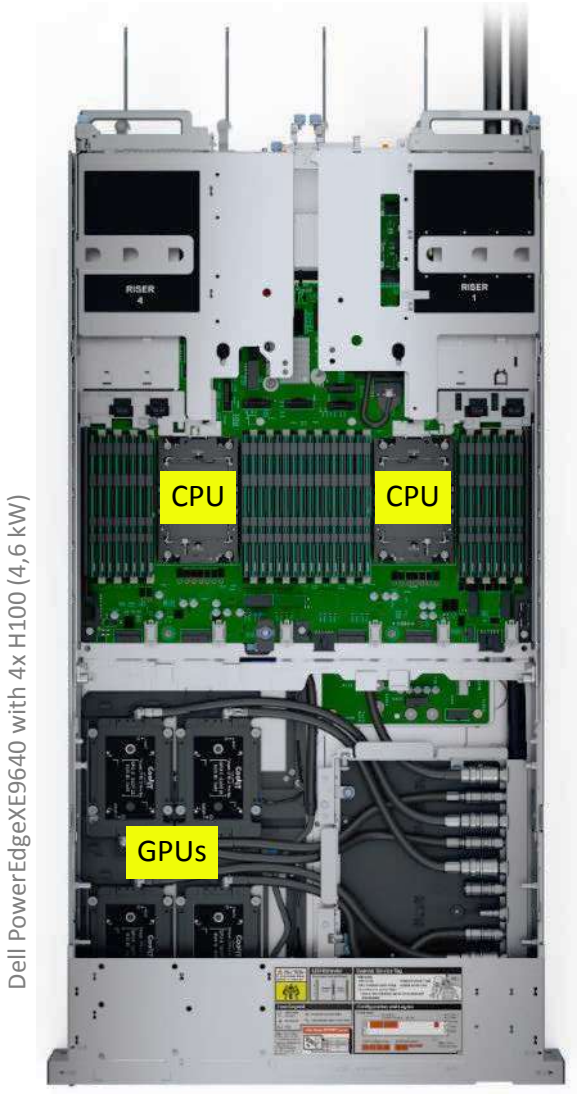
NVIDIA GB200 NVL72 – The next chapter in generative AI.

- 36 Grace Blackwell Superchips per rack
- Heat load: 132kW
- 15% of the heat is dissipated into the air (per NVL rack)
- 30% of the total heat (per pod), including networking racks, must still be managed by air cooling

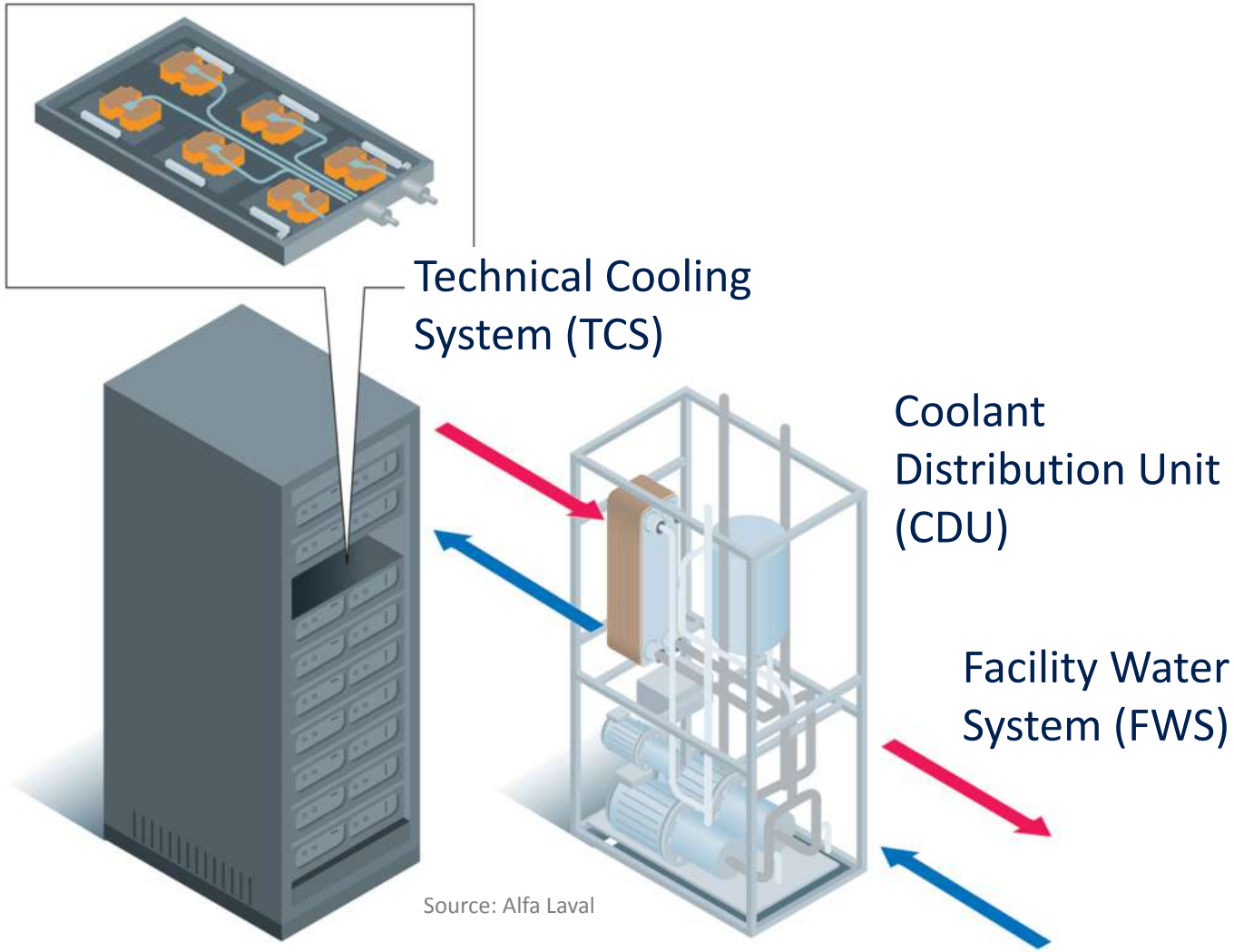
- **Liquid cooling is becoming vital**
- **Air Cooling will still play a key role**
- **The future is HYBRID**

The Mechanics of Direct-to-Chip Liquid Cooling (DLC)

CoolWall-assisted liquid cooling



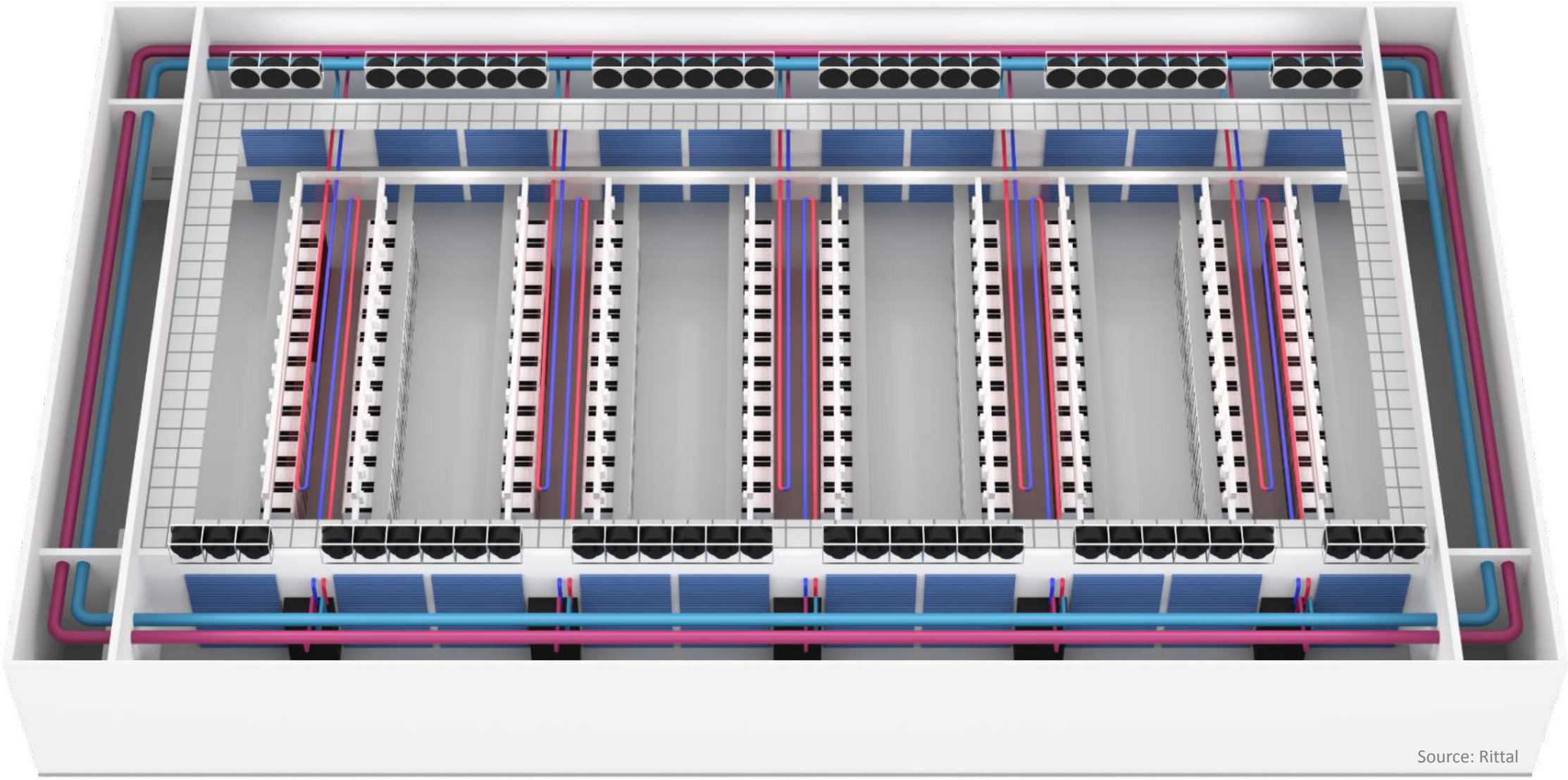
Dell PowerEdgeXE9640 with 4x H100 (4,6 kW)



Source: Alfa Laval

CoolWall: the smart option for the remaining heat load

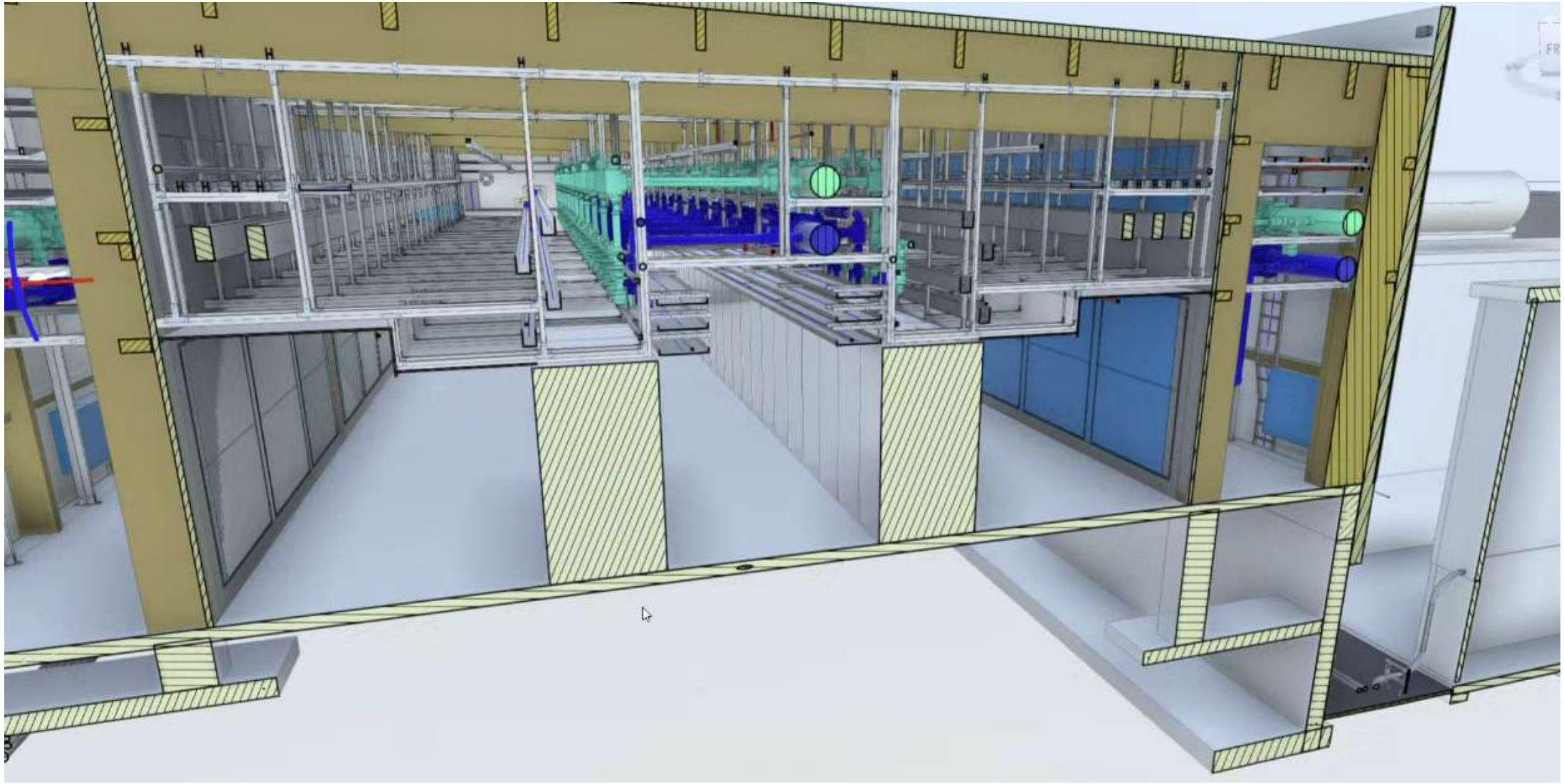
CoolWall-assisted liquid cooling



Source: Rittal

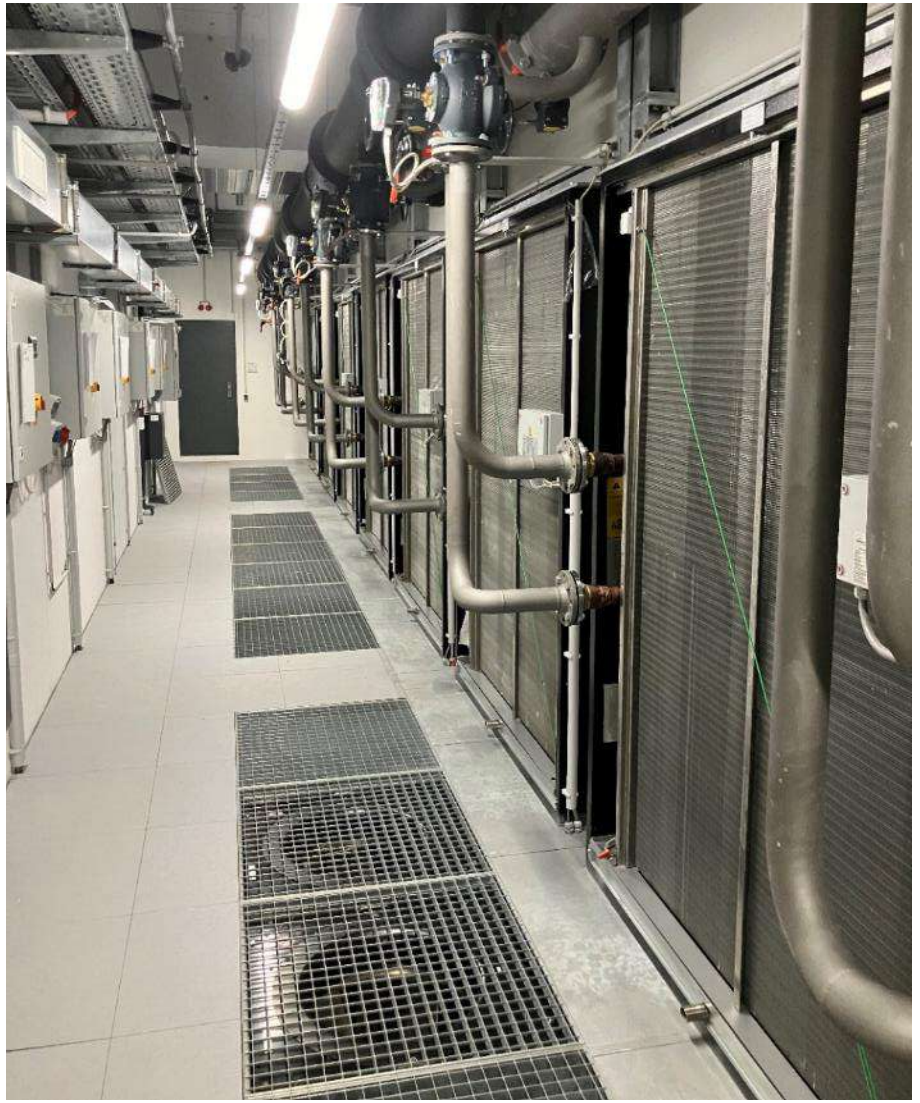
Application example: hybrid cooling with DLC and CoolWall

CoolWall-assisted liquid cooling



Hundreds of existing sites with CRAH units need to be refurbished

CoolWall-assisted liquid cooling



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Weiss Klimatechnik GmbH
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