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Datacenters Demanding Future Sustainability

NOVEMBER 9-10, 2021

SI (Strategic Initiatives)

Datacenters Demanding Future Sustainability

Moderated by Bill Carter, CTO, OCP

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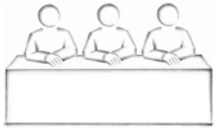
Your Panel



SUSTAINABILITY

Bill Carter
(Moderator)

Rolf Brink
Asperitas

Andreas Meyer
Rittal

Don Mitchell
Victaulic

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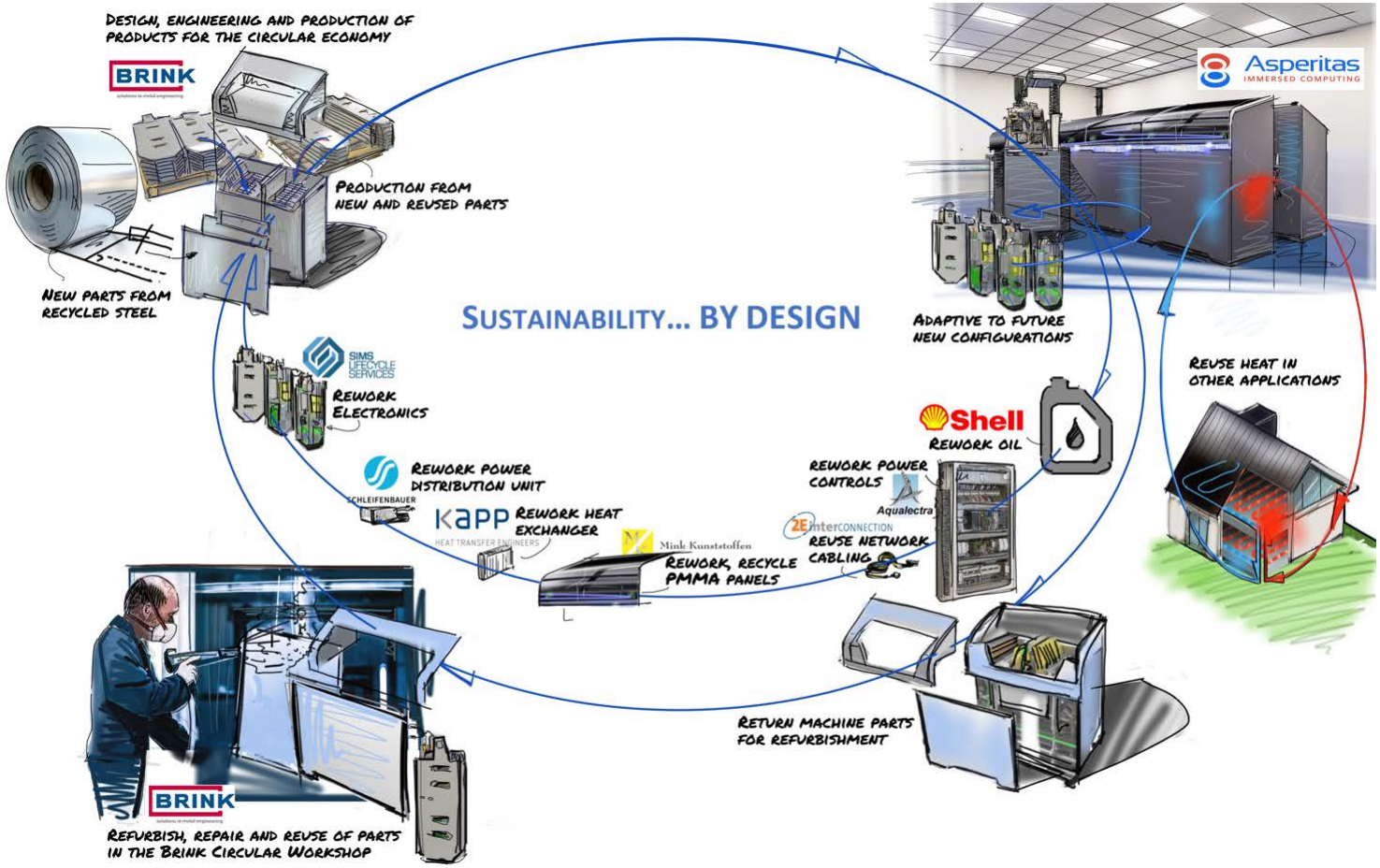

SUSTAINABILITY

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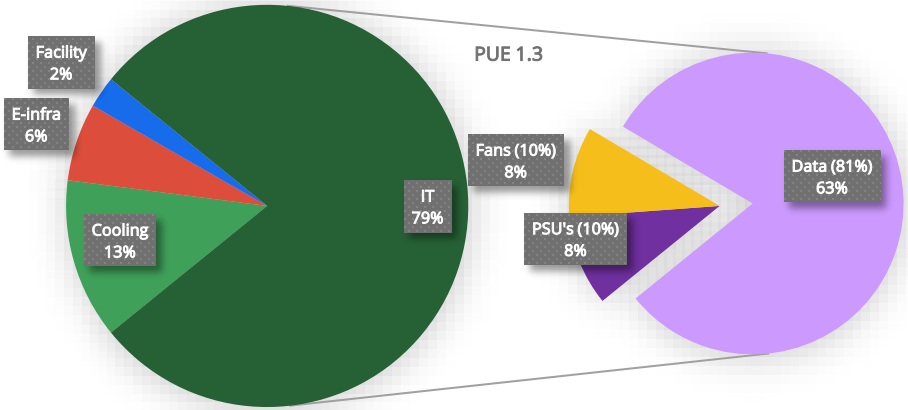
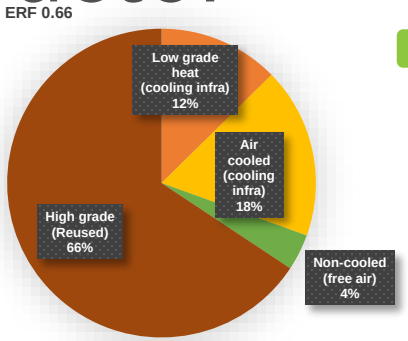
Beyond PUE – Energy Reuse Factor

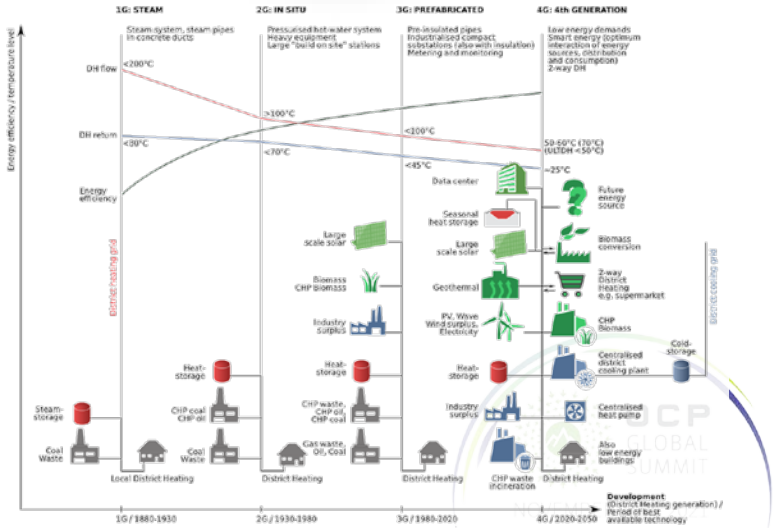
SUSTAINABILITY

ERF: Ratio of reused energy and the total energy (including IT, cooling, power, lighting, etc.)

$$PUE = \frac{Total\ Energy}{IT\ Energy} \qquad ERF = \frac{Reuse\ Energy}{Total\ Energy}$$







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https://eehpcwg.llnl.gov/documents/infra/06_energyreuseefficiencymetric.pdf

Liquid cooling effects

SUSTAINABILITY

no coolers | no chillers | pumps -95% | UPS -40% | GenSet -40%

High grade temperature | Combined Heat Compute

no fans | no bearings | no F-gases

extended lifetime

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Beyond PUE – GHG & Carbon Footprint

SUSTAINABILITY

GHG

Green House Gas

- Scope 1 —company or job site makes directly
- Scope 2 — Company or job site makes indirectly – i.e. electricity source
- Scope 3 — All emissions up & down the value chain. i.e. products from suppliers.

Hyperscale headlines:

- Facebook: carbon negative by 2030
- Google: carbon negative by 2030
- Microsoft: carbon negative by 2030
- Microsoft: erasing historical carbon footprint by 2050
- Amazon: carbon negative by 2040
- Apple: carbon negative by 2030

Policy headlines:

EU green deal: climate neutral continent by 2050

China: Carbon neutral by 2060

Call to Action – Participate!

Sign up and participate in the OCP Strategic Initiatives:

- Sustainability & Circularity + Common Test & Validation - Strategic Initiatives (SI)
  https://www.opencompute.org/projects/ocp-2021-strategic-initiatives

- Scale Out of Liquid Cooling/Immersion - Advanced Cooling Facility (ACF) & Advanced Cooling Solutions (ACS)
  https://www.opencompute.org/projects/acs-immersion
  https://www.opencompute.org/projects/acs-cold-plate
  https://www.opencompute.org/projects/acs-door-heat-exchanger
  https://www.opencompute.org/projects/advanced-cooling-facilities-incubation

- Heat ReUse: Weekly Calls, Tuesdays 1100ET
  OCP ACF “Heat ReUse – Global Opportunities & Success Case Studies”

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Thank you!

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Efficiency effects of liquid cooling

SUSTAINABILITY

Mainstream platforms (high density)

Rear Door Heat exchangers:

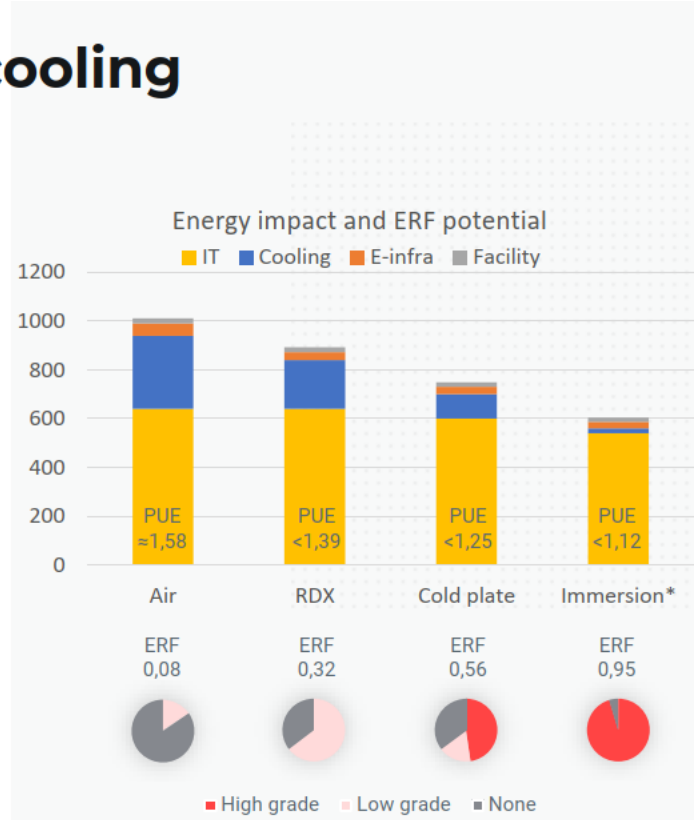
- Highly efficient air-cooling infrastructure (no air transport)
- More free cooling (seasonal), chilled water still required

Cold plate:

- Partial liquid cooling
- High heat reuse potential with partial high return temperatures
- More free cooling (year round), chilled water still required (seasonal)

Immersion:

- Total liquid cooling (No air cooling required)
- Full reuse potential with high return temperatures
- Free cooling (year round)



https://www.hpcwire.com/off-the-wire/asperitas-wins-deal-for-immersion-cooling-for-french-bank-credit-agricole-tier-4-datacentres/

Asperitas

*Asperitas customer facility measured at PUE 1,03

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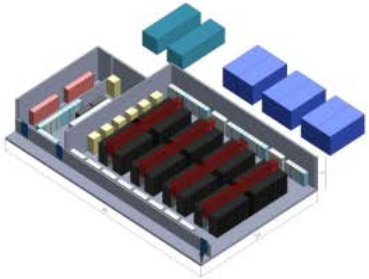
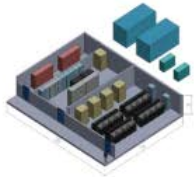
Liquid cooling business case effects

SUSTAINABILITY





Warm liquid cooled datacentre impact

- **PUE** reduced to **1.30-1.03 anywhere**
- **Up-to 50%** energy footprint reduction
- **Up-to 40%** more CPU performance
- **Up-to 80%** physical footprint reduction
- **Up to 99%** energy reuse potential
- **Up-to 50%** TCO reduction
- **Elimination of water consumption**
- **Climate independence**

Asperitas

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Beyond PUE – Water Usage Effectivenes

SUSTAINABILITY

INDUSTRY PERSPECTIVES

A Data Center That Guzzles Water Isn't Sustainable

The cooling plant inside Google's Taiwan data center

The industry's nearly singular focus on energy overlooks another key component of sustainability.

Ignore Data Center Water Consumption at Your Own Peril

June 2016 / in Executive

by Kevin Heslin

https://journal.uptimeinstitute.com/dont-ignore-water-consumption/

https://www.datacenterknowledge.com/industry-perspectives/data-center-guzzles-water-isn-t-sustainable