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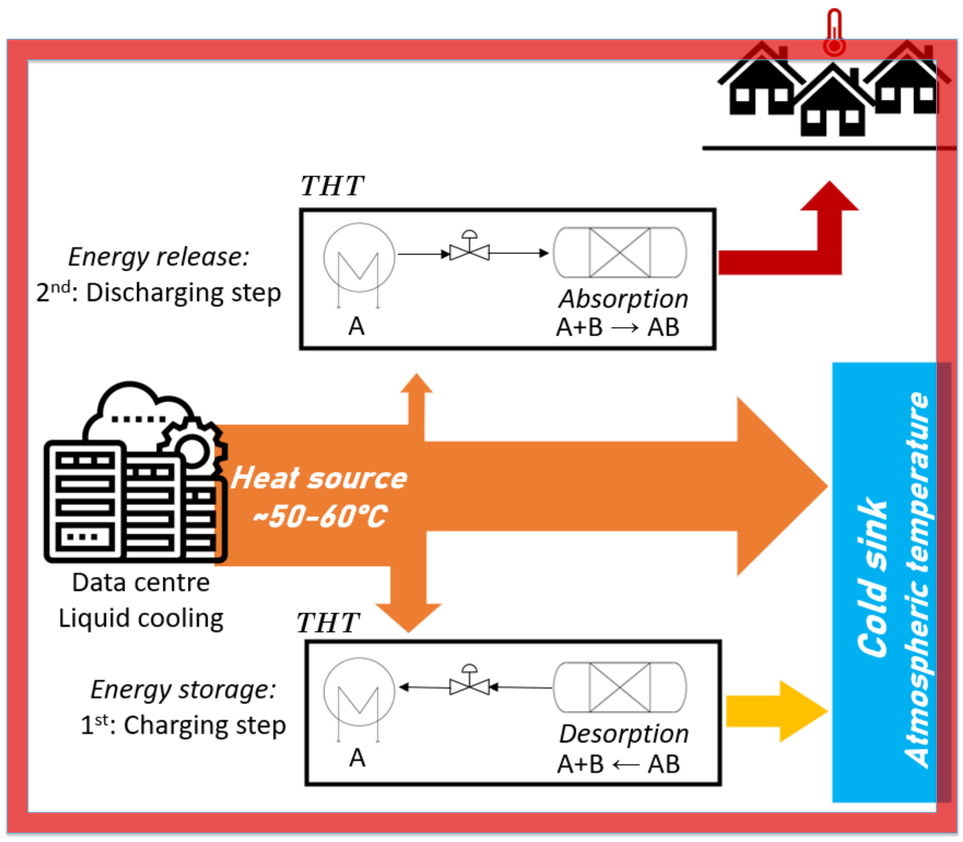
THERMOCHEMICAL HEAT STORAGE FOR LOW TEMPERATURE DATA CENTER WASTE HEAT RECOVERY

The **exponential growth of the digital economy** makes data centers critical, but their massive energy consumption conflicts with the EU's climate goals. Conventional methods fail to resolve the **thermal gap** between the low-grade supply and the required demand.

Thermochemical Heat Transformers (THT) enable both loss-free **energy storage** through reversible chemical reactions and a critical **temperature upgrade** of the recovered heat.

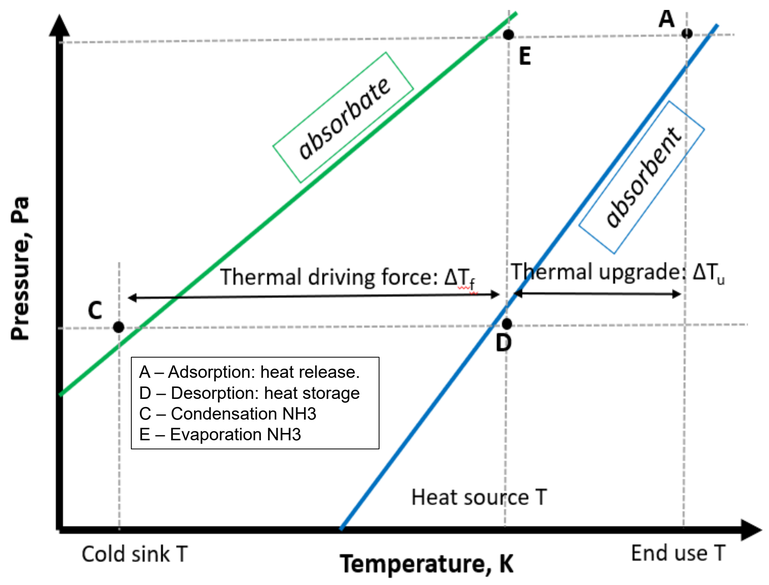


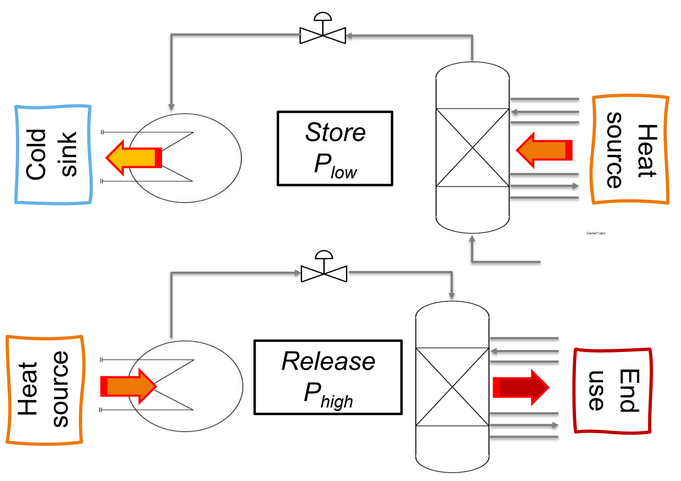
Thermodynamic analysis

NH_3 works best as working fluid.

2 Reactor + condenser system improves upgrade.

BaCl2 and CaCl2 as most promising working pair. Up to 25°C ΔT

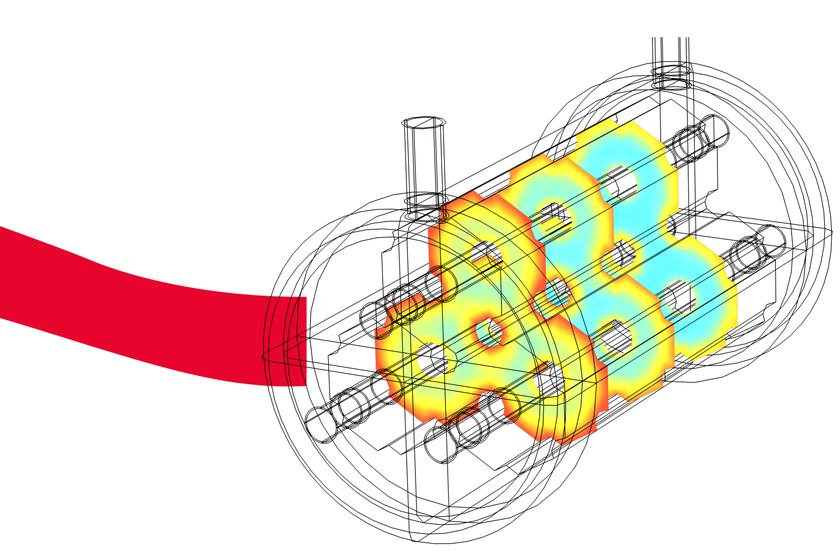


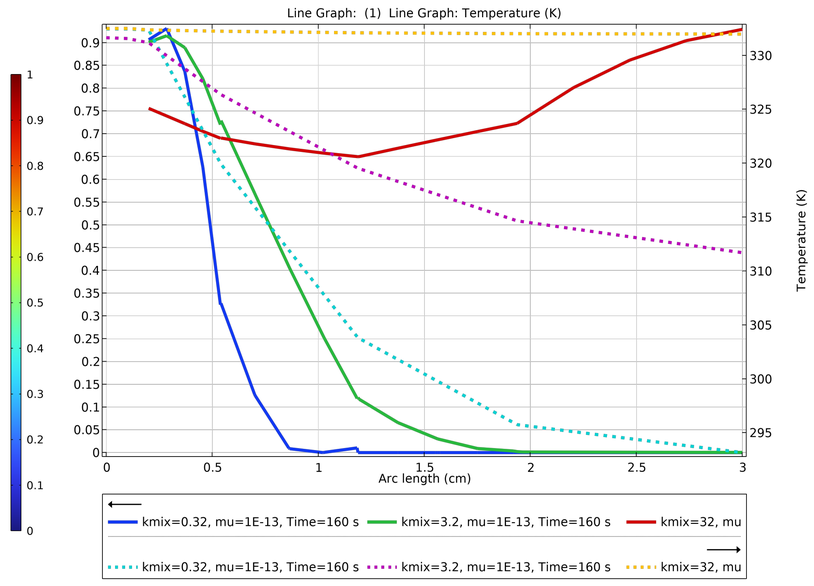


- **When** does the TCM store/release heat?
- **How much** heat can be stored per unit of material?
- **How much** can temperature be upgraded?

Can the material store and release heat at the available conditions and required demand?

Numerical analysis using CFD





Permeability becomes the limiting factor at higher thermal conductivities.

When heat transfer limited, the relation between conductivity and conversion rate is linear.

How much can we improve heat storage rates if we improve thermal conductivity?

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