

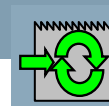


Energy Storage Issues and Opportunities

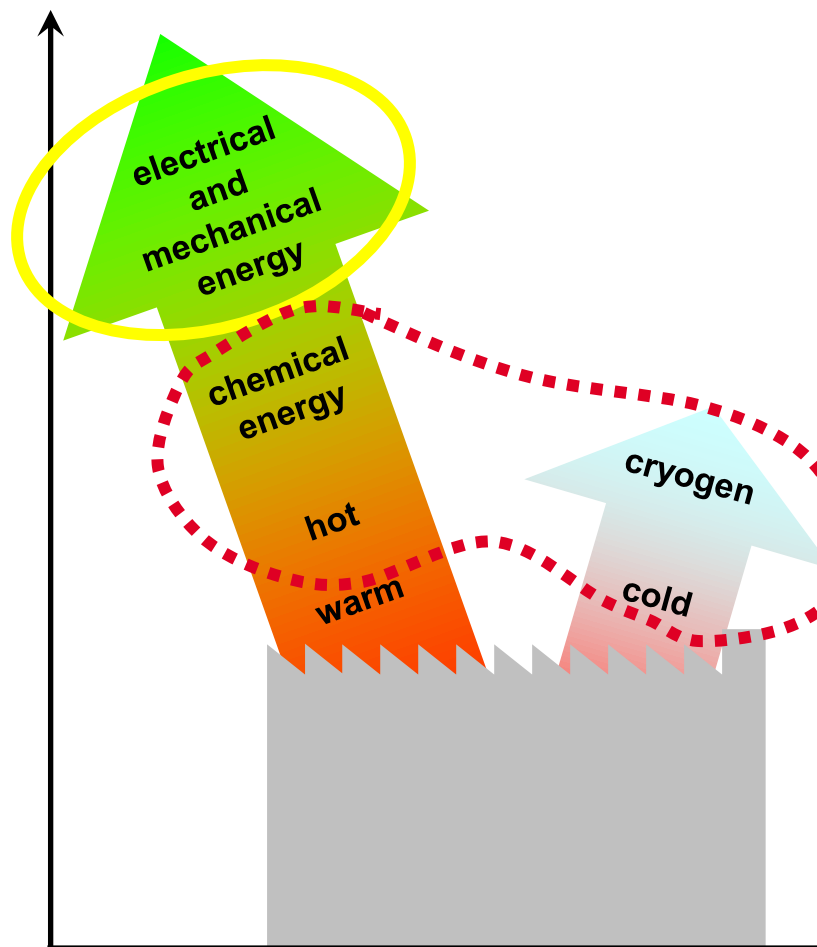
TRANSFORMATION: FROM STORAGE TO SAVINGS

**Industry Sector:
Results of break-out session discussion**

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Exergy
(useful part of energy)



Hypotheses 1:

There is a high technical standard of energy-recovery in drive-and control systems (electrical and mechanical).

In future following aspects are helping:

- economy of scale
- higher energy cost
- TCO-calculation

Hypotheses 2:

For industrial applications we need more R&D for Energy-Transformation in Mid-Exergy Sector (high temperature, very cold systems)

Barriers

- High cost and long pay back
(breakthrough needed in cost of recovering low grade energy)
- Reduction potentials depend on cost assumptions (energy and CO₂)
- Economics: lack of incentive to further reduce emissions beyond what is already economic
- Energy storage opportunities differ by sector and region
- Stand by mode

Opportunities

- Waste heat: wide range of temperatures in different industries – need to define
- Combined Heat and Power
- Heat applications: heating green house, district heating if applicable
- Technologies available to transfer heat to cooling; heat to dehumidification
- Ice storage for air conditioning and process cooling
- Building codes for factories, eg. to encourage geothermal
- Need smart solutions to move from heat to cool, from heat to electricity
- Black-Scholes analysis – to speed up technology development curves