Working fluids and System Configurations

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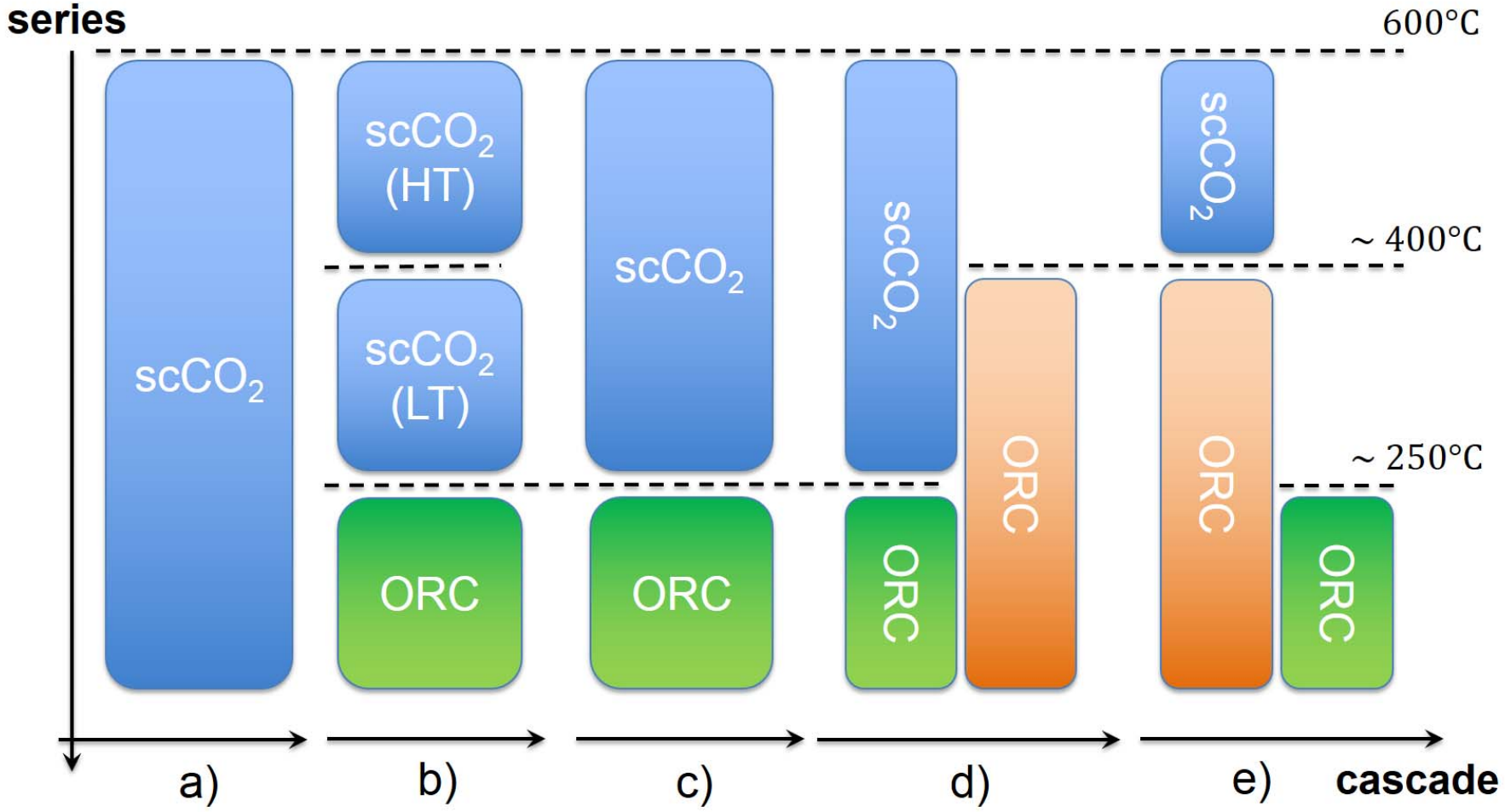
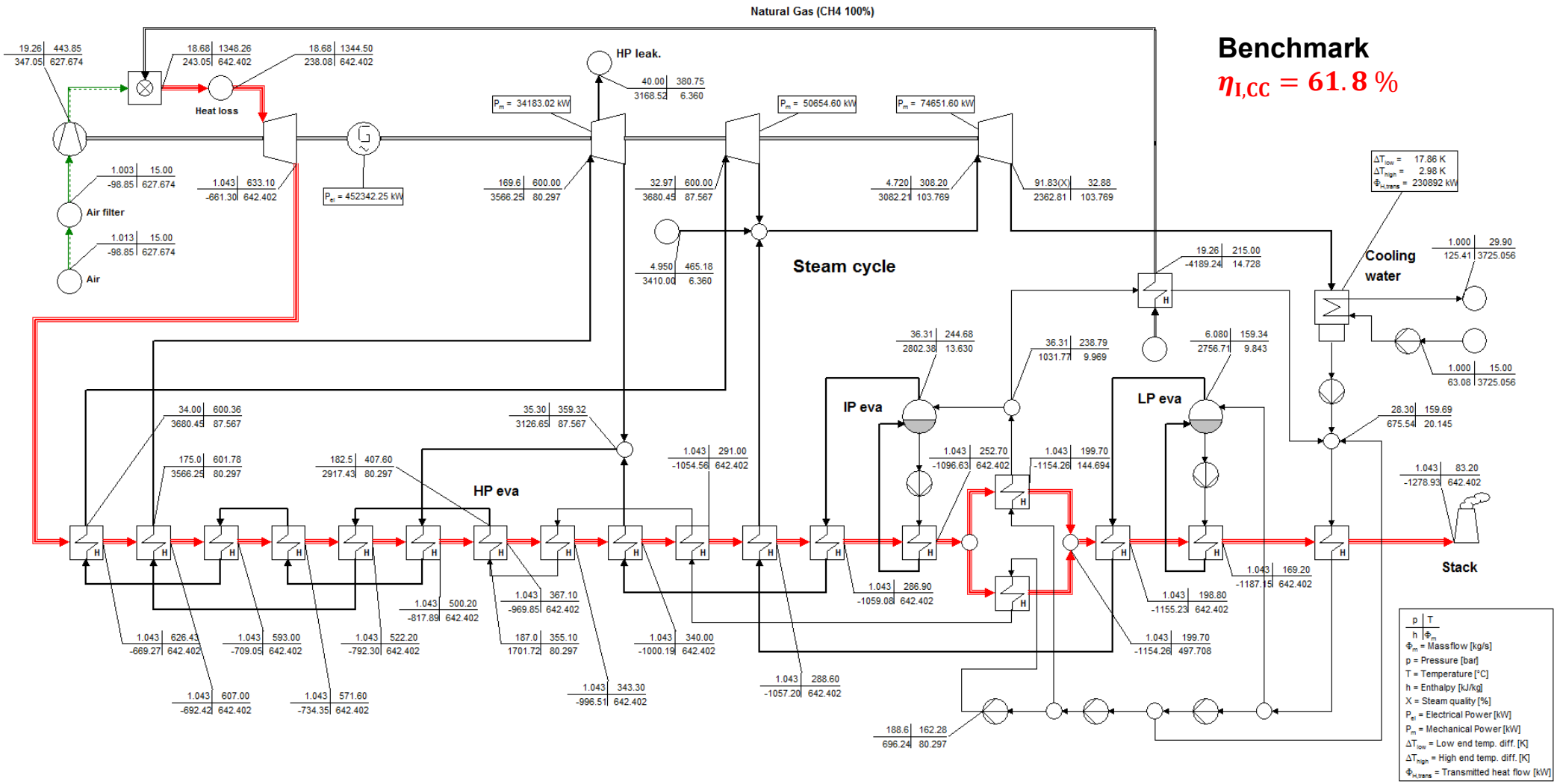
System studies: still?

- **Yes**: but new integrated design methods
  - Working fluid (CO_2 *doping*)
  - System configuration
  - Preliminary sizing of HX and turbomachinery
  - Dynamics and control
- Especially for technology with no consolidated experience
- Competition with steam: possibility to extend advantages

Example: configurations for LGTCC





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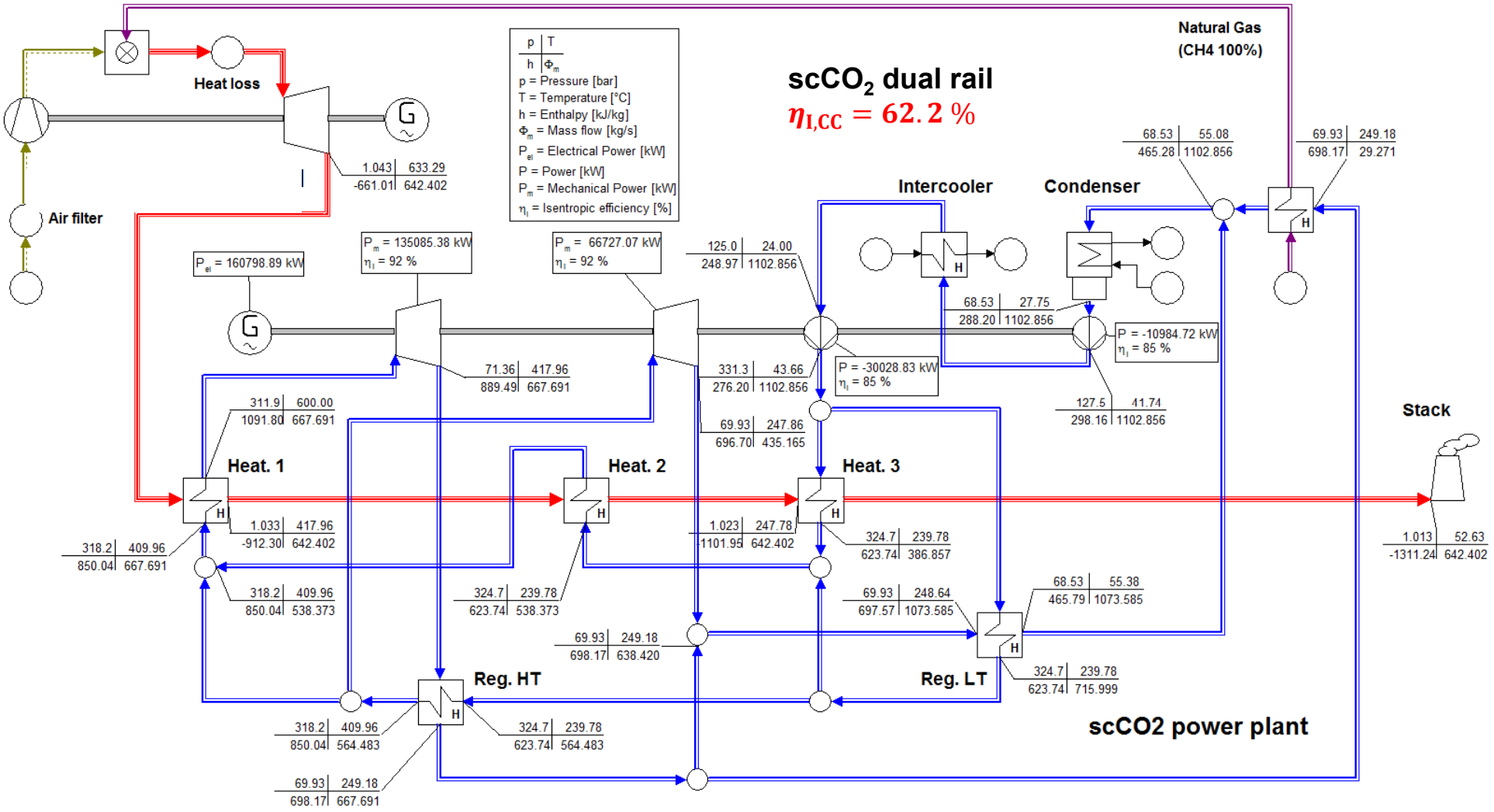

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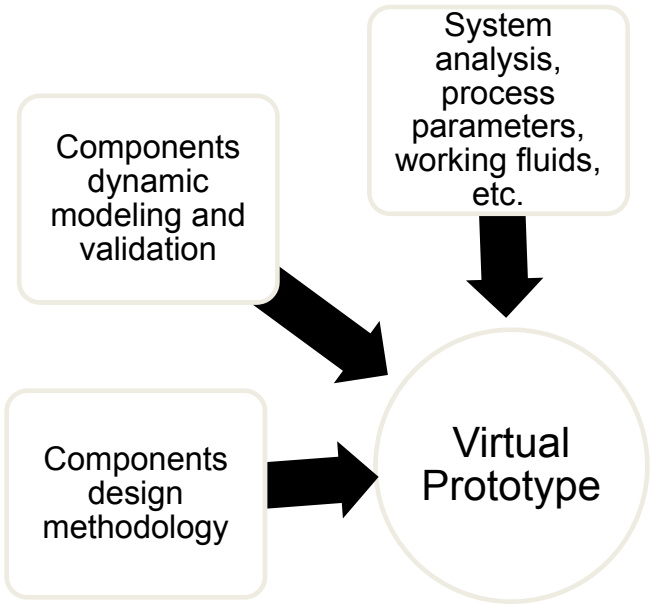
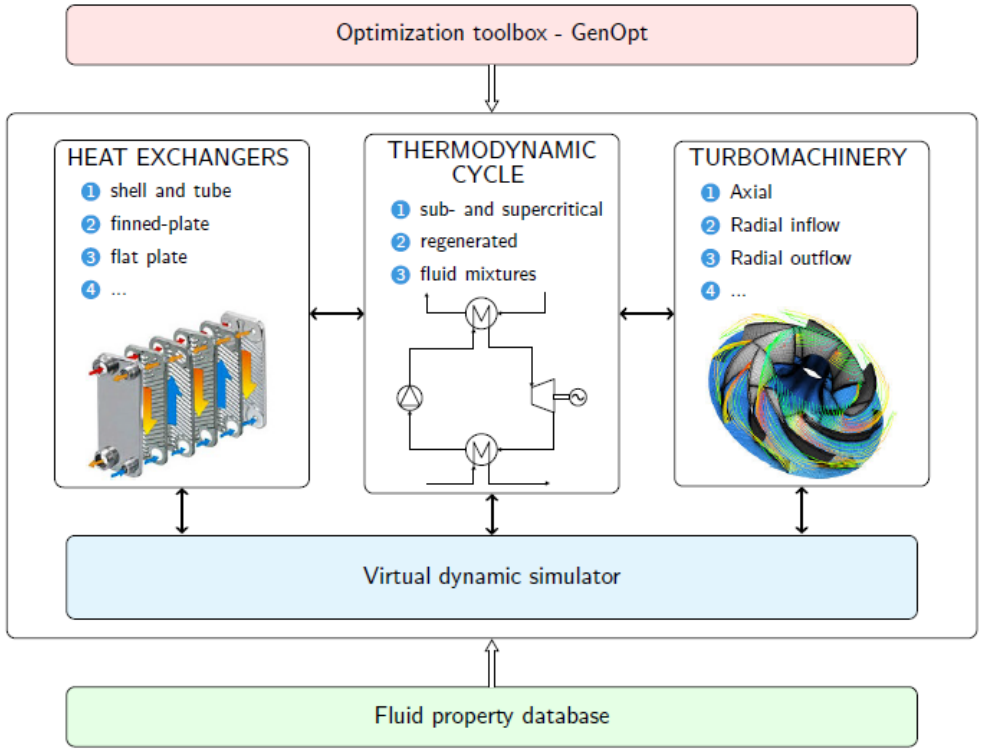
Integrated Design Methods

Single modeling, simulation and optimization environment





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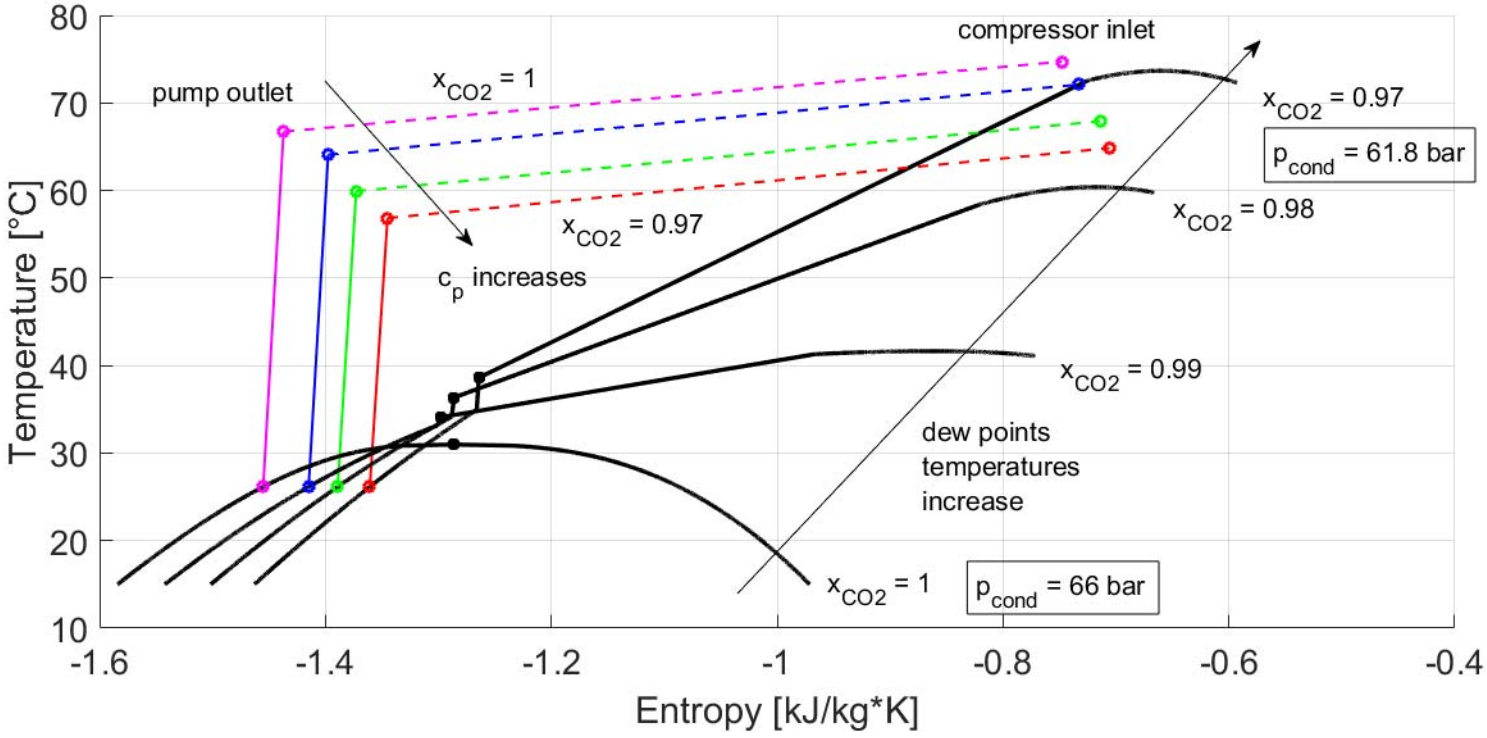
"Doped" $scCO_2$ working fluids

Use of $scCO_2$ + organic fluid, stable till 650°C



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Possible advantages

- “Tune” critical point for best performance vs ambient
- Optimal trade off between smaller turbomachinery and expensive HX (lower pressure)
- Decrease corrosion?
- …

CO_2 "Doping" R&D

- Thermal stability
- Corrosion
- Thermodynamic and transport properties
- Heat transfer