

Heat Dispatch Centre – Symbiosis of renewable generation units for sustainable thermal energy supply

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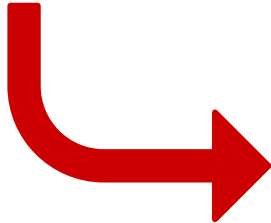
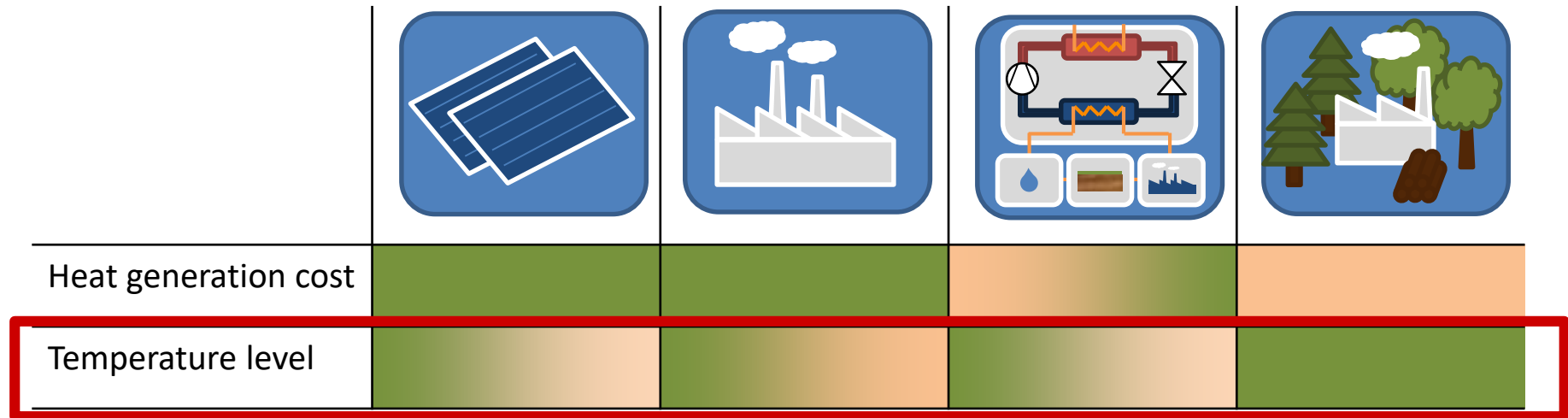
1 Motivation for series-connection of renewable heat sources

2 Concept of Heat-Dispatch-Centre

3 Case study for implementation

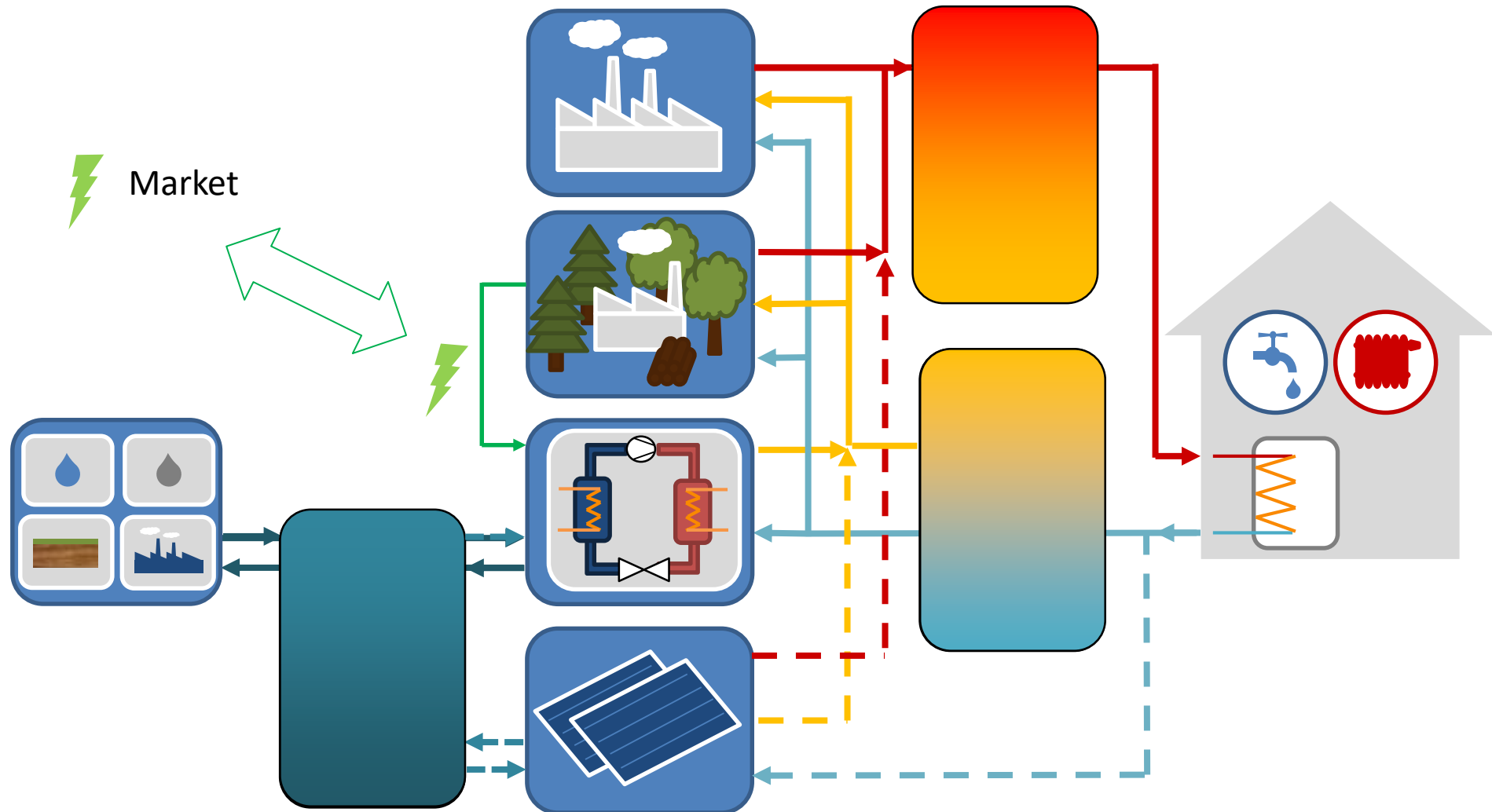
4 Discussion and Outlook

Limitations of renewable heat sources

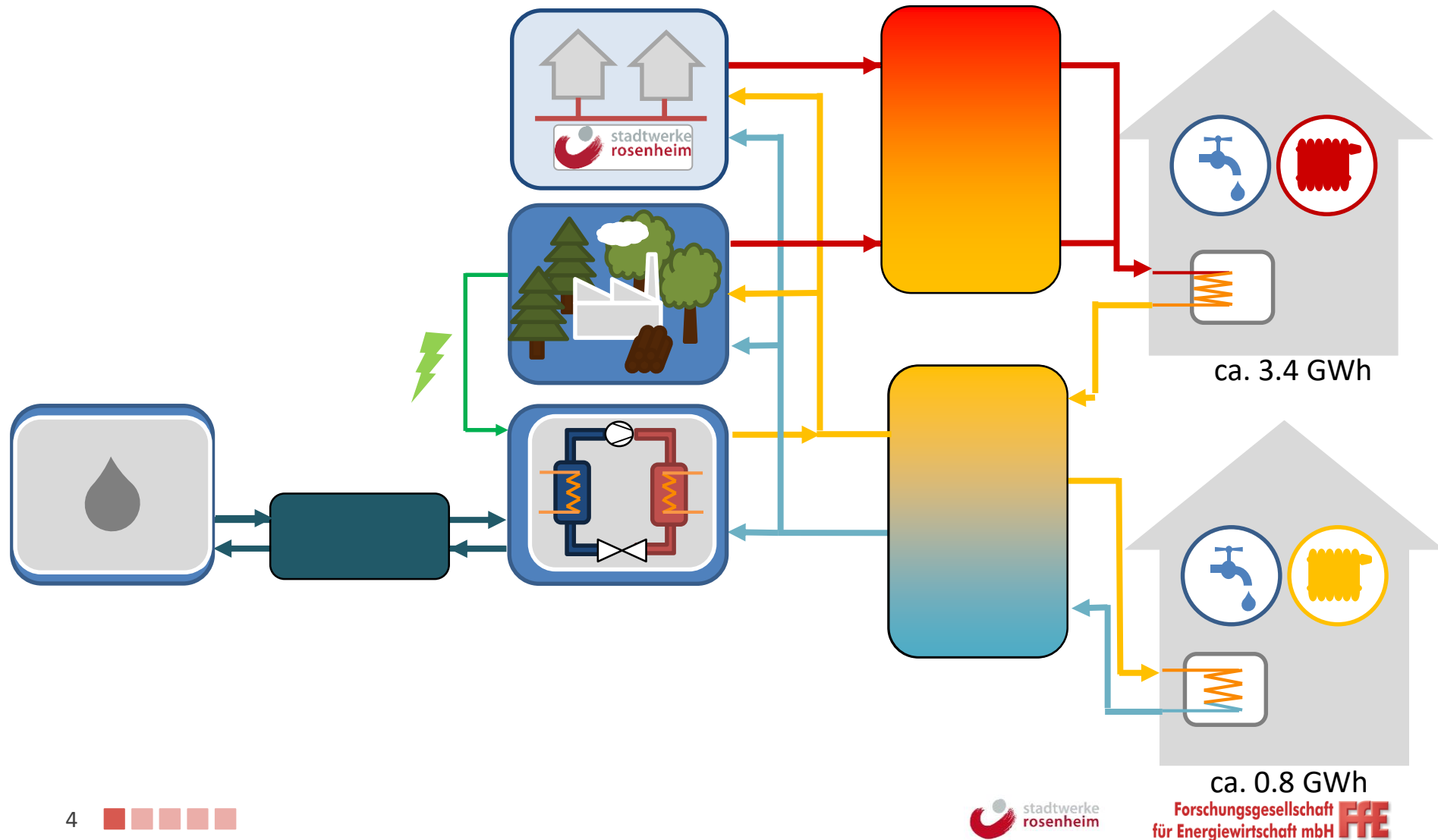


Interconnection of renewable heat sources by temperature level

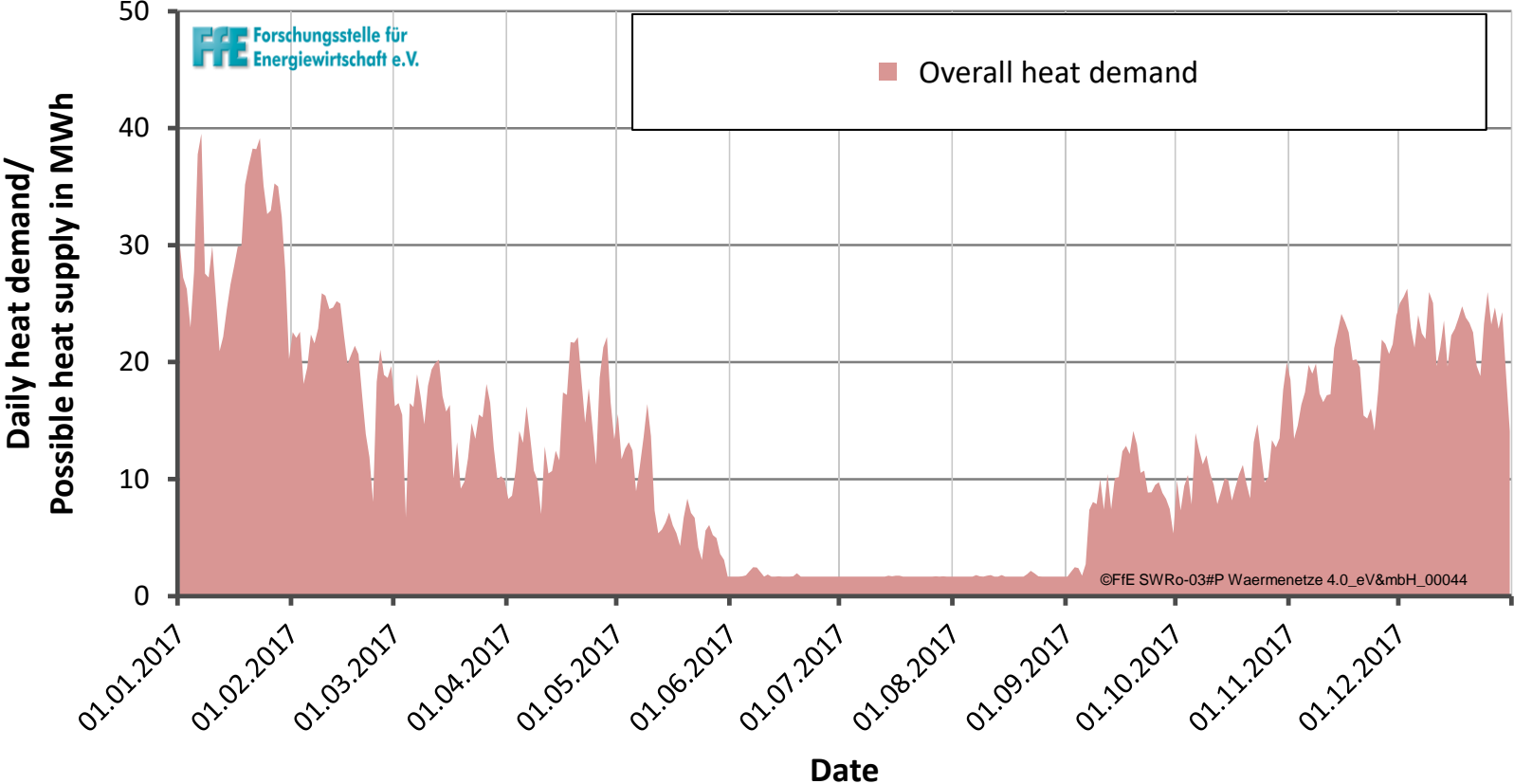
Interconnection of different heat sources in series as an essential characteristic of the Heat-Dispatch-Centre



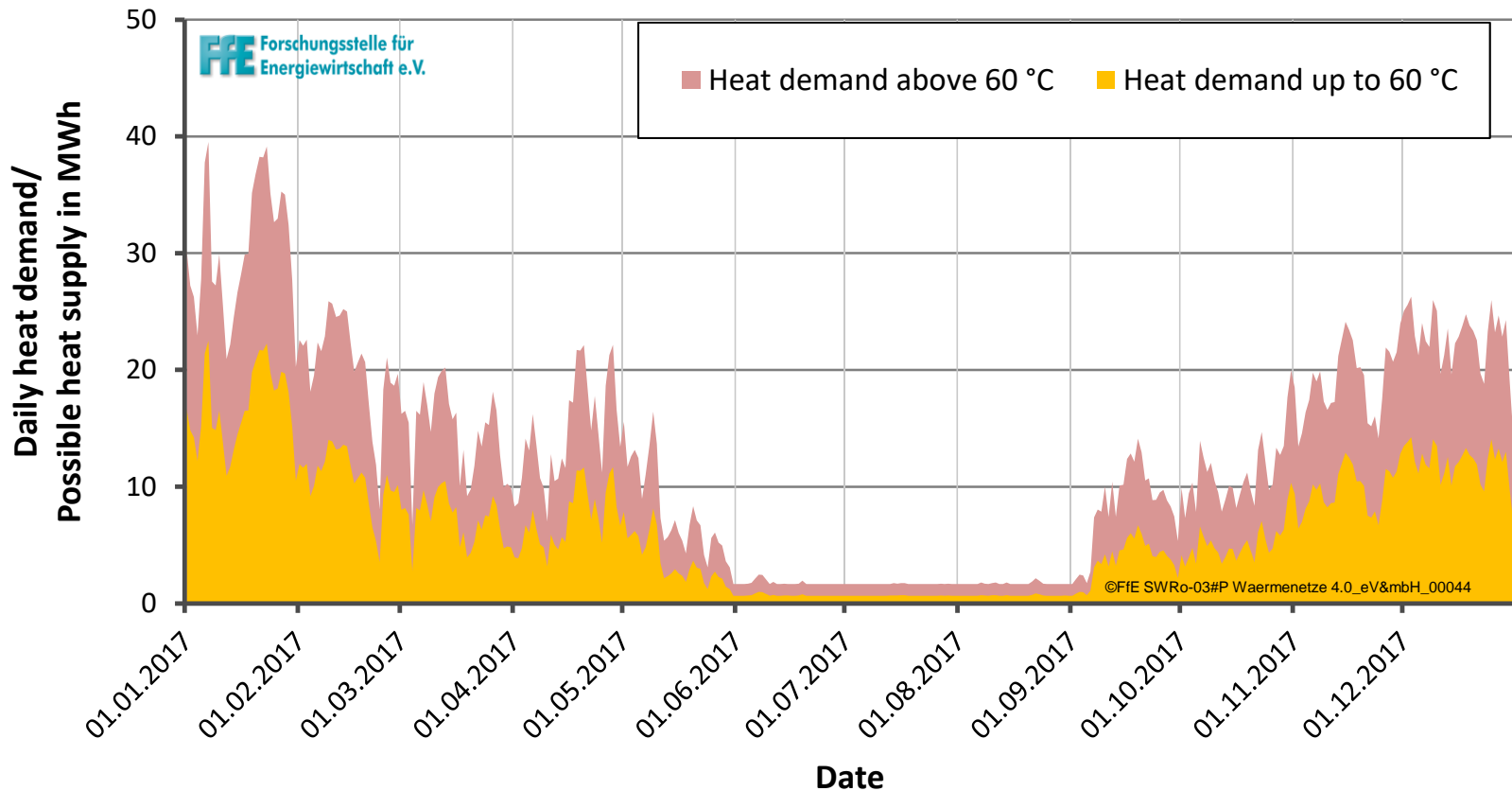
Case Study for the Heat-Dispatch-Centre including available heat sources in the investigated area



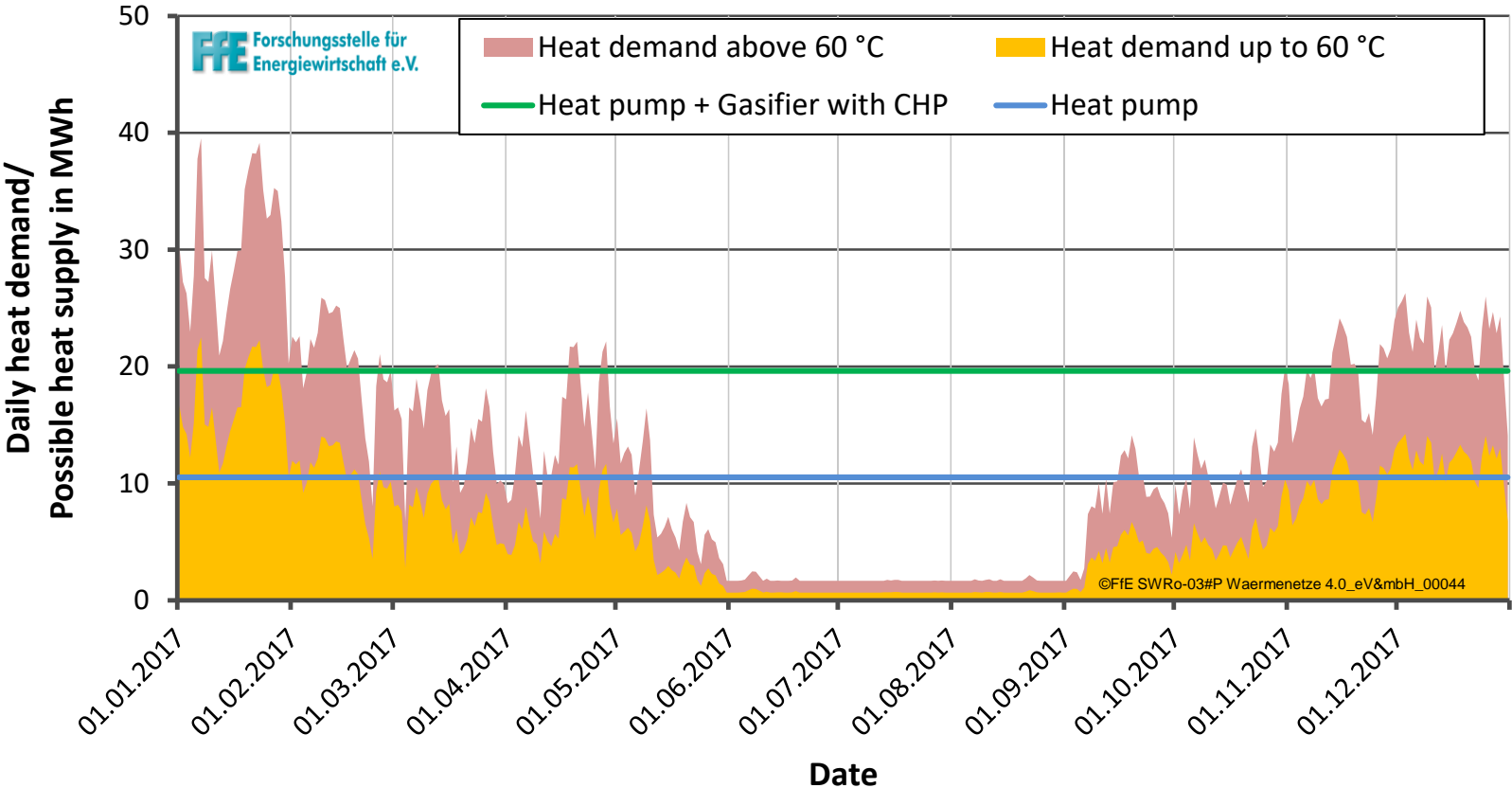
Analysis of heat load profile – Heat demand



Analysis of heat load profile – Heat demand by temperature level



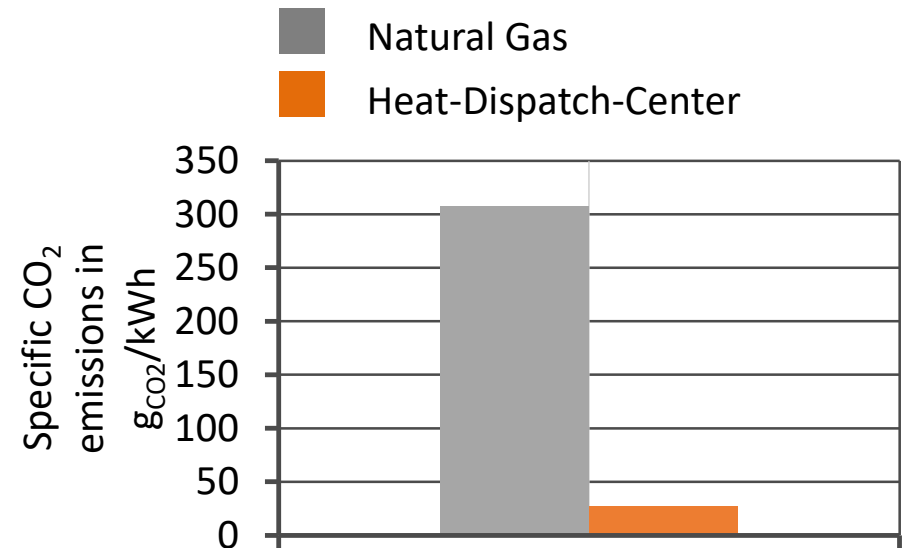
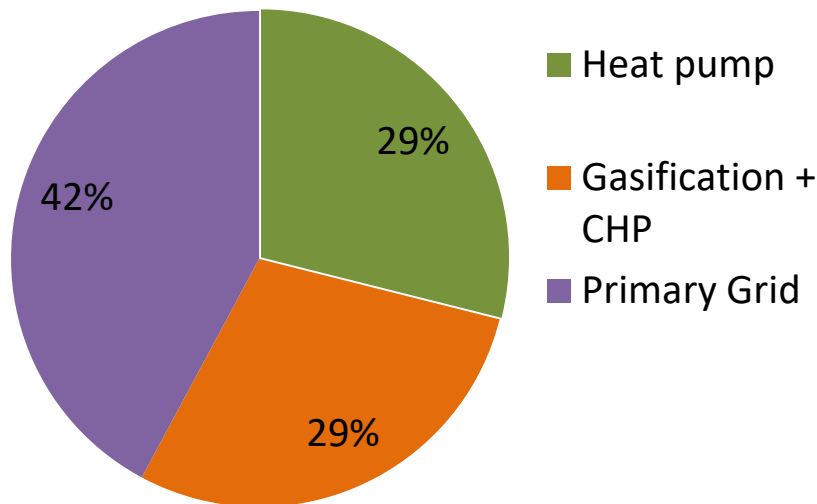
Analysis of heat load profile and supply – Heat demand by temperature level and possible heat generation units



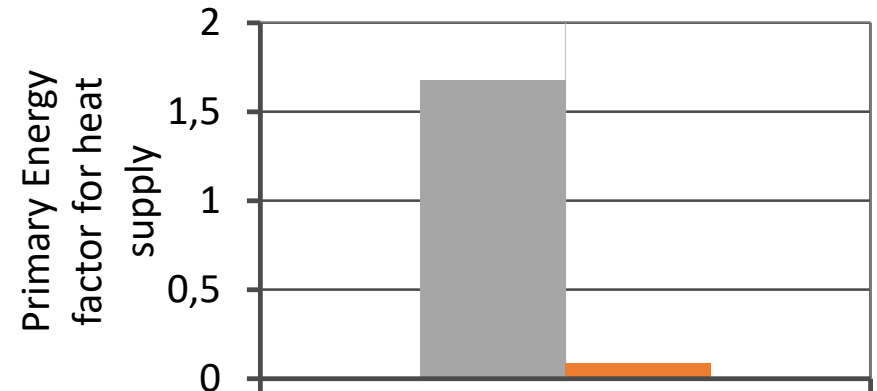
Techno-ecological boundary conditions and results for heat supply of the investigated area

- Requirements for heat supply:
50 % of generation has to come from renewables, max. 50 % of this from biomass

Achieved heat supply composition with Heat-Dispatch-Centre



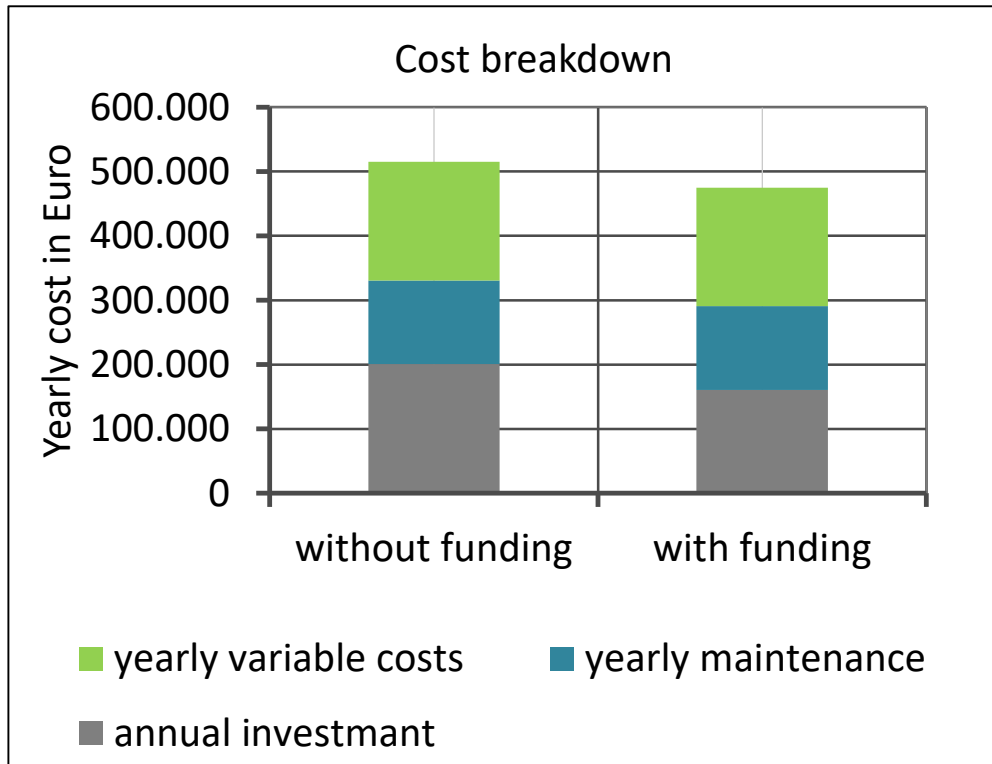
Specific CO₂-Emissions



Primary Energy Factor

Economic boundary conditions and results

- Electricity overproduction from CHP is sold as green electricity at 5 €/kWh_{el}
- Funding according to BAFA fund „District heating 4.0“ is 20 % on all investments

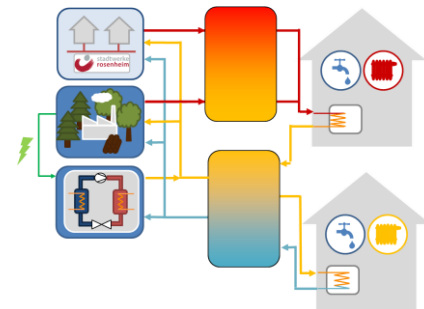
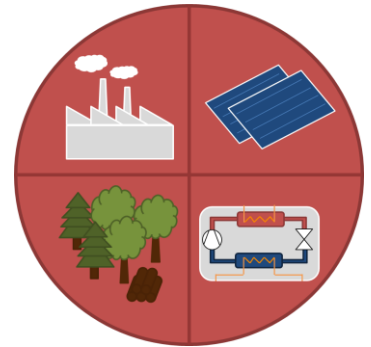


- Specific heat generation cost excluding uncertainty margin
 - 11,0 €/kWh_{therm} including fixed income
 - 12,0 €/kWh_{therm} excluding fixed income
- Cost Benchmark:
 - „District heating 4.0“ is 12 €/kWh
 - District heating in Rosenheim is about 7 €/kWh

Conclusion and Outlook

1. Future heat supply will rely on a **composition of different heat sources**
2. Heat generation units should be **combined** in temperature cascades
3. **Unit control is key** as frequent adaptations are required
4. **Higher costs for invest, maintenance and operating material** render system uneconomical, further **income** e.g. from electricity trading/load reserve required

To increase flexibility of Heat-Dispatch-Centre further investigation of the hydraulic connection, load control and storage limitations are needed





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Project information: www.ffegmbh.de/waermenetze

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