

RUHR-UNIVERSITÄT BOCHUM

Selecting the right heat source in an ultra-low temperature heating network



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Agenda

- Ultra-low temperature district heating
- Possible heat sources
- Selected heat source systems
- Model residential area
- Comparison of heat source systems
- Conclusion

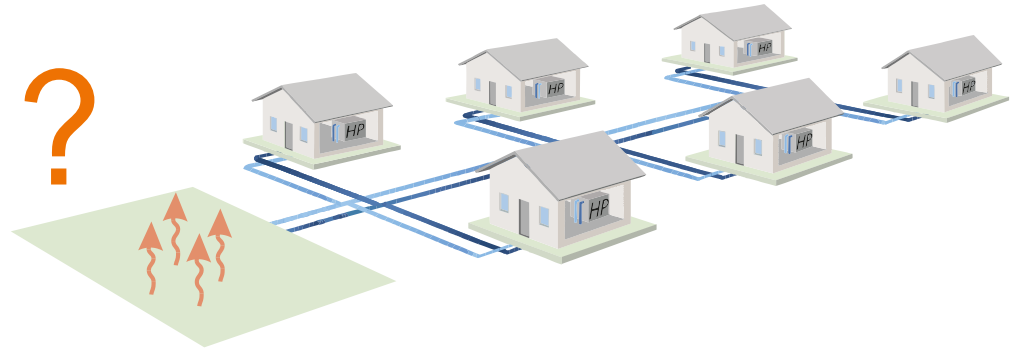
Ultra-low temperature district heating

Concept: to make one source available for several consumers in a network

Network temperatures $< 20\text{ }^{\circ}\text{C}$

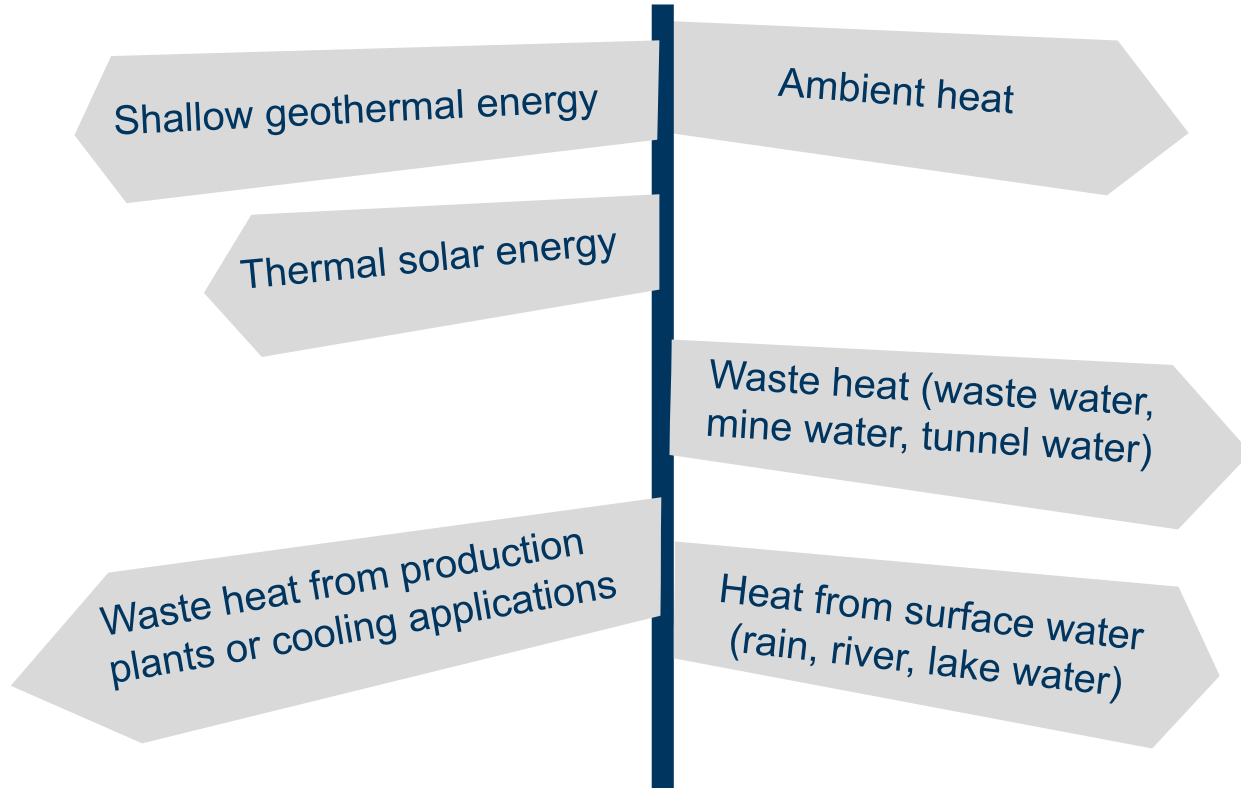
Decentral heat pumps

Low temperatures enable the integration of renewable energies

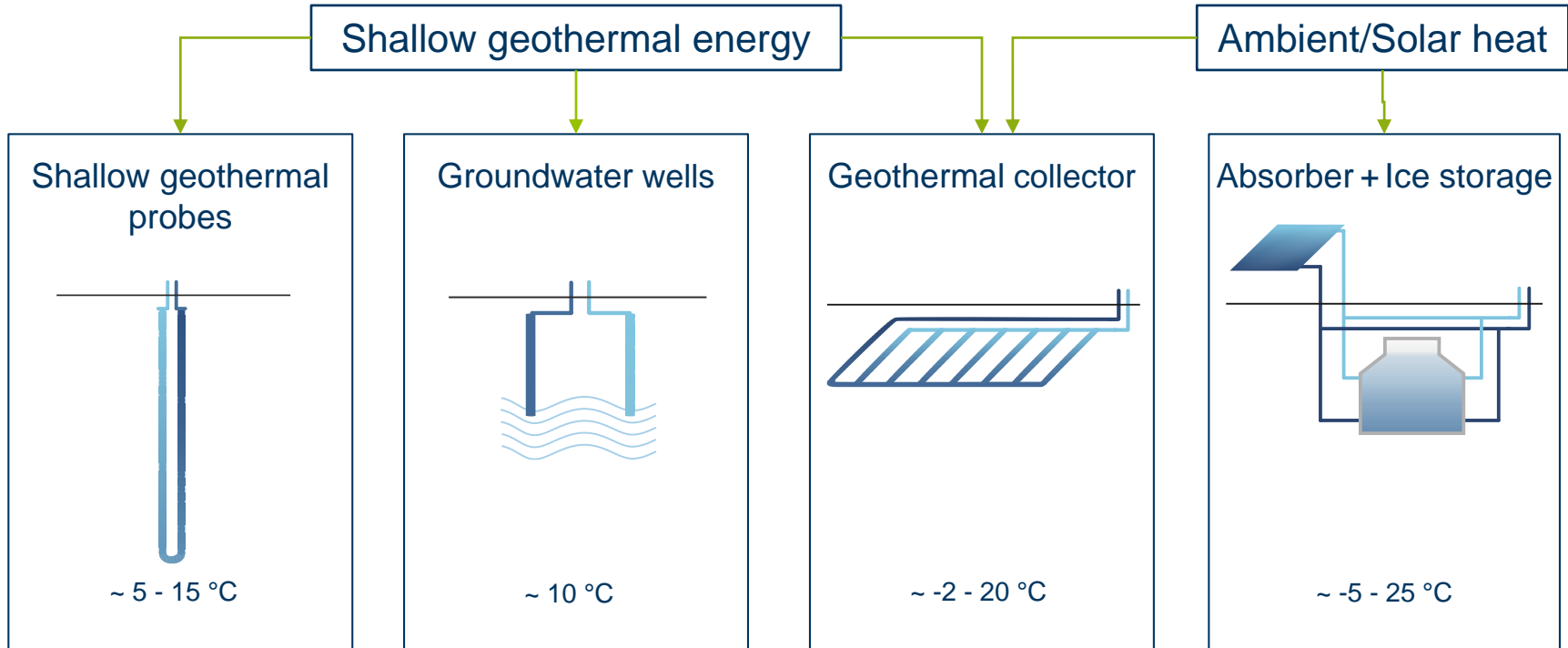


Question: Which heat sources should be used?

Possible Heat Sources



Selected heat source systems



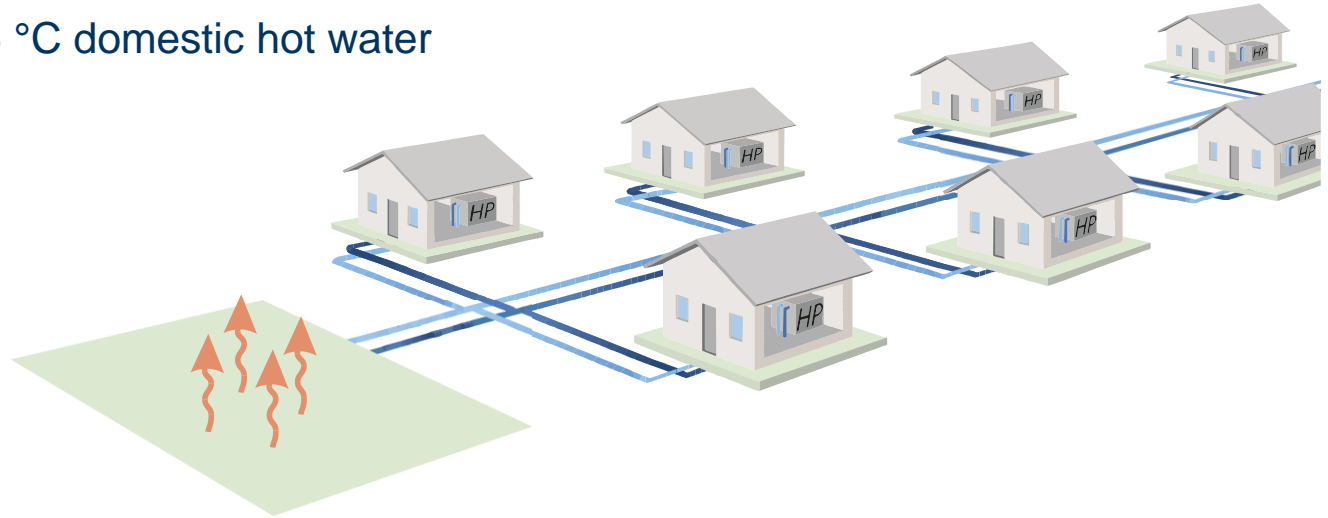
Model residential area

Consumers: 50 x single houses (200 m²) in a row

Heat line density ~ 740 kWh/(m*a)

Cooling demand < 300 h/a

35 °C space heating, 55 °C domestic hot water



Comparison of heat source systems

	Shallow geothermal probes	Groundwater wells	Geothermal collector	Absorber + Ice Storage
Space requirement	~ 11.000 m ²	~ 200 m	~ 8.200 m ²	~ 1.000 m ²
Impact on primary energy	PEF ~ 0,35	PEF ~ 0,37	PEF ~ 0,38	PEF ~ 0,39
Invest costs €/consumer	“reference”	savings ~ 8.000	savings ~ 4.000	Savings ~ 3.000

Conclusion

All heat source systems are technical feasible

For the model area we would select heat from groundwater wells

There is not the “one” right heat source

Ultra-low temperature networks can be useful, but each case must be examined individually

Thank you for your attention !