



RUB

RUHR-UNIVERSITÄT BOCHUM

WASTE HEAT FROM MINE WATER IN AN ULTRA LOW
TEMPERATURE DISTRICT HEATING NETWORK

6th International Conference on Smart Energy Systems
Tobias Reiners | Ruhr-University Bochum



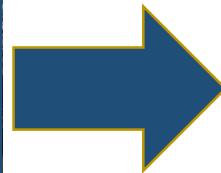
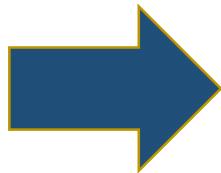
Chair of
Energy Systems &
Energy Economics

Agenda

- Motivation and Research Question
- Case Study and Energy System
- Economical and Ecological Aspects
- Summary

Motivation and Research Question

- Can ultra low temperature district heating (ULTDH) networks use renewable heat from minewater to supply residential quarters?



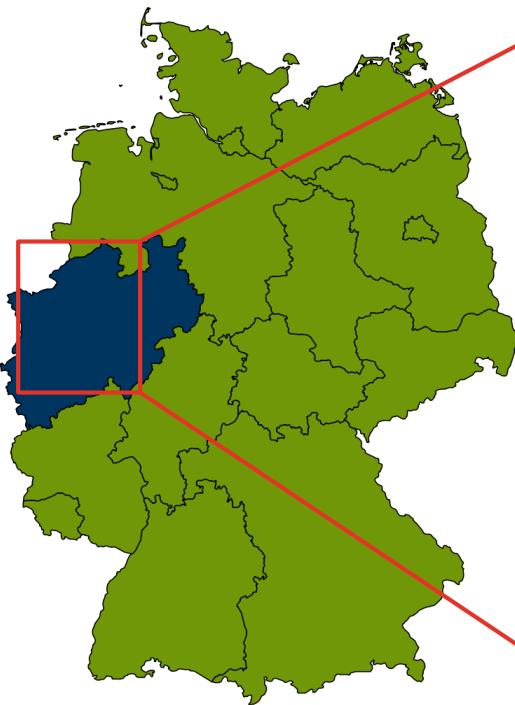
- minewater pumping for drinking water protection in post mining areas
- Renewable energy for 150.000 Households*
- Increased efficiency of heatpumps with 20°C source temperature

*LANUV Potenzialstudie Warmes Grubenwasser 2018

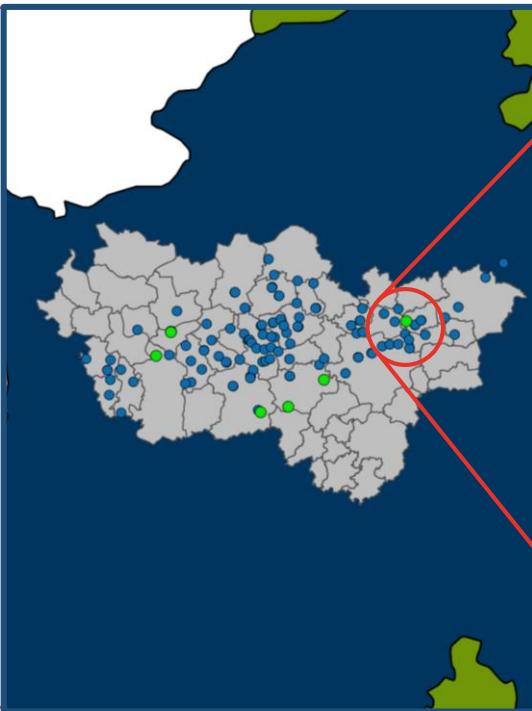
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Germany



Ruhr Area



Water City Aden



Water City Aden

131x
single family house

8x
duplex house

7x multiple family dwelling

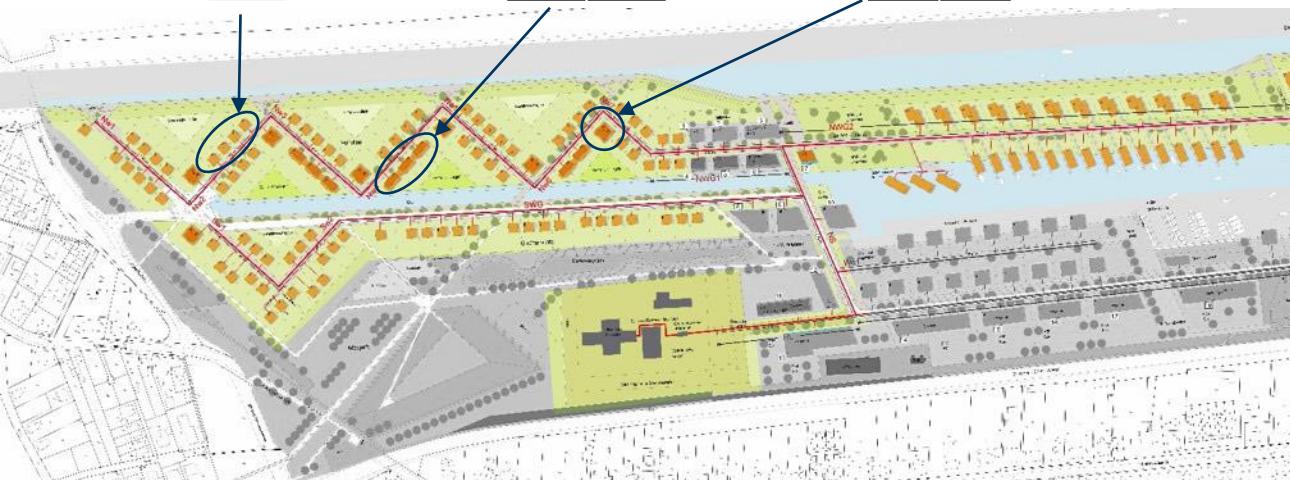


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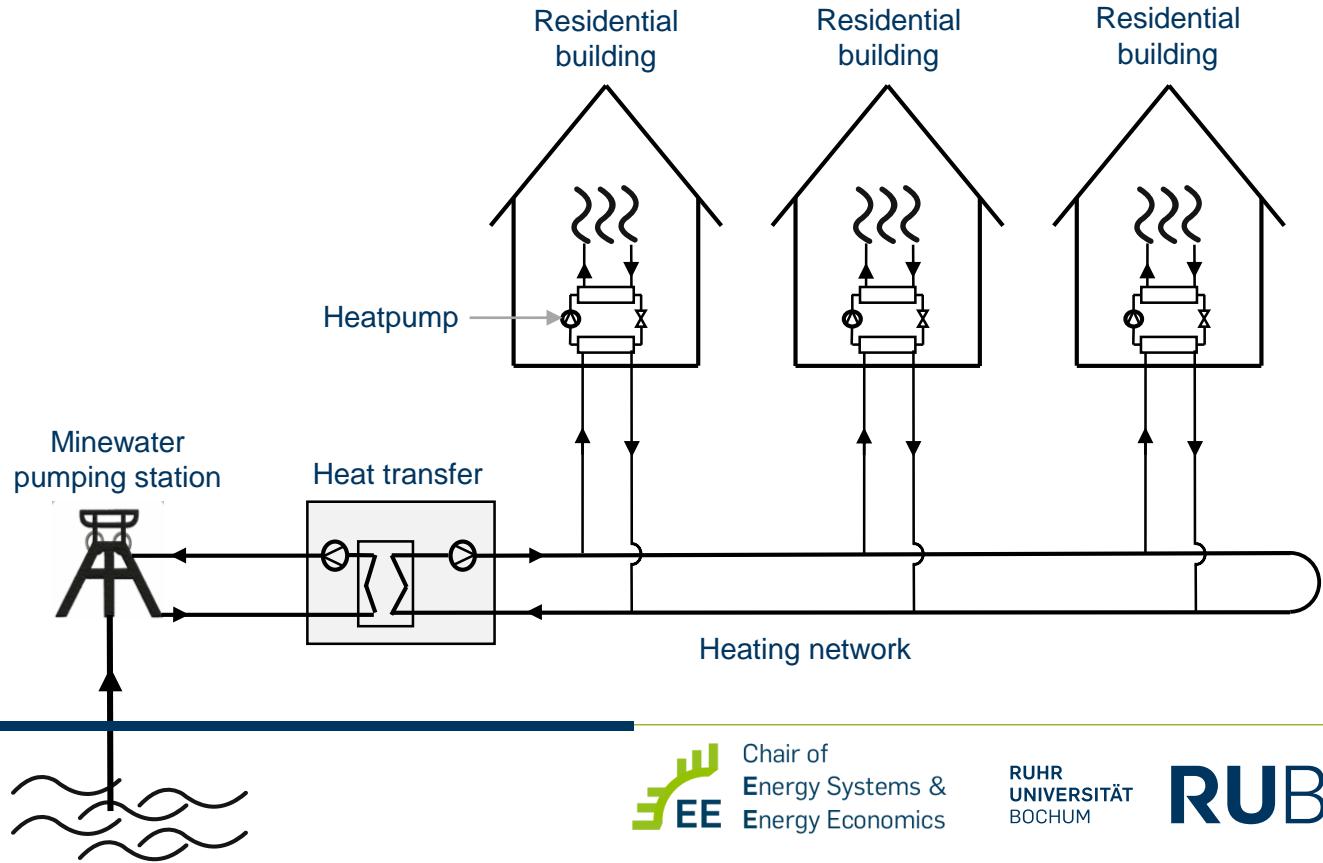
Fact sheet minewater

- Temperature: $28 \pm 2^\circ\text{C}$
- Pumping volume:
ca. $21 \text{ m}^3/\text{min}$
- Renewable heat 16 MW
- Depth -600 mNN

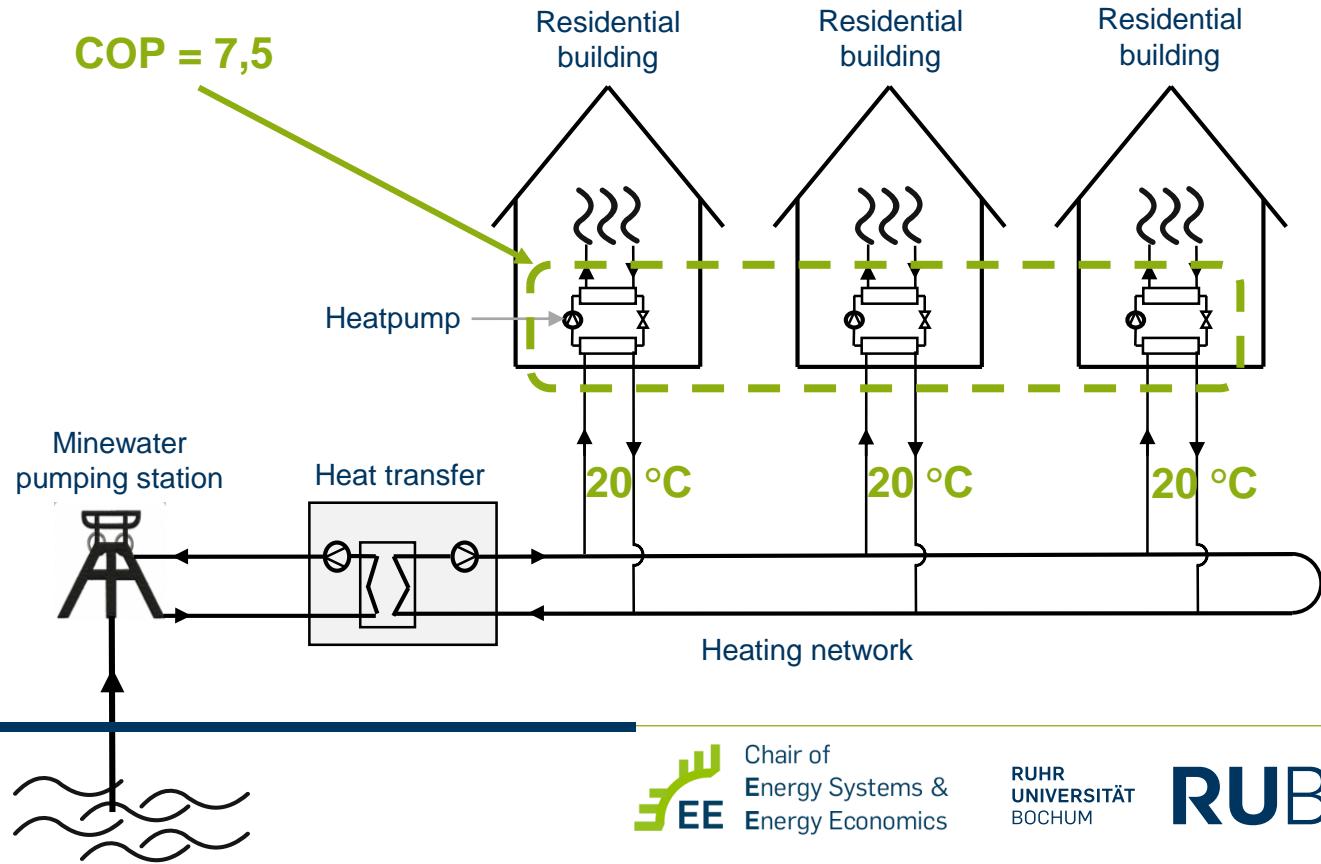


One of six central pumping
stations in the Ruhr Area

Ultra low Temperature District Heating Network



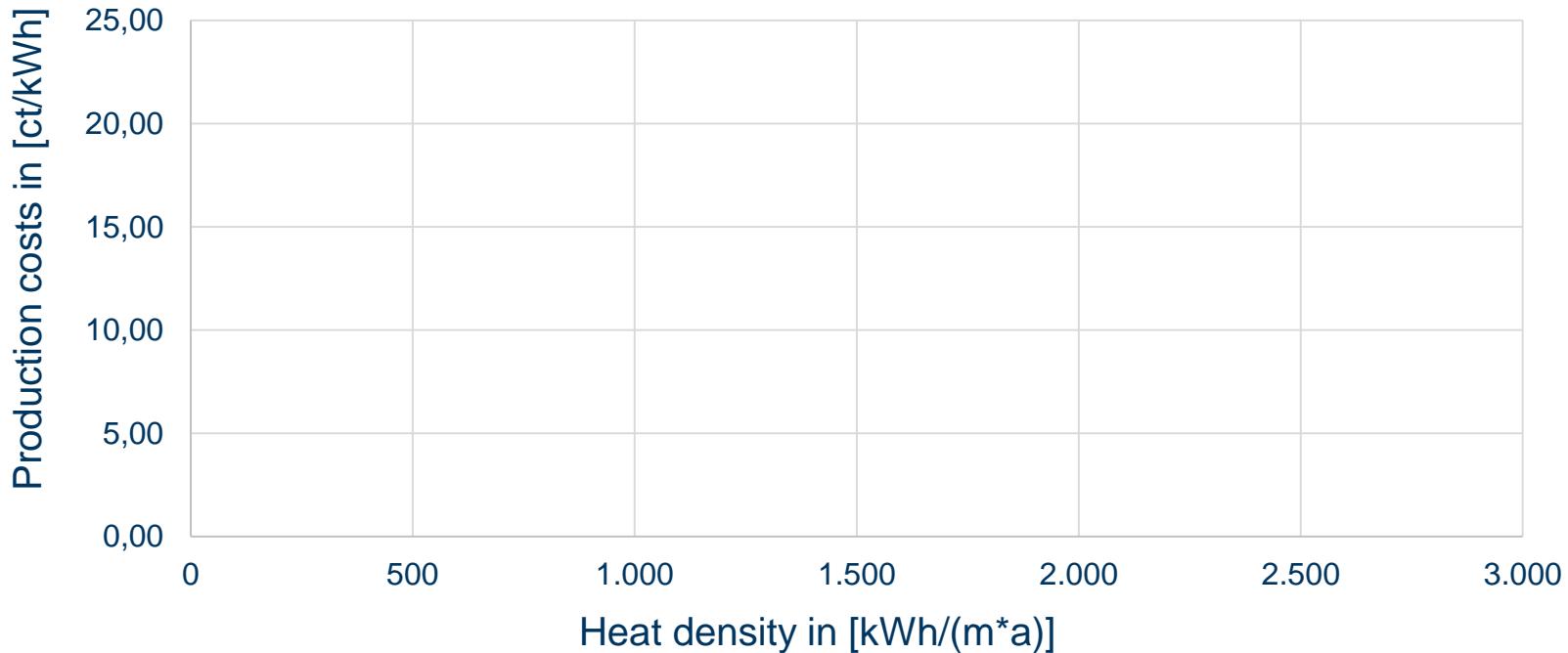
Ultra low Temperature District Heating Network



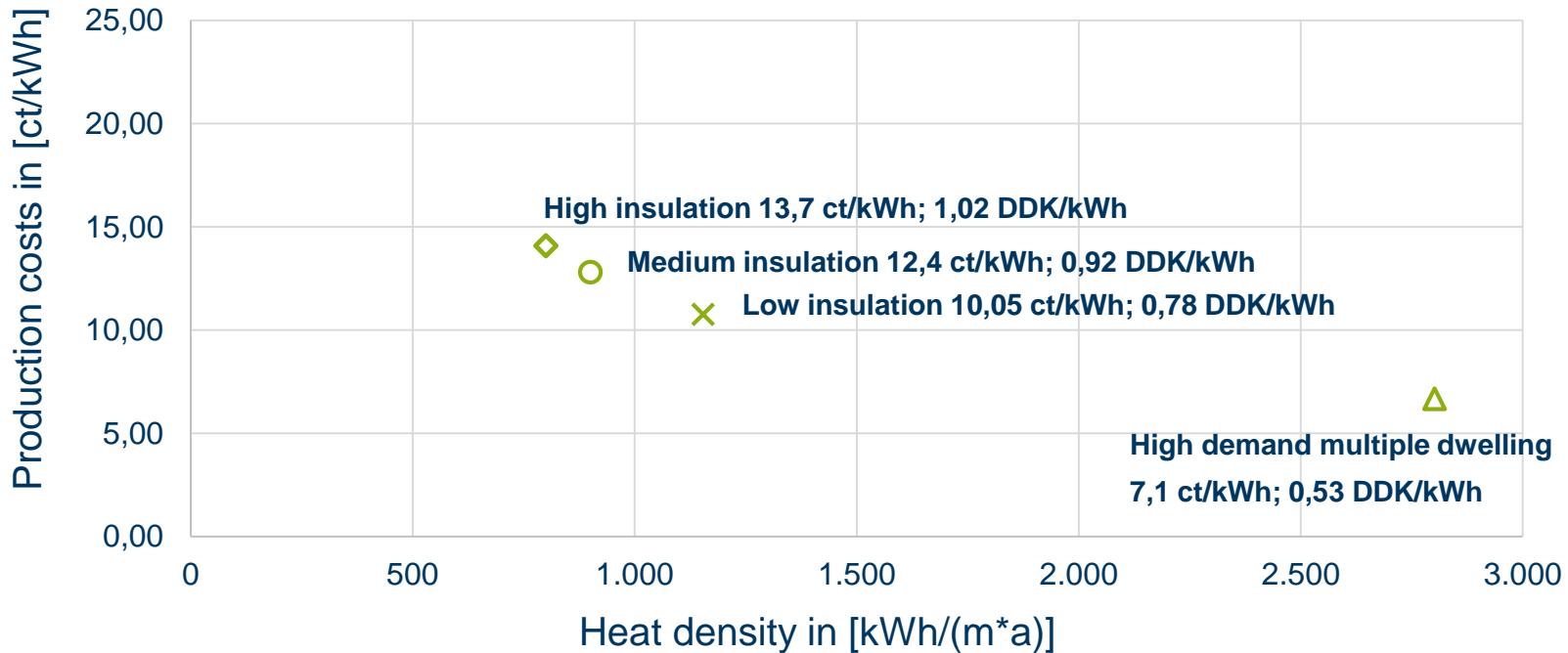
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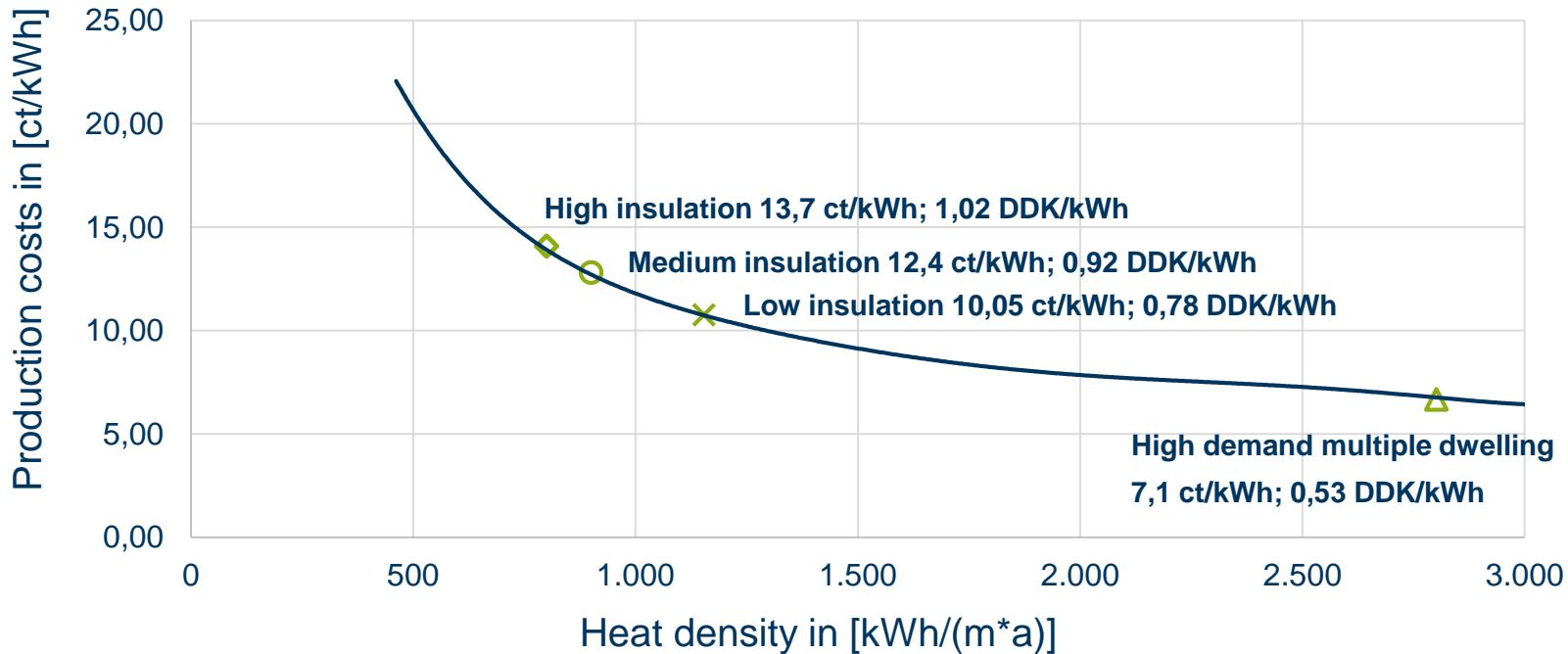
Water City Aden



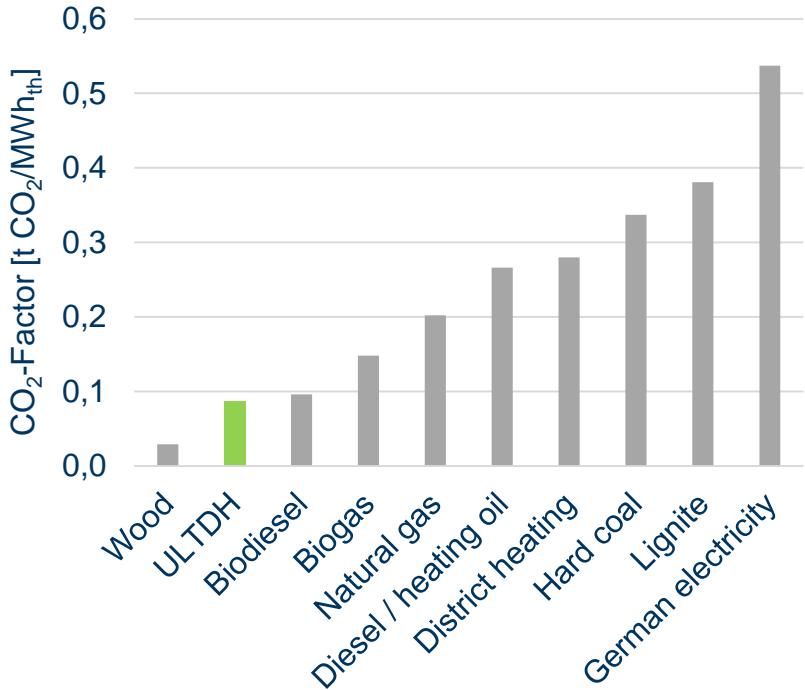
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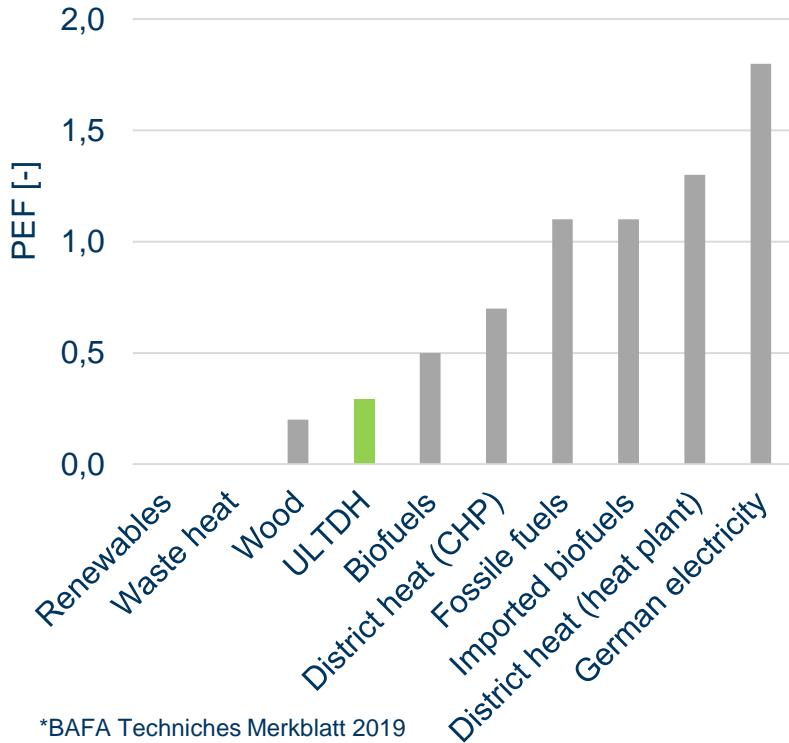
Water City Aden



CO₂ and Primary Energy



*BAFA Merkblatt CO₂-Faktoren 2019



*BAFA Techniches Merkblatt 2019

SUMMARY

Can ultra low district heating networks use renewable heat from minewater to supply residential quarters?

- Minewater can be used as a heat source
- Heat pumps work with high coefficient of performance
- Low CO₂ emission and low primary energy factor
- Cost depending on heat demand
- Economically competitive



➤ **Mine water utilization offers an economic and sustainable supply**



THANK YOU FOR LISTENING

