

FEV Signature Solutions

District Heating Network Design

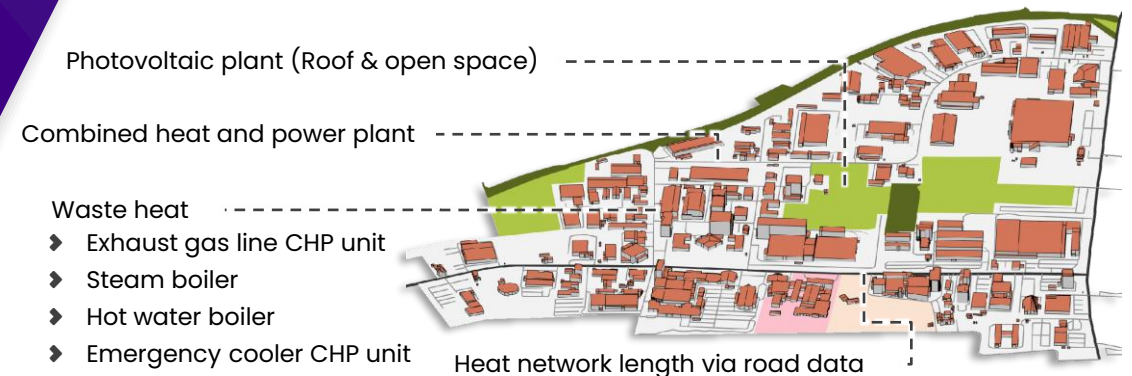
Shape a climate-neutral heat supply for your municipality while minimizing costs

FEV offers

- ▶ Comprehensive district heating network design based on our municipal heat planning and technology-neutral design approach tailored to local conditions
- ▶ Advanced thermal-hydraulic network modeling with high-fidelity simulation models validated in real-world projects and optimized CAPEX and OPEX through integrated system modeling
- ▶ Demand-driven network dimensioning
 - Load profiles based on building-level heat demand
 - Consideration of simultaneity and future demand development
- ▶ Integration of diverse heat sources
 - Renewable heat, waste heat, heat pumps, CHP, and thermal storage
 - Optimal source dispatch and network operation strategies
- ▶ Optimization of investment and operating costs
 - Pipe sizing and routing optimization
 - Reduction of heat losses and pumping energy

Why FEV

- ▶ 45+ years of engineering excellence, trusted by its customers to deliver innovative, production-ready solutions with deep domain expertise
- ▶ Proven experience in municipal heat planning, district heating & energy system engineering
- ▶ Customer-centric solutions: Transparent processes and scalable designs aligned with long-term decarbonization pathways
- ▶ End-to-end engineering support from feasibility to implementation



Reference project FEV energy + resources

PARTNER: MUNICIPALITY OF SCHERMBECK

FEV energy + resources

Municipal Heat Planning in Schermbeck

FEV supports the municipality of Schermbeck in drawing up a municipal heating plan in accordance with the Heating Planning Act and the NRW Heating Planning Act.

The goal is to achieve a climate-neutral and socially acceptable heat supply by 2045 based on an analysis of heat demand and local potential, followed by an action plan.

The basis for this is digital modelling of the municipality, which is used to develop scenarios for future heat supply and make them assessable.

> 13.000

Residents

8

Districts with different settlement structures

> 83 %

Fossil fuel heating systems

Reference project FEV energy + resources

PARTNER: CITY OF WITTENBURG

FEV energy + resources

Municipal Heat Planning in Wittenburg

FEV supports the Wittenburg municipal authority in drawing up a municipal heating plan in accordance with the Heating Planning Act and state-specific requirements.

The aim is to achieve a climate-neutral and socially acceptable heat supply by 2045 based on an analysis of heat demand and local potential, followed by an action plan.

The basis for this is digital modelling of the municipality, which is used to develop scenarios for future heat supply and make them assessable.

> 9.150

Residents

14

Districts with different settlement structures

> 79 %

Fossil fuel heating systems

Reference project FEV energy + resources

PARTNER: CITY OF AACHEN

FEV energy + resources

Industrial Park Transformation in Aachen

FEV is conducting a research project to support the energy transformation of 100+ industrial parks (Aachen region) with the goal of achieving climate neutrality by 2035.

The aim is to analyse the future transformation paths of local companies and to derive the energy requirements of industrial parks in the region.

The basis for this is the digital modelling of sector groups in order to analyse their individual transformation paths before they are combined into synergistic clusters.

>200

Industrial parks in the research area

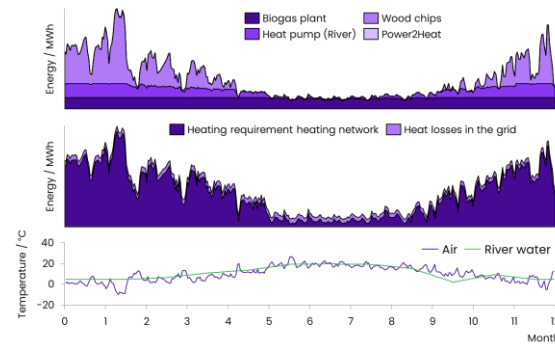
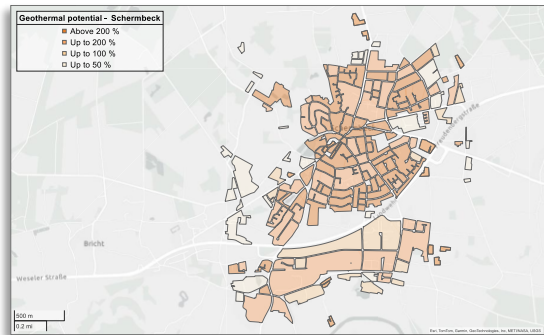
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Utilities and network operators as stakeholders

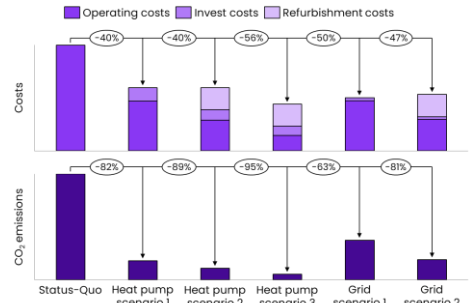
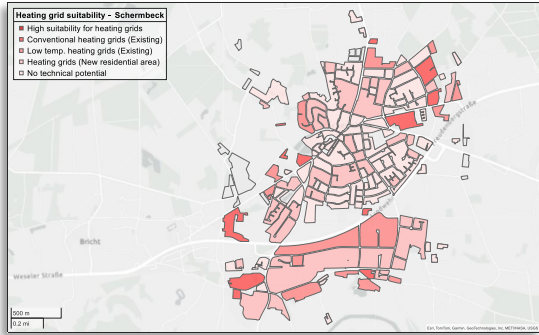
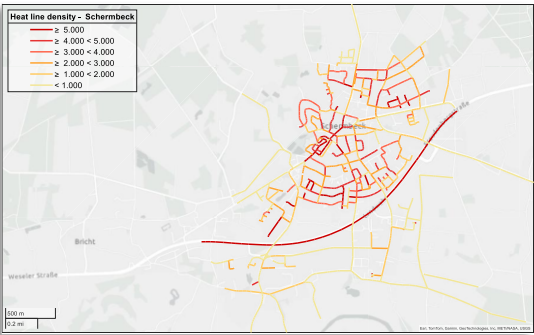
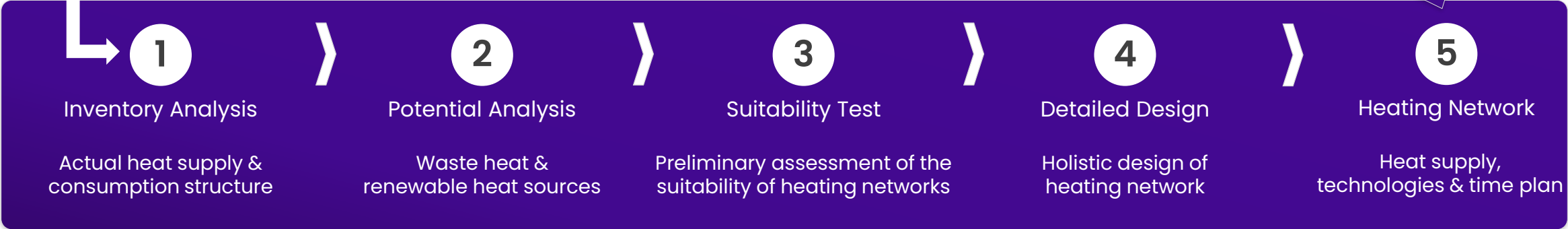
20%

Symbiotic efficiency improvement as a goal

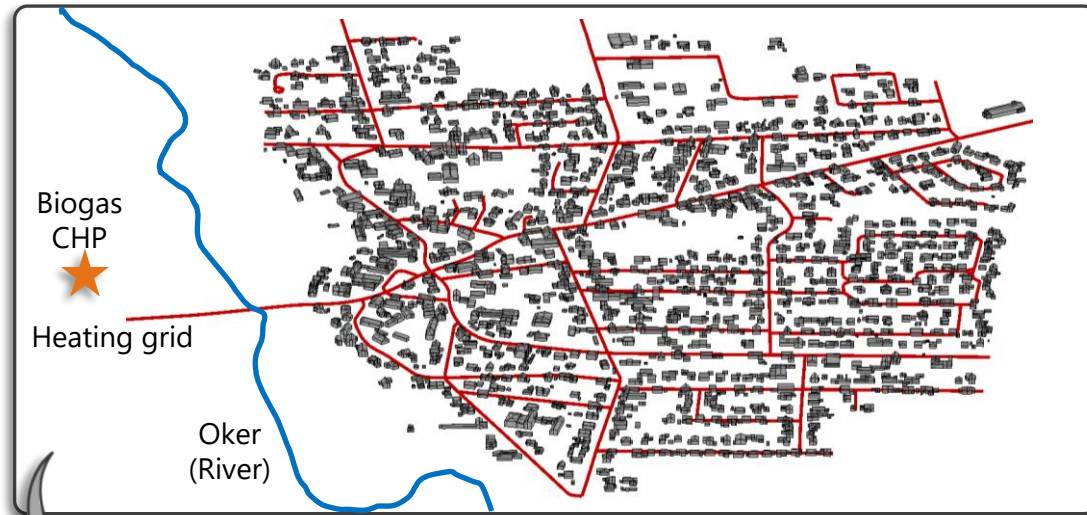
FEV shortens District Heating Network Design with innovative methodology through the application of an automated digital twin



Continuous involvement of stakeholders



Technical framework conditions and cost distribution in heating network operation – Up to 40 % funding of investment costs possible for green networks



- Double length for feed and return
- Biogas CHP
- Large heat pump (River water)
- Wood chip heating
- Power-to-heat plant



➤ Financing

Cost calculation for heating grid

Fixed costs (Operator) per year	unrenovated renovated
➤ Capital service ¹	829.571 € 747.717 €
➤ Maintenance & servicing	256.375 €
➤ Administration & provisions	180.000 €
Total	1.265.946 € 1.184.092 €

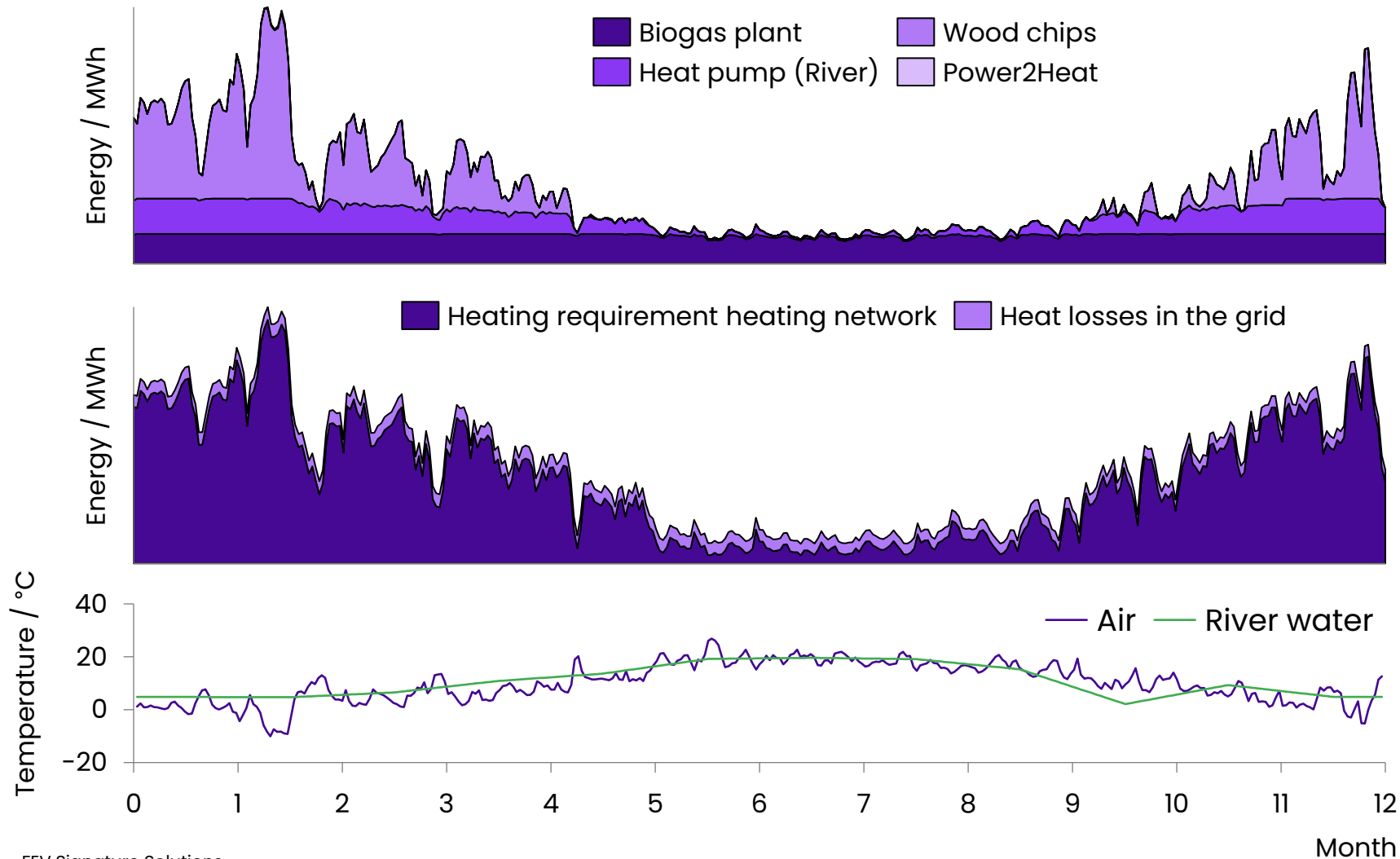
Costs (Household)

➤ Fixed costs via basic fee	379.784 € 355.228 €
➤ Fixed costs via operating price	950.813 € 828.865 €
➤ Generation costs ¹	1.974.000 € 980.312 €
Operating price (Household)	6.9 Ct/kWh 9.7 Ct/kWh
Annual basic fee (Household)	24€/kW a 37€/kW a

¹Includes 40 % subsidy for the heating network and systems according to BEW, industrial electricity price for large heat pump and electricity price subsidies for P2H
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Sector coupling in the heating network: Utilisation of biogas, wood chips, river heat and Power2Heat for green heat supply

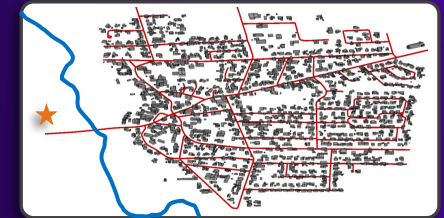
THERMAL ENERGY FLOWS



Case example

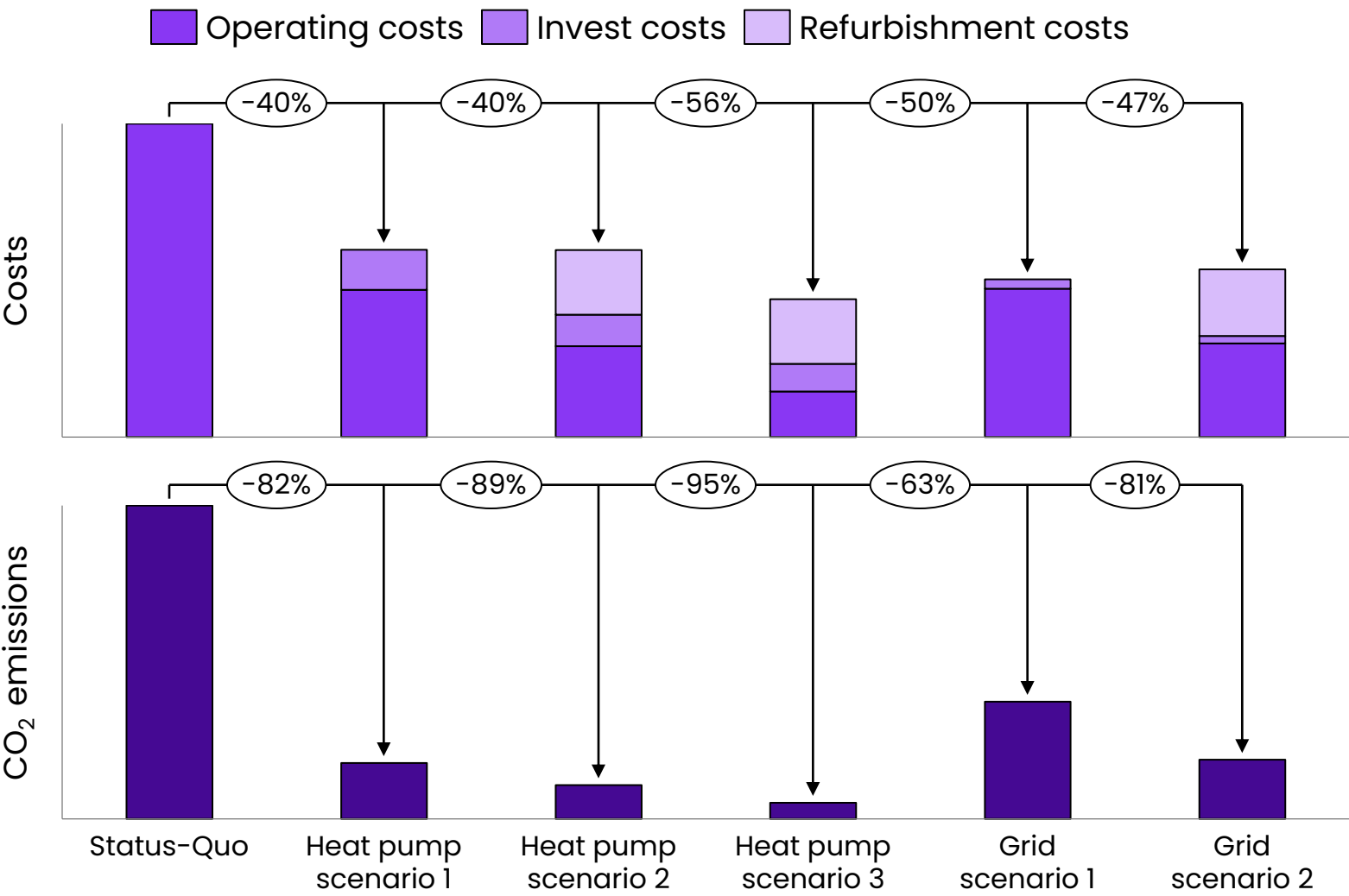


Heat grid



- ▶ Biogas CHP already exists
- ▶ Heat for large heat pump is extracted from the river
- ▶ Power-to-heat plant is only used at very low temperatures
- ▶ Weather data year 2021

Transformation analysis: Pathways to climate-friendly heat supply - projection from 2025 to 2045



► Projection from 2025 to 2045

Sustainable heat supply

- 731 residential buildings, 2200 inhabitants
- Biogas CHP already exists
- Air-water CHP well suited to the climatic conditions
- Consideration of different refurbishment scenarios
- Weather data 2021 (warming assumed for projection)

Get in touch with us for further information



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signature-solutions](http://www.fev.com/en/signature-solutions)