

Combine district heating and wastewater treatment plants



Source: Robert Davidson. All rights reserved



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Expert Workshop on Design and Operation of Digitalized Sector-Coupled Energy Systems, 20th to 21st April 2023, Vienna, Austria



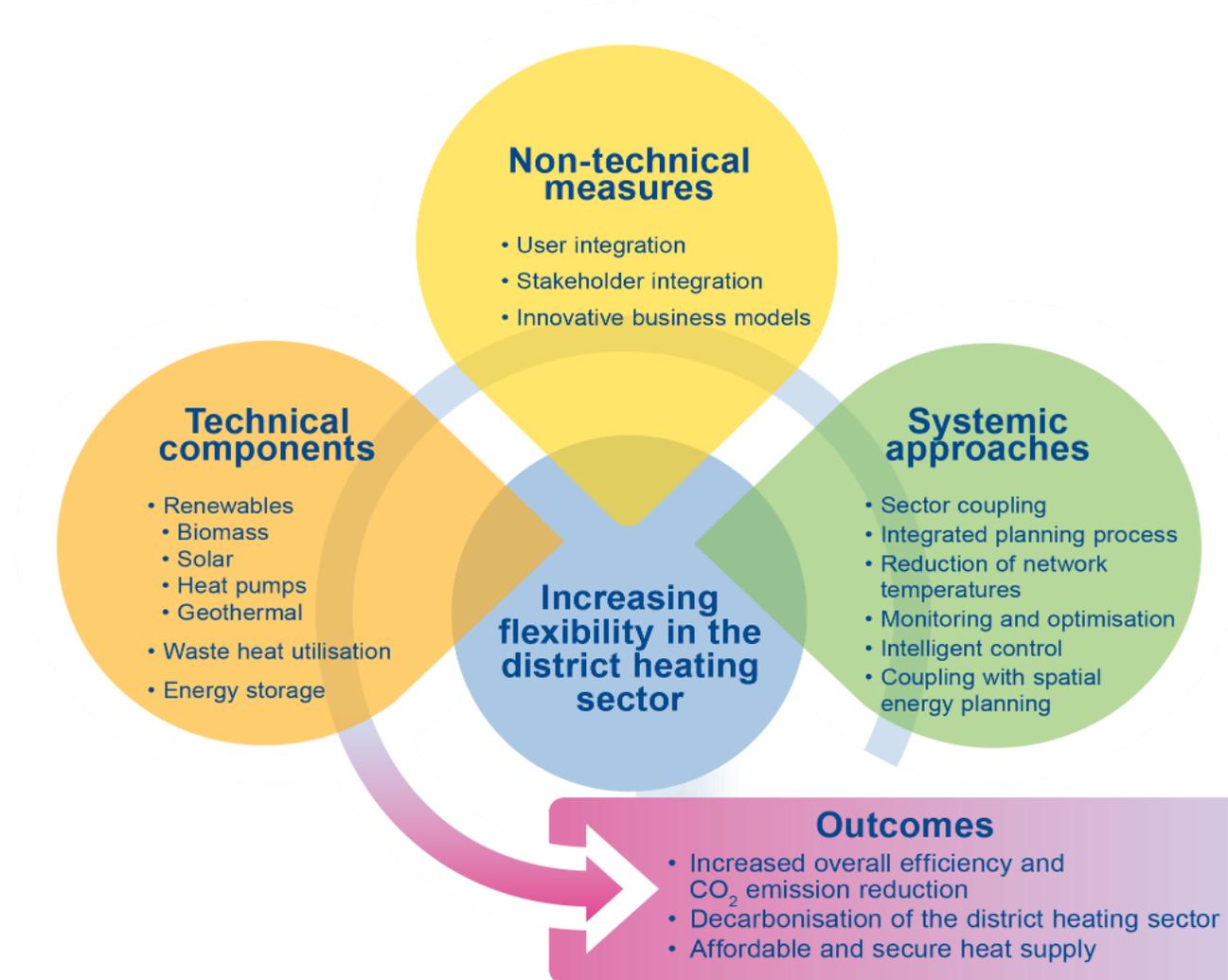
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Flagship project ThermaFLEX

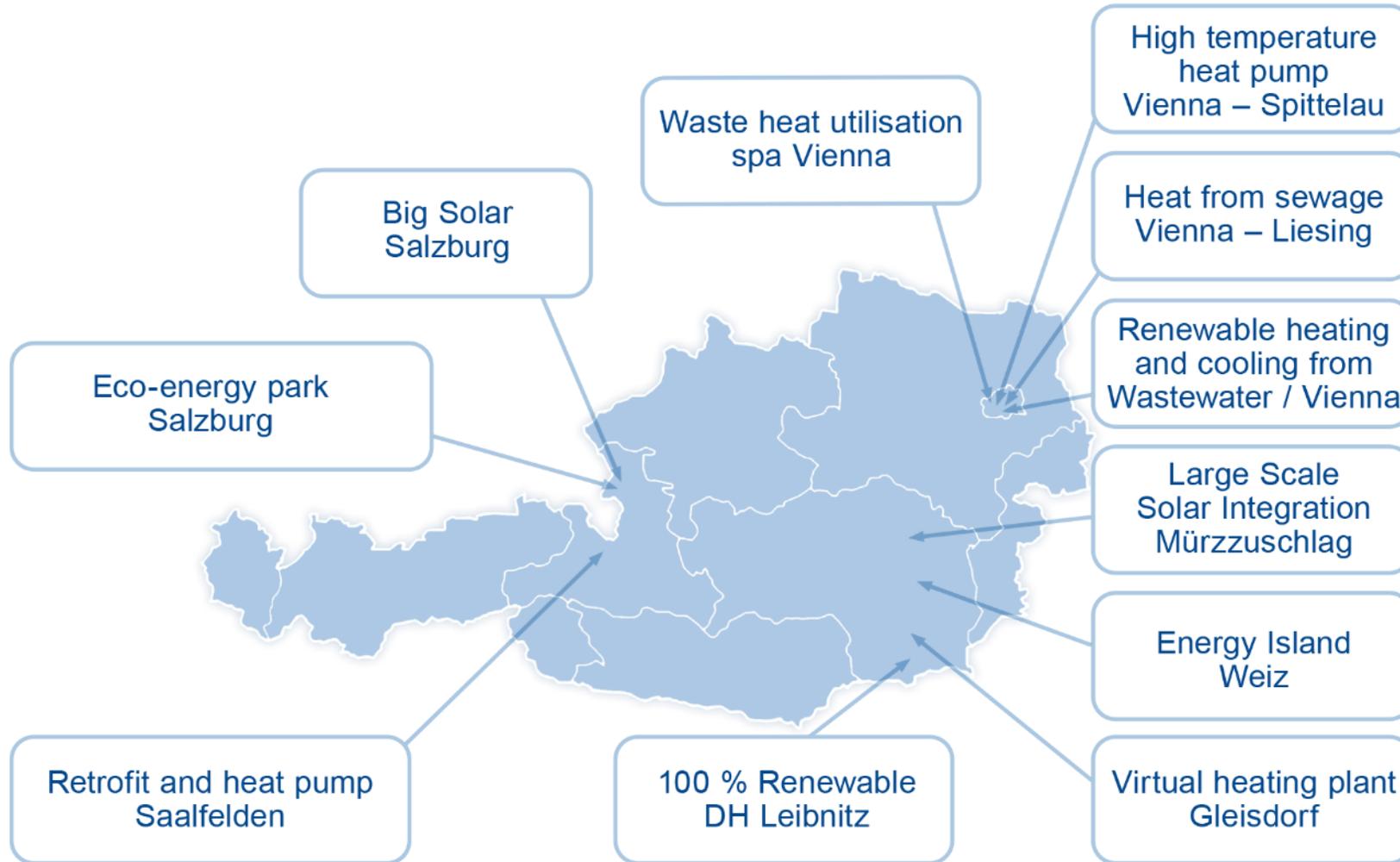


Increasing flexibility is more than just one thing



Source: AEE INTEC

Demonstration in Austrian DH networks



Source: AEE INTEC

Integration of WWTPs: Potential & Opportunities



Energy in

COD



Temperature influent
10 – 25 °C



Energy out

Biogas (combustion, CHP)



Temperature effluent
10 – 25 °C
e.g. via heat pump

Resource cycles

- Nutrient recovery (N,P,K)
- High value products (lipids, proteins,...)

Internal processes

- Optimization e.g. AD
- Aeration & pumping
- Buildings

Opportunities

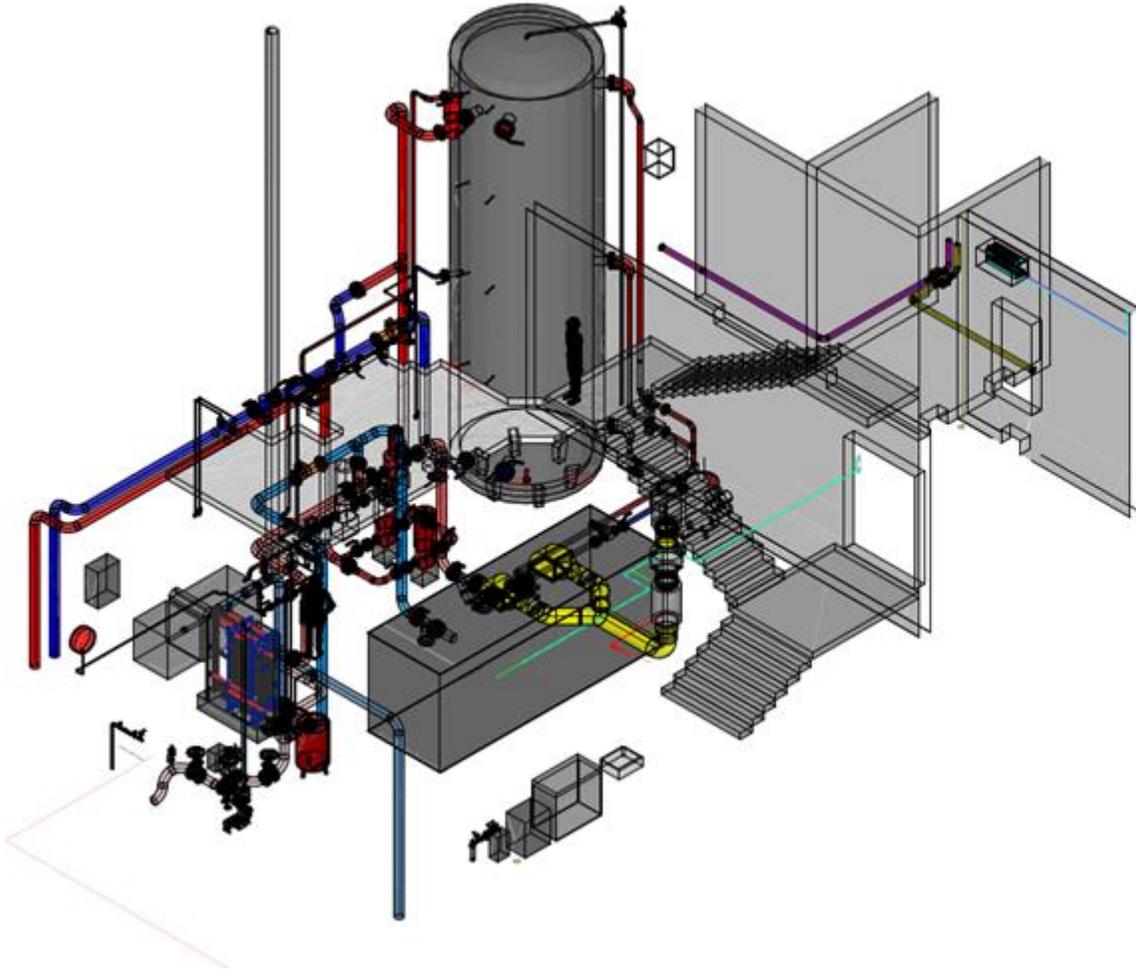
- Resource, bioeconomy and energy hub
- Surface area in surrounding

Sector coupling with wastewater treatment plant

Source: Stadtwerke Gleisdorf



Sector coupling with wastewater treatment plant



Roll-out potential

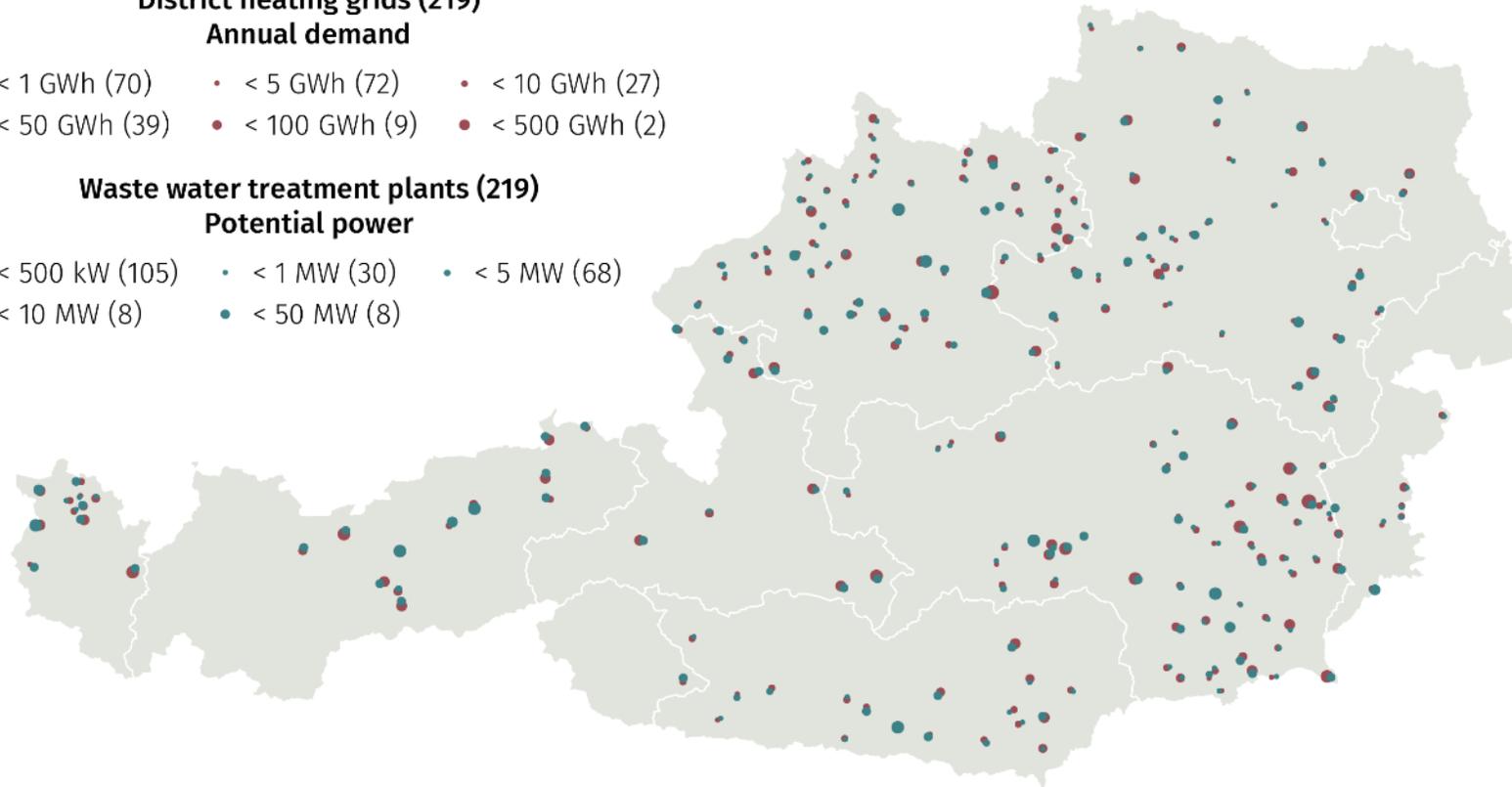
District heating grids and waste water treatment plants
 (maximum distance = 2000 m)
 (annual heat production potential = 1976 MWh)

District heating grids (219)
Annual demand

- < 1 GWh (70)
- < 5 GWh (72)
- < 10 GWh (27)
- < 50 GWh (39)
- < 100 GWh (9)
- < 500 GWh (2)

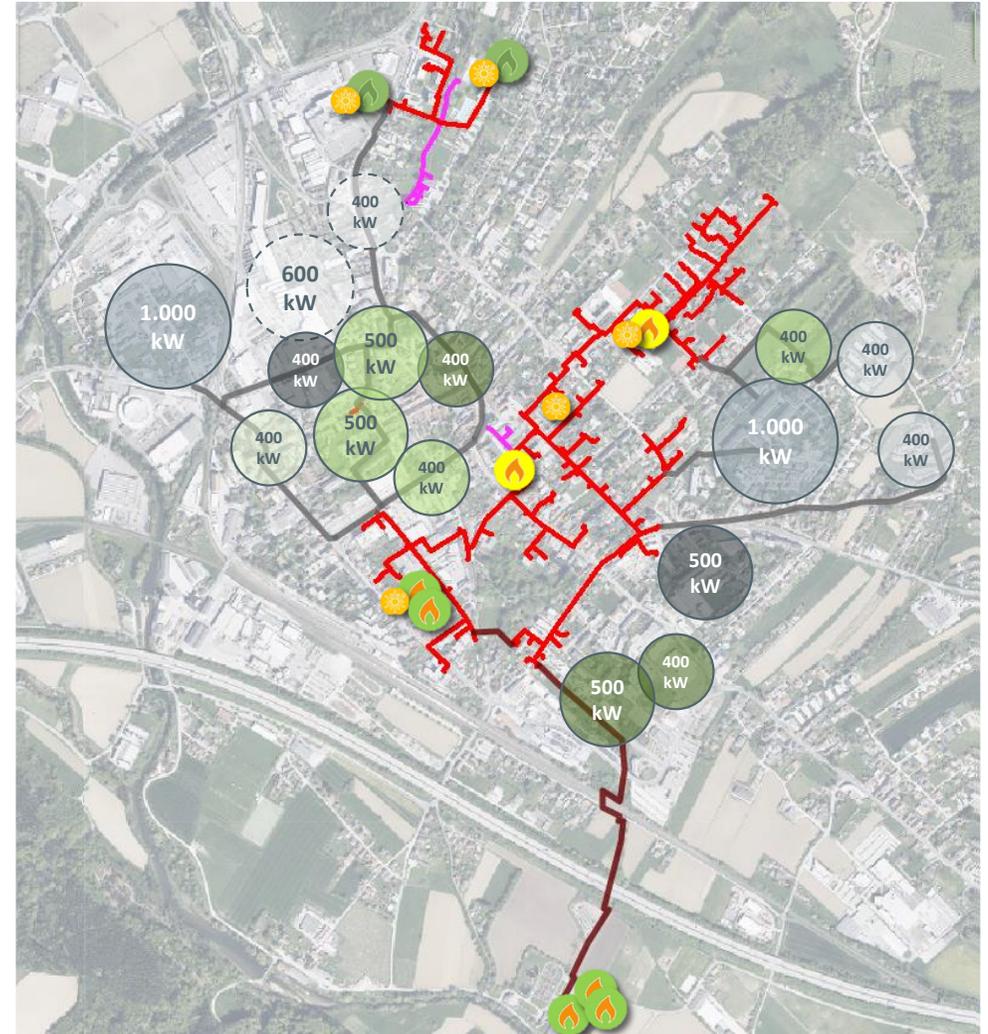
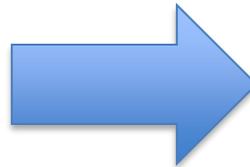
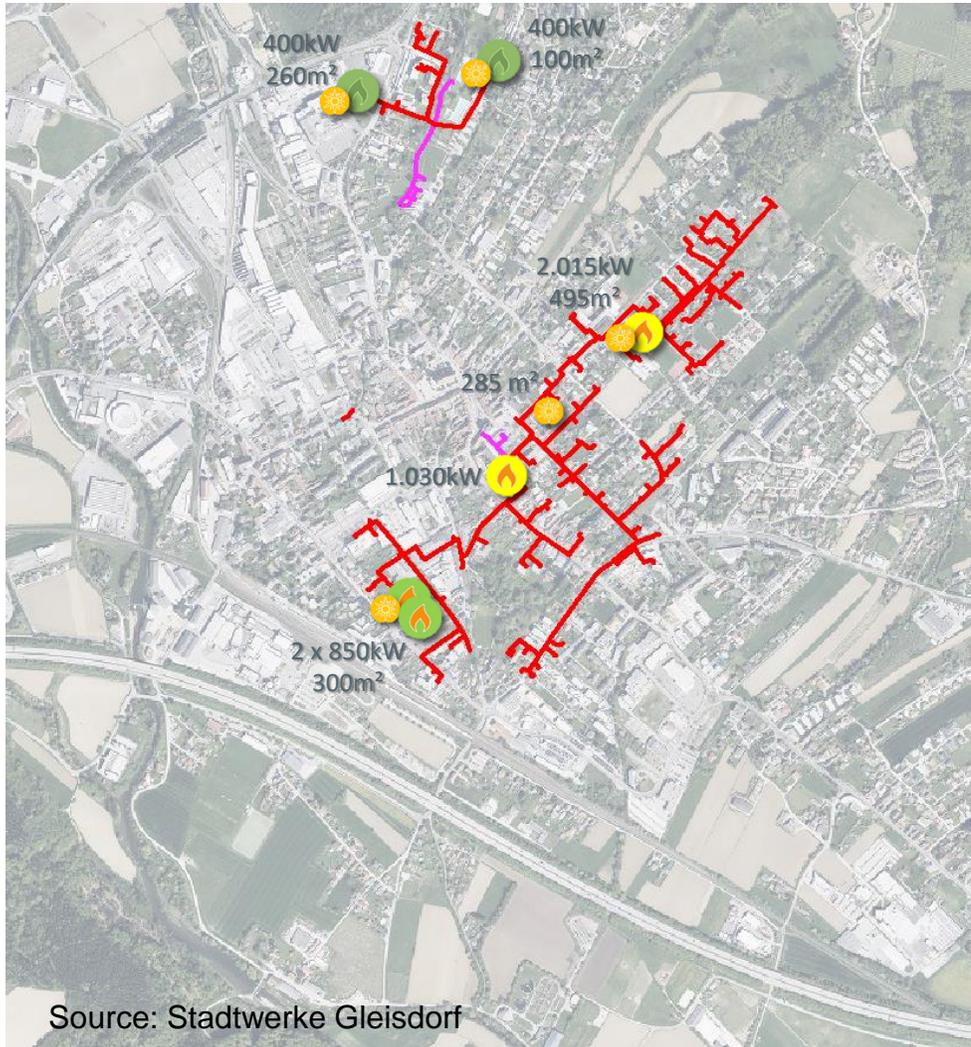
Waste water treatment plants (219)
Potential power

- < 500 kW (105)
- < 1 MW (30)
- < 5 MW (68)
- < 10 MW (8)
- < 50 MW (8)



Source: TUW/EEG

Flexibility paves the way for decarbonizing and diversification



Advantages and challenges for integration WWTPs

■ Advantages

- Opportunities for resource, bioeconomy and energy hub
- Surface area in surrounding: PV, solar thermal, storage, other
- Potential for base load supply
- WWTPs mostly far away from anything else
- Every DH customer can become prosumer



■ Challenges

- Distance to main district heating network
- Stakeholder involvement / Multiple infrastructures

Stakeholder Integration

Partner 1
e.g. DH operator

Partner 2
e.g. waste water treatment plant owner



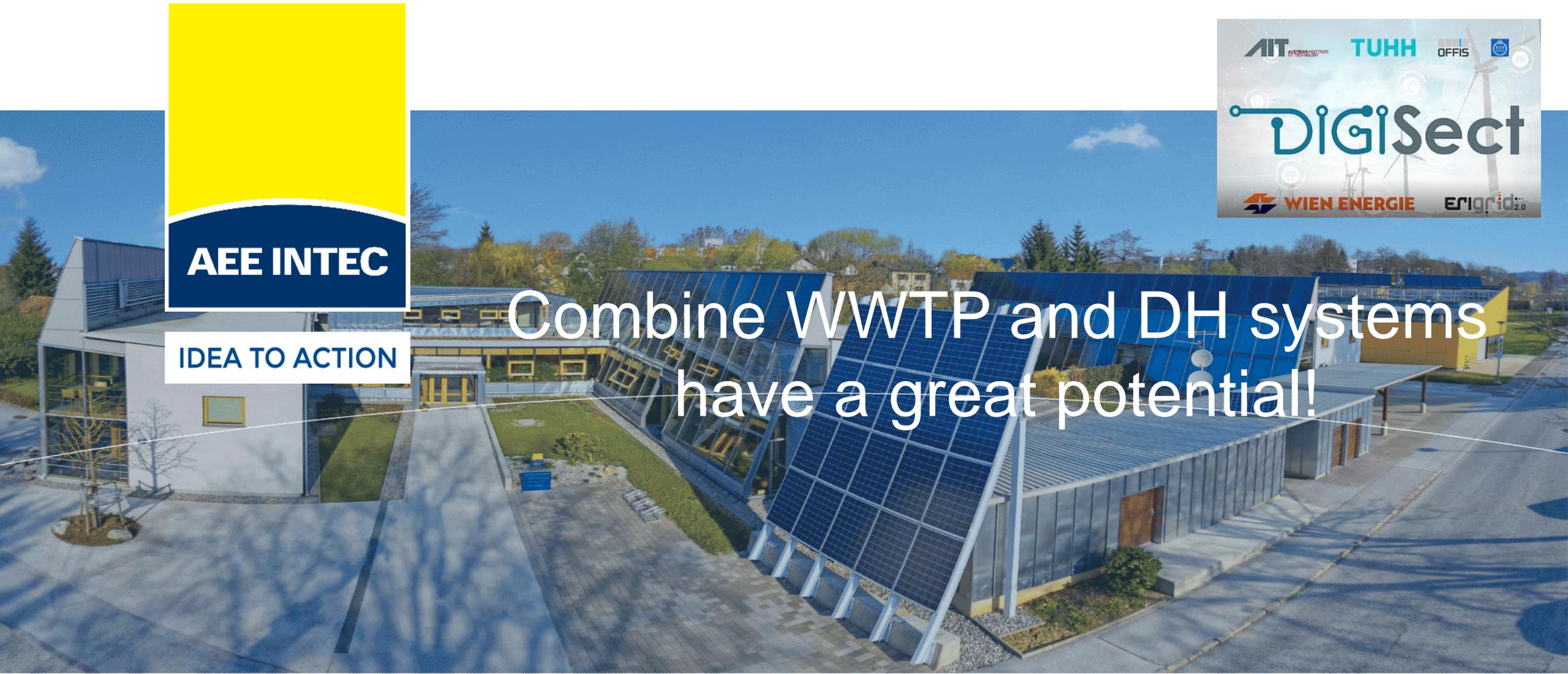
Some
scientists...

City council

Major and
politics

Regional
authorities

Citizens



AEE INTEC

IDEA TO ACTION

Combine WWTP and DH systems
have a great potential!



VORZEIGEREGION
ENERGIE



ThermaFLEX

<https://thermaflex.greenenergylab.at/>

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