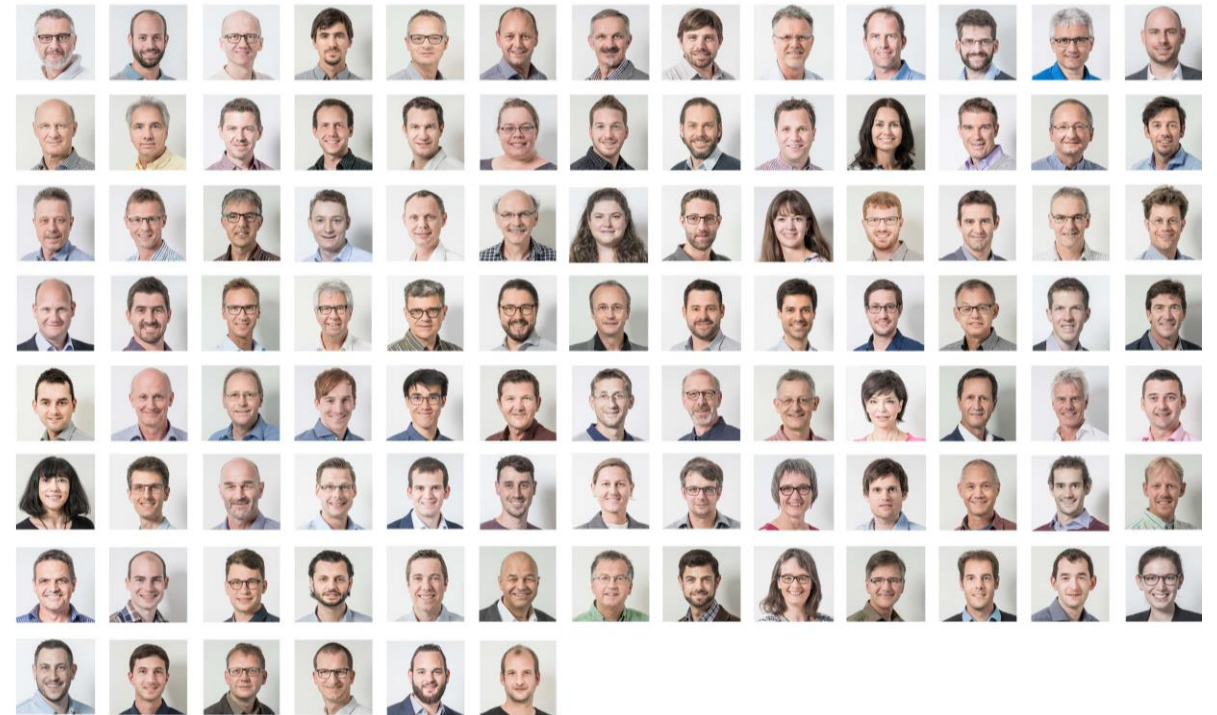
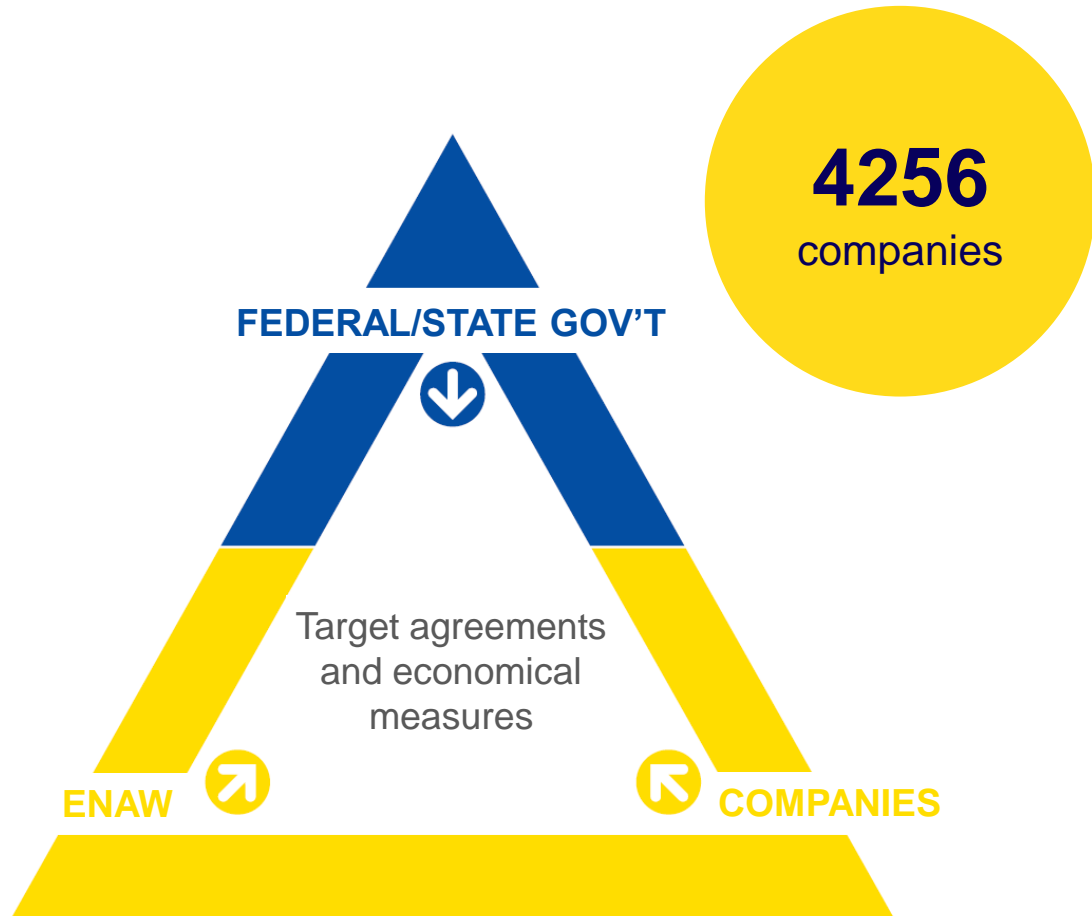




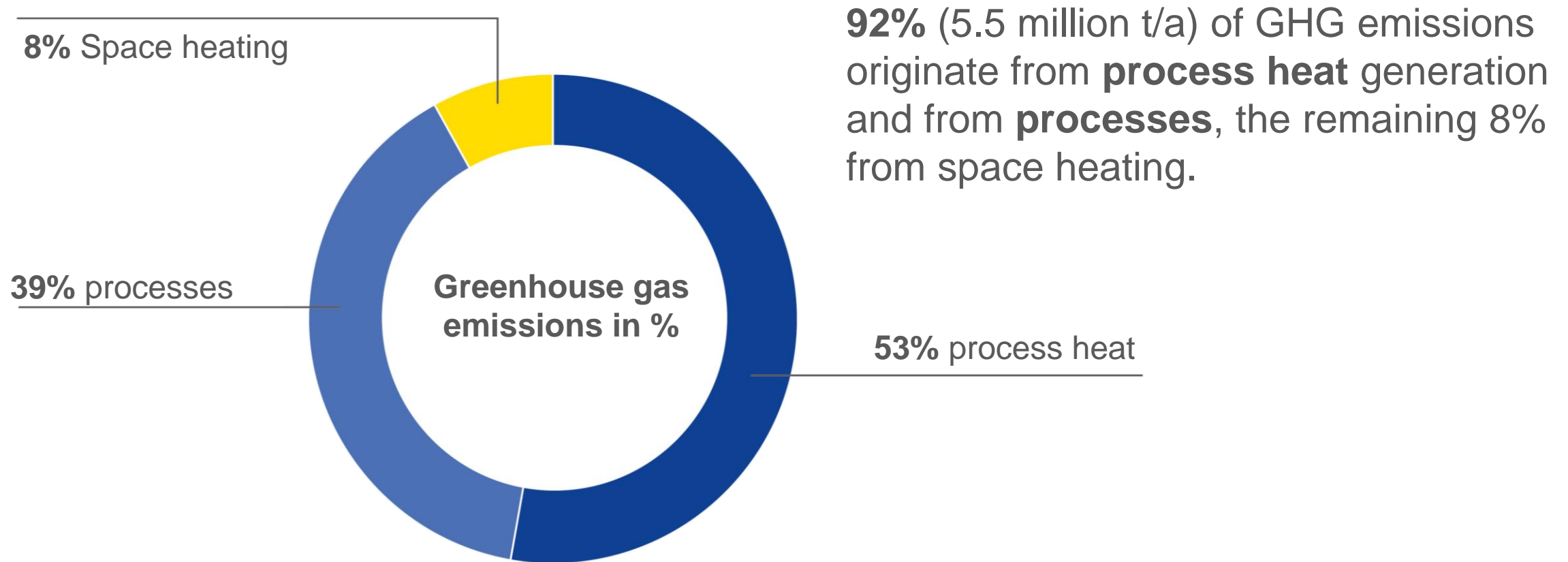
With the EnAW Roadmap on the way to net-zero

SWEET DeCarbCH Networking Conference 2023

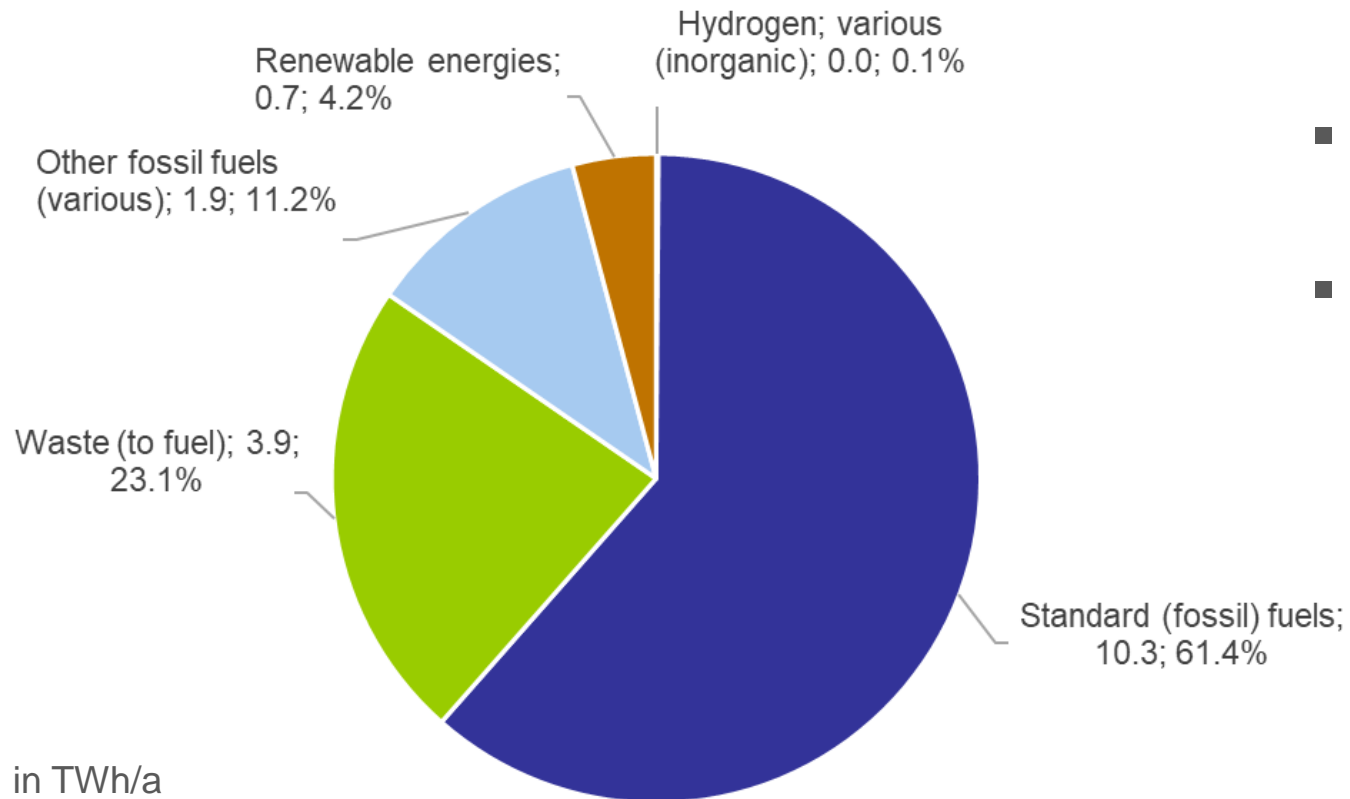
The Energy Agency of the Swiss Economy (EnAW)



Industrial greenhouse gas emissions by source

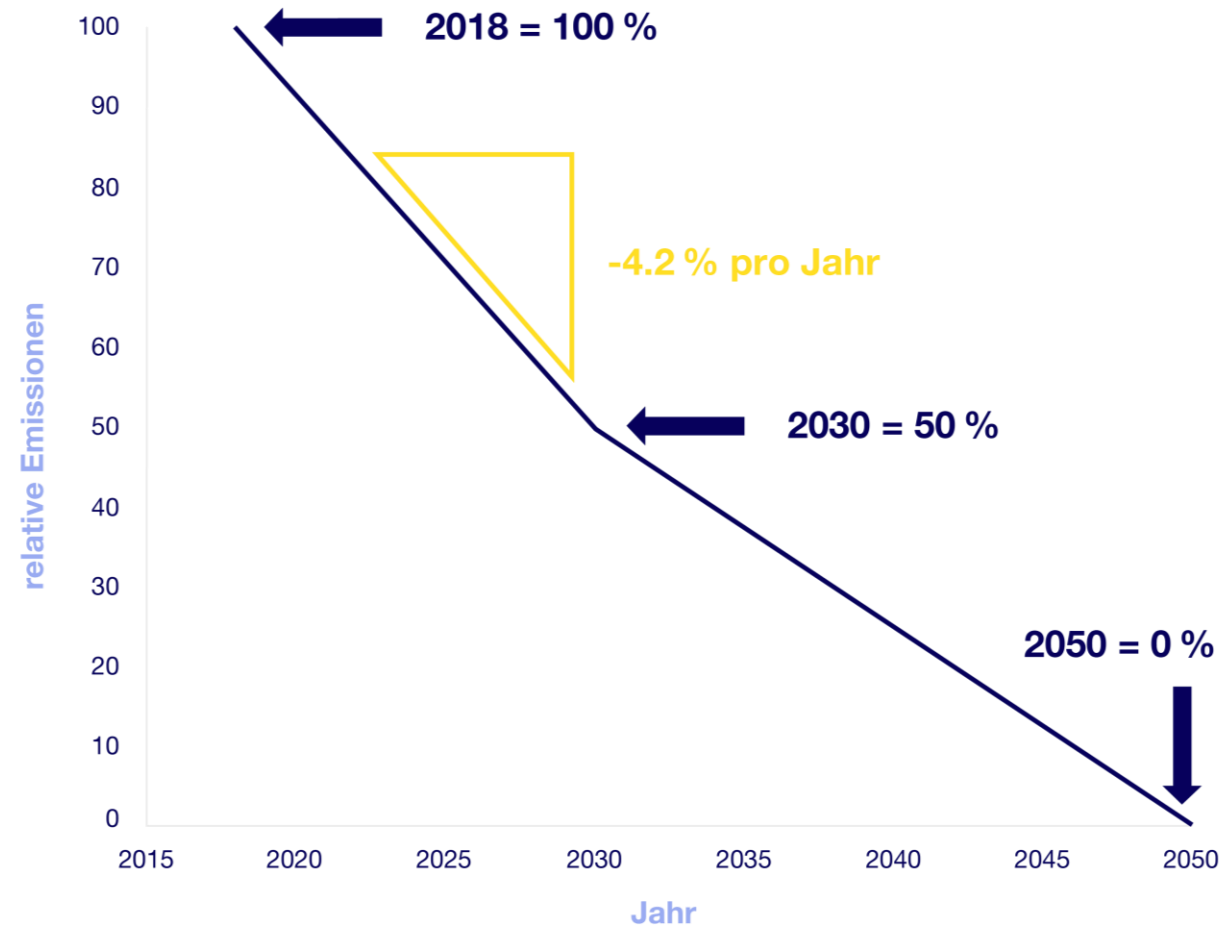


Fuels used for process heat



- Mainly fossil fuels (73%) and waste materials (23%)
- Only 4.2% renewable energy sources

Science Based Targets initiative (SBTi)



GOAL

Developing a plan to reduce greenhouse gas emissions to “net-zero” in a forward-looking, economically sensible and step-by-step manner.

Methodology for creating a Decarbonisation Roadmap

Process/technology changes

- Temperature requirements
- New methods/technologies
- Process integration
- Innovations

Efficiency measures

- Process optimisation
- Technological change
- (Waste) heat recovery

Product changes

- Product substitutions with more energy-efficient products
- Lower temperature requirements
- Lower resource demand
- Better recyclability

Thermal networks

- Expansion of thermal networks (internally or across sites)
- Storage

In-/Offsetting, CCS/CCU

- In-/Offsetting
- CO₂ capture & storage/utilisation

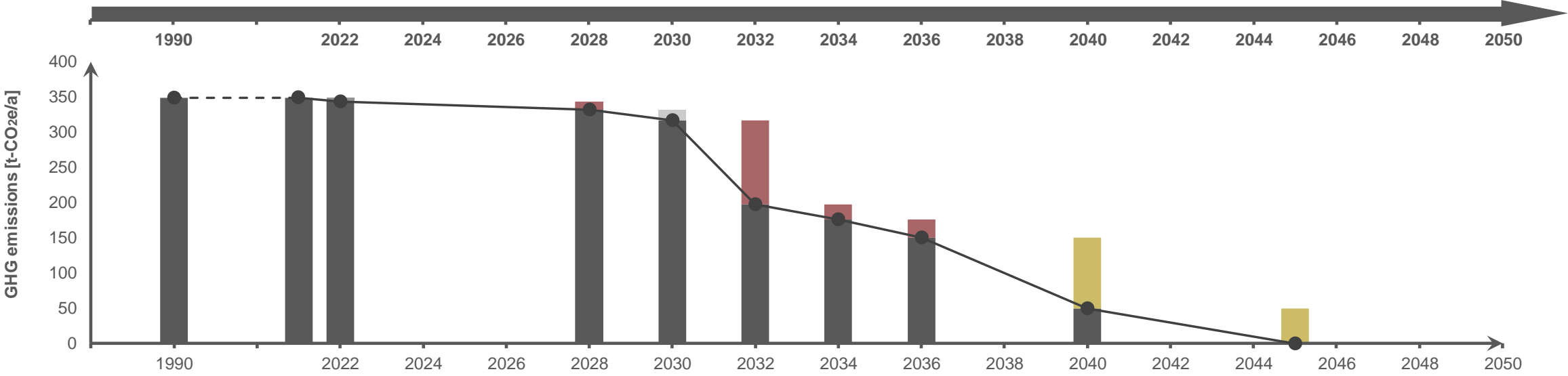
New energy technologies

- Selection by:
- Temperature
 - Availability/potential
 - Costs



Roadmap results at a glance (example)

Area of measure	2022-2030	2030-2040	2040-2050
Efficiency measure	Restoration office build.		
Process/techn. change			
Product change			
Thermal networks	T reduction th. network/HW		
RE source/technology	Local steam/heat generator	WHR re- frigeration WHR waste water AW- HP	Change of Process 1 Change of Process 2
Compens./neutralis.			



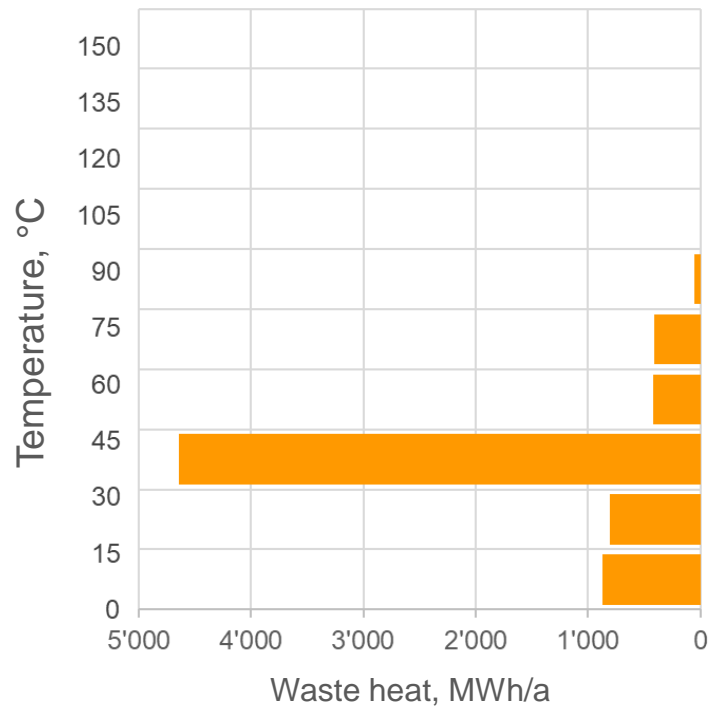
Focus: optimizing the overall system

Our main focus is on the best possible interaction of all site units, including the energy supply, and therefore always on optimizing the overall system!

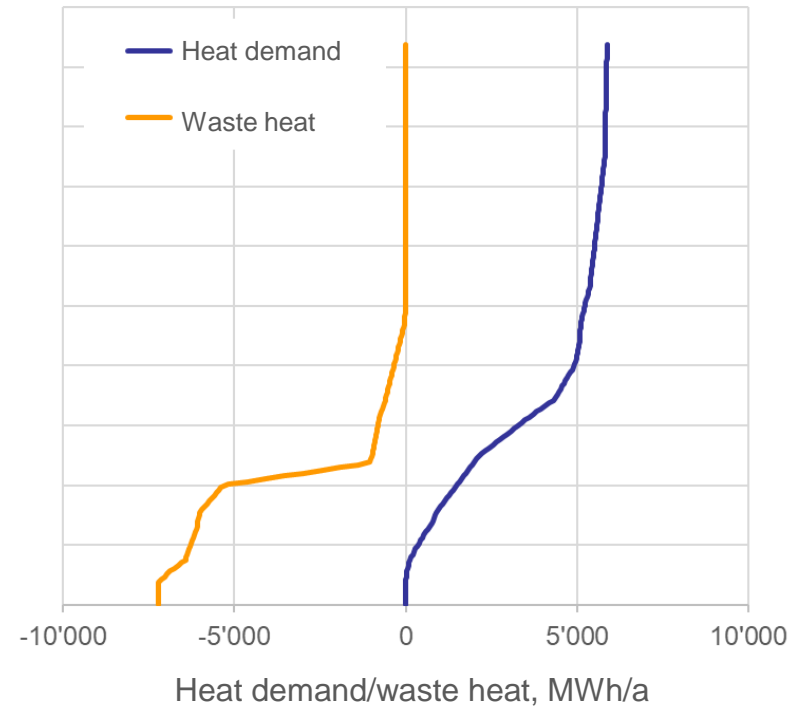
- Using waste heat instead of recool it
- Reducing the process temperatures to increases the heat recovery potential
- Substitution of CO₂-intensive by renewable energy sources

Thermal fingerprint of the heat/cold streams

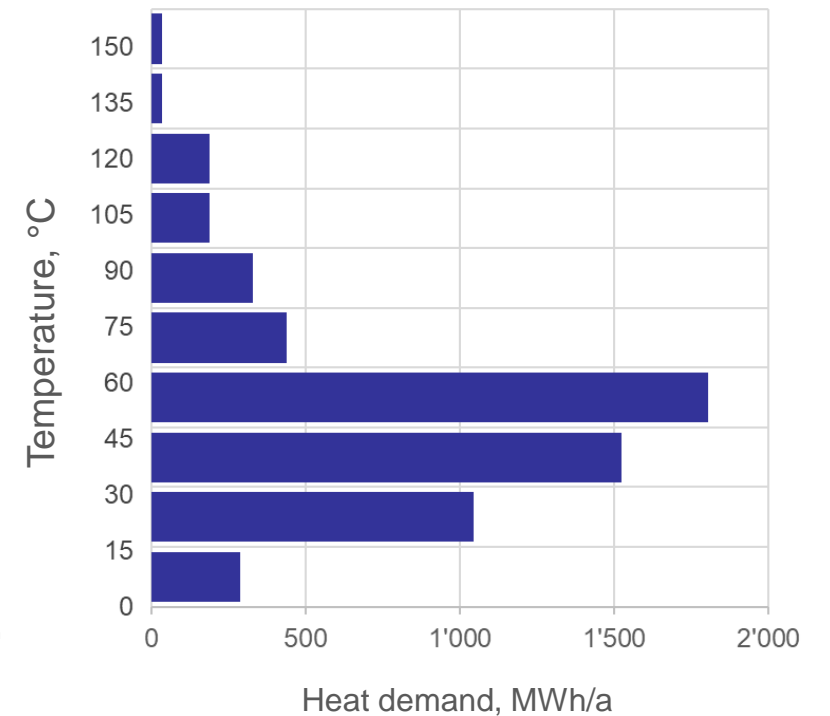
Waste heat



Cooling/heating curves



Heat demand



Challenges of decarbonising the industrial and especially SME sector

Challenges of decarbonising the SME sector

Technology

- Practical aspect: From the study to the construction project
 - Retrofitting steam to hot water systems in existing site infrastructure
 - Substitution of direct burned air dryer to a renewable system (powder coating systems, grass dryer,...)
 - Dimensioning of systems especially heat pump / heat recovery and storage technologies
- Know-how about CO₂ capture & storage/utilisation systems for SME

Socio

- Dealing with uncertainties and concerns about new technologies
- Waiting for new technologies (hydrogen)
- Interaction between the various suppliers (heating, cooling, compressed air, waste water, ...)
 - Mutual know-how of technologies
 - Dimensioning of matching systems and taking the responsibility
 - SME are not used to pay for dimensioning studies or energy concepts

Thank you very much for your attention.

**For further information on EnAW's
decarbonization roadmap, please visit:**

www.enaw.ch/dekarbonisierung

