Energy from waste water

-

An efficient way to reduce operating costs for heating and cooling

Huber - A Manufacturer

- Over 100 year history
- €200 Million Turnover
- Production Area: 45000 m^2 Stock Area: 8,000 m^2.
- 4 Production Lines
- >1000 Employees World-wide
- Stainless Steel consumption of >5,000 T/A.

HUBER Technology in the UK

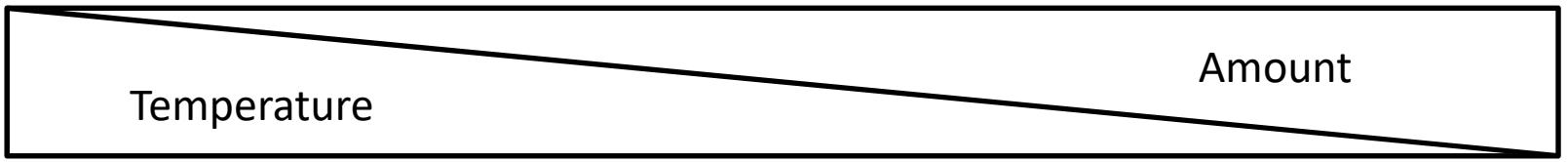
- Equipment first supplied in 1986
- Currently Supply all UK & Irish Water Companies
- Installed Asset Value of approximately £160,000,000
- Core Equipment Supplied includes
  - 900 Sludge Screens
  - 2000 Inlet Screens
  - 1300 Storm Screens
  - 500 Screenings Handling Plants
  - 200 S  terir  cke 
- £1m pa Bus

Waste Water Temperatures

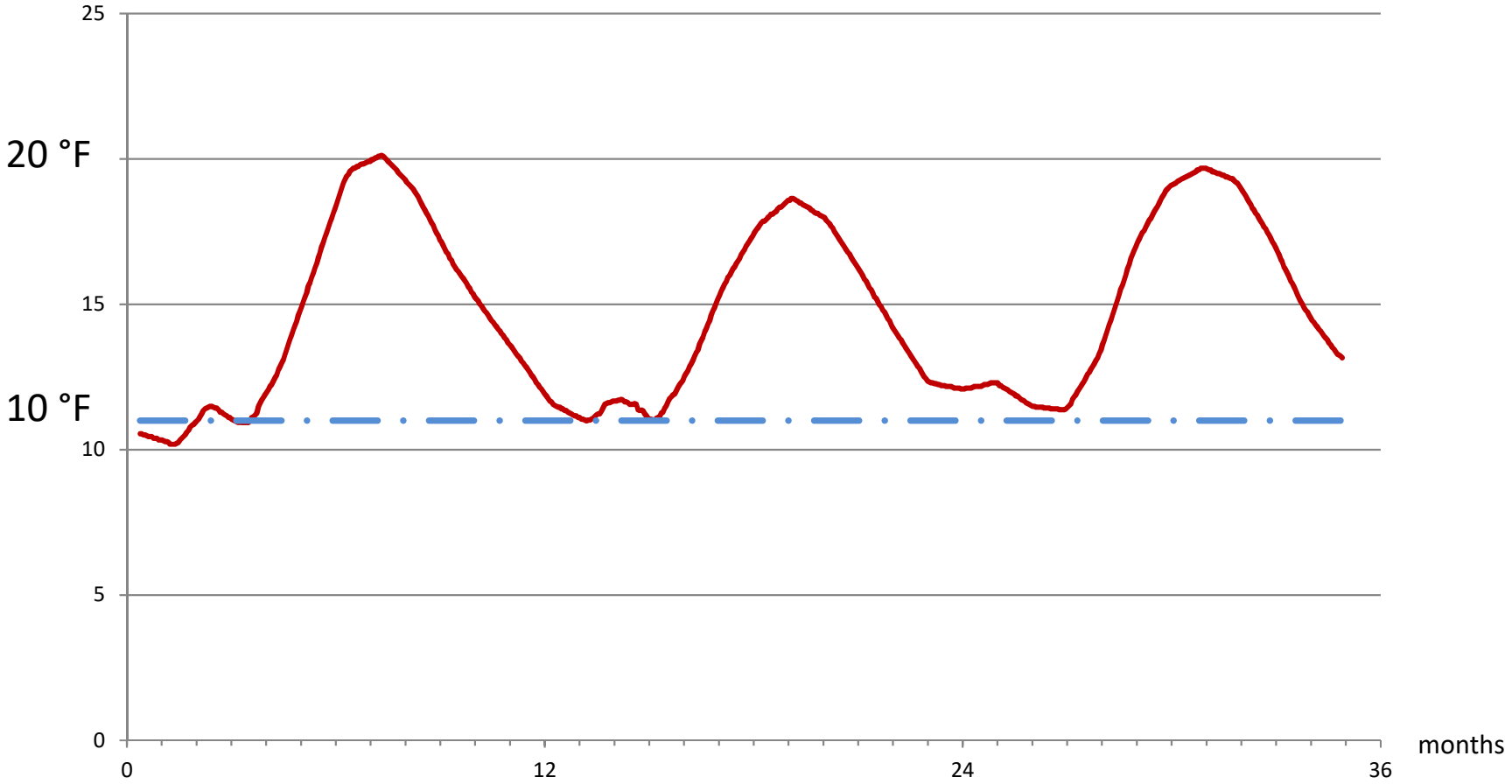
Producer (municipal/industrial) | Sewer | Pumping station | Treatment plant | Receiving waters

Municipal: ~23 °C
Industrial: 60+ °C

~11-14 °C | **~10-14 °C** | **~10-12 °C**



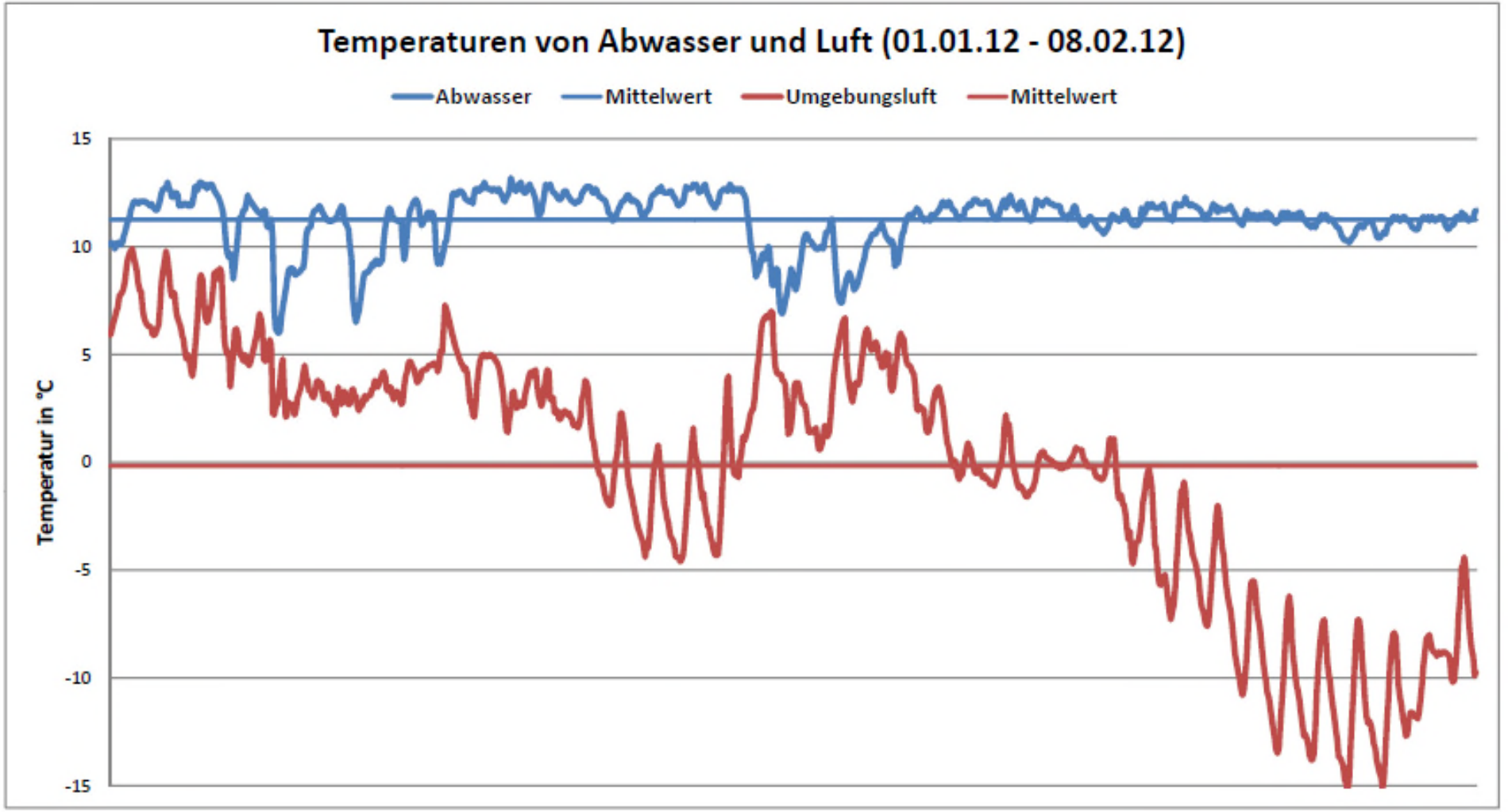
Waste Water Temperatures



Temperature log of a waste water treatment plant in Europe over the course of 3 years.

→ Waste water temperature is fairly constant throughout the year.

Waste Water Temperatures



Waste water temperatures can vary drasticaly from the ambient air temperature!
Temperature levels of waste water are more beneficial to heat pump efficiency → lower operational costs!

Yearly Energy Profile of a London Office Building

HUBER TECHNOLOGY
WASTE WATER Solutions

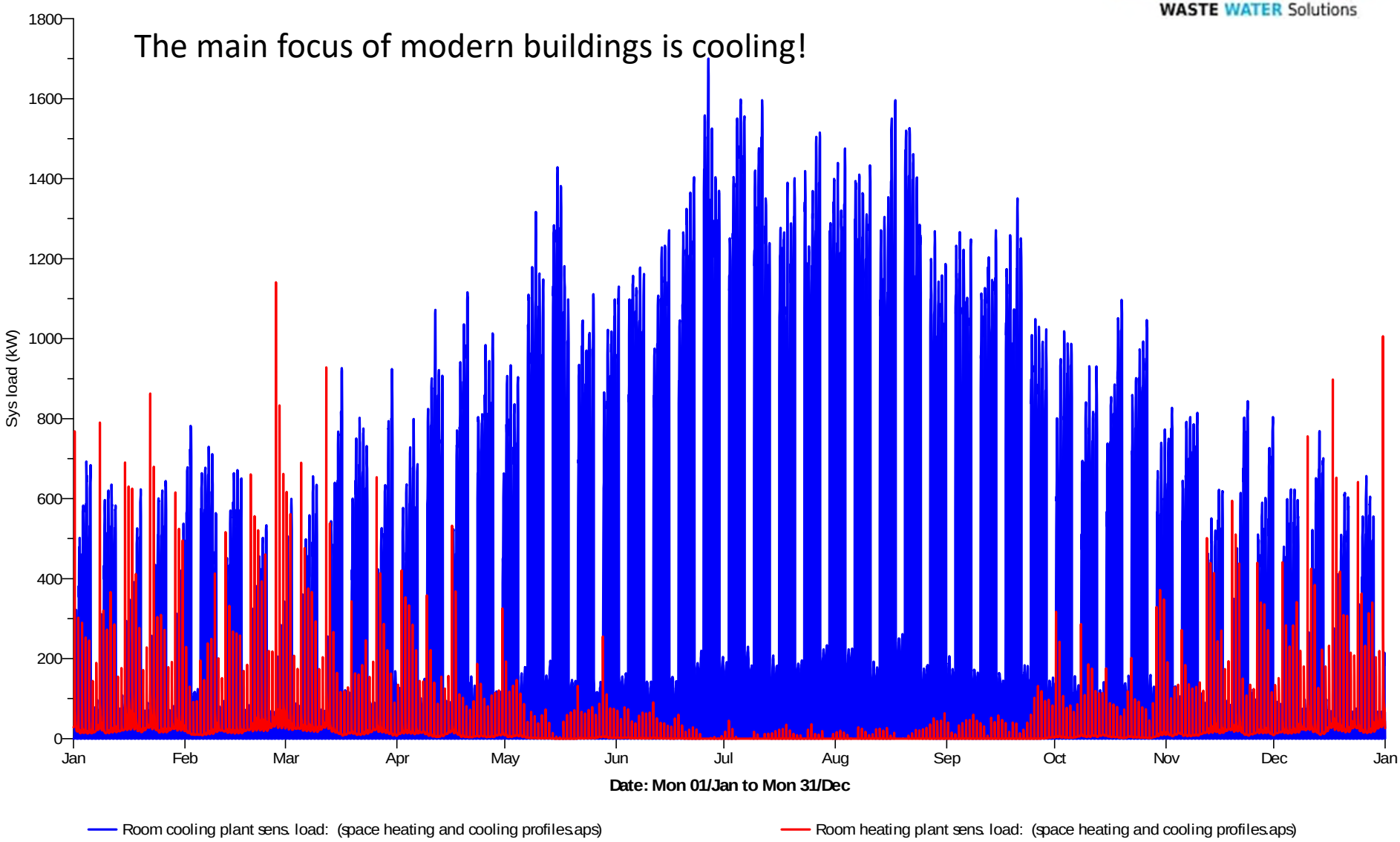
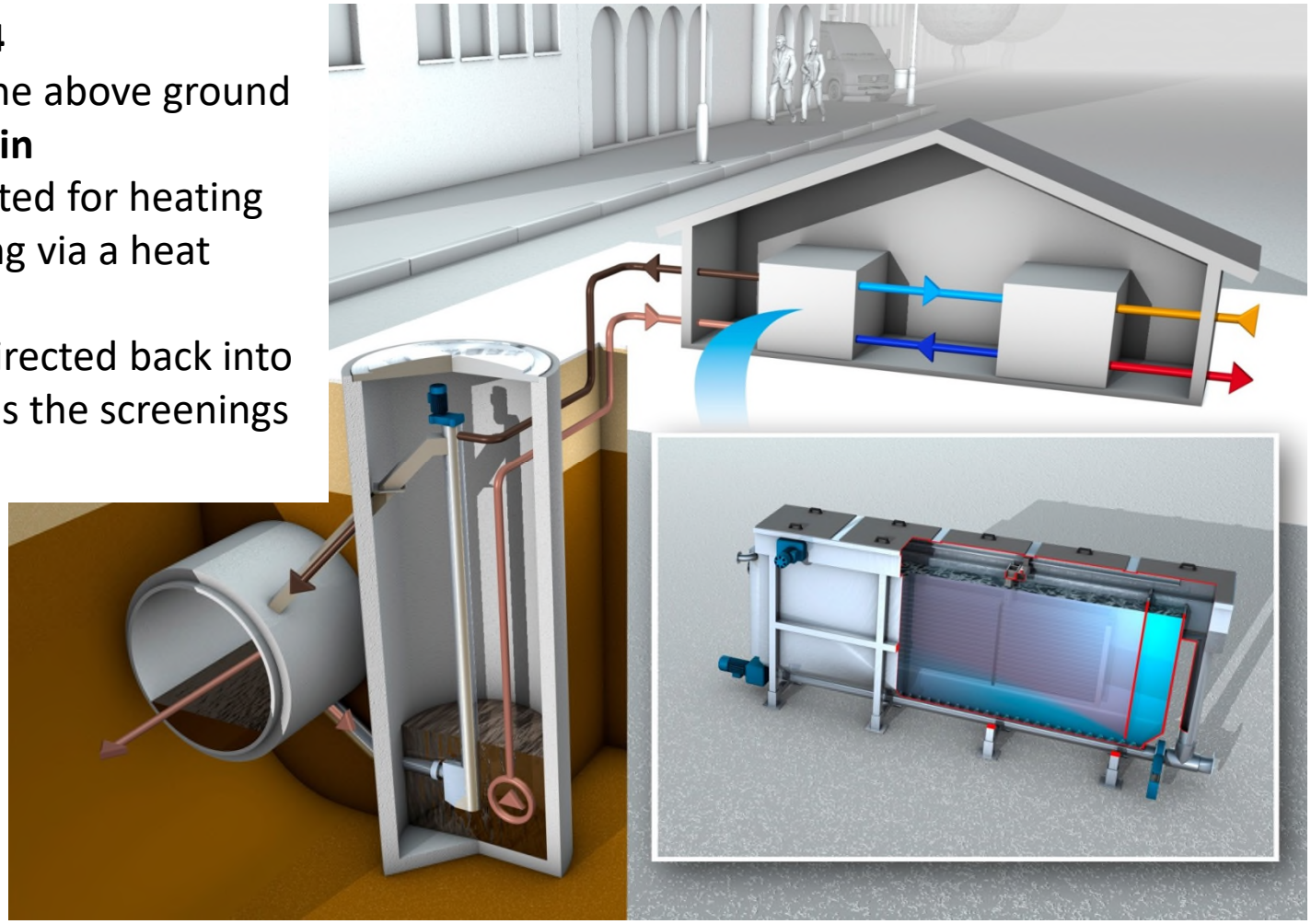


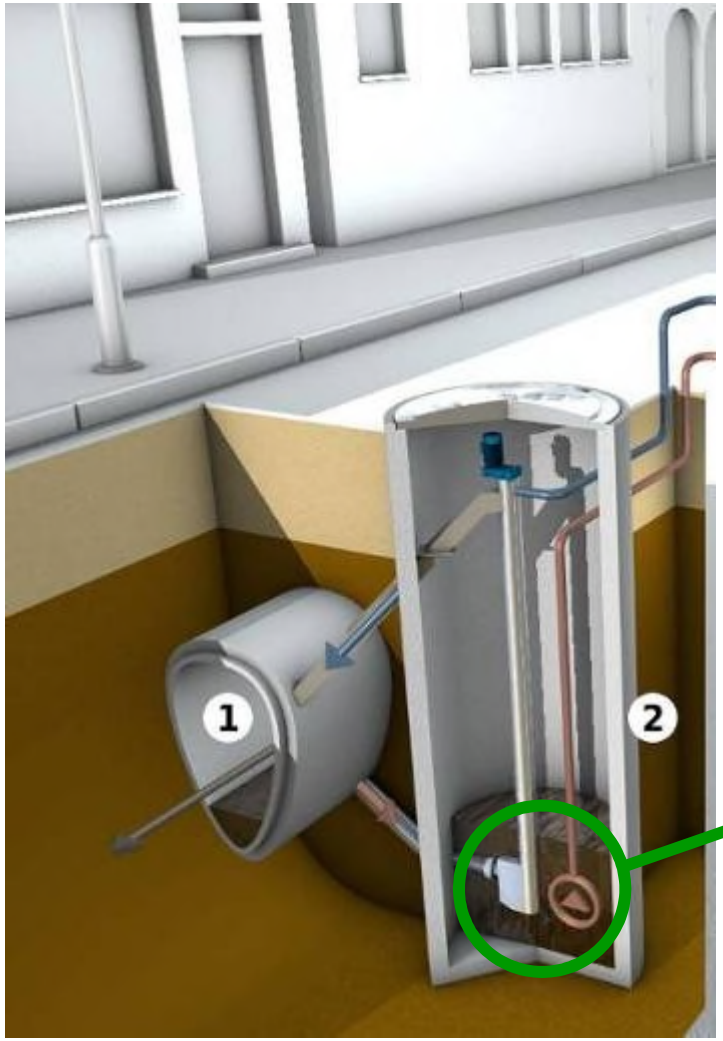
Chart data supplied by atelier ten

Huber ThermWin® Solution

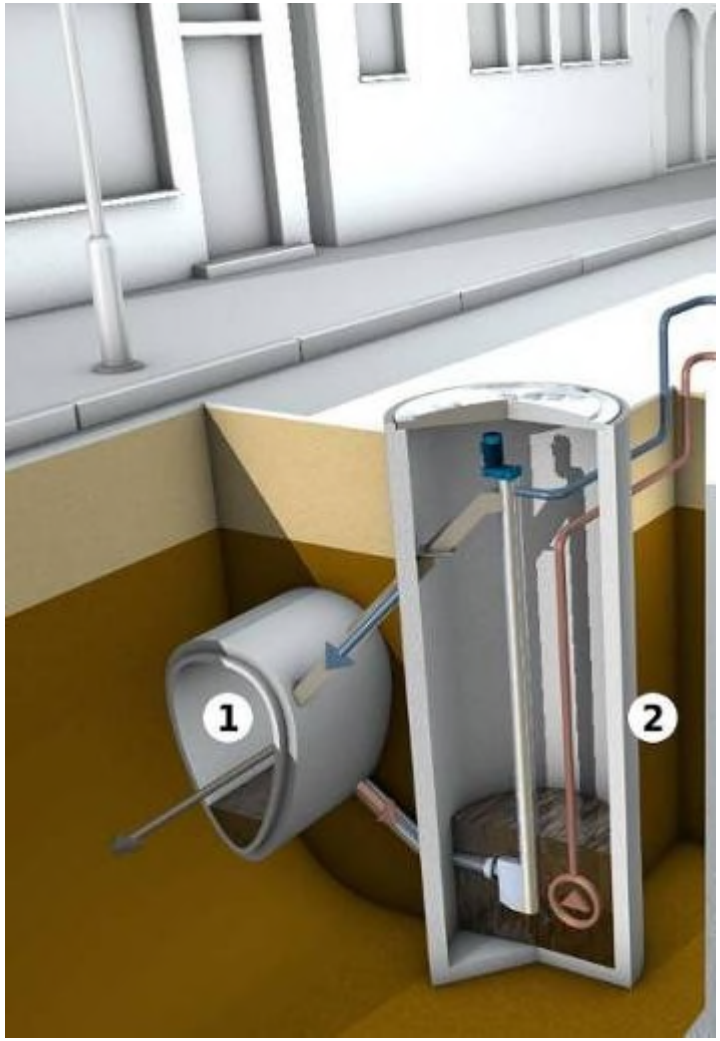
1. Draw waste water from the sewer and screen it in **RoK4**
2. Pump the water to the above ground heat exchanger **RoWin**
3. Energy can be extracted for heating or dumped for cooling via a heat pump
4. The waste water is directed back into the sewer and flushes the screenings back, too.



Wintower (Winterthur, CH)



Wintower (Winterthur, CH)



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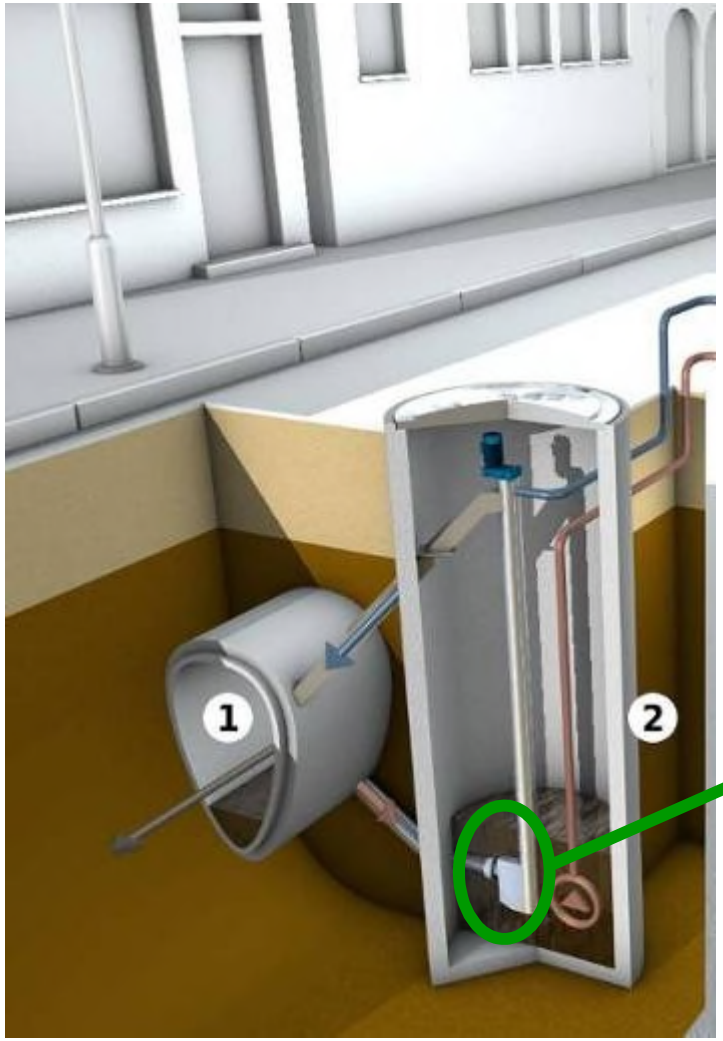

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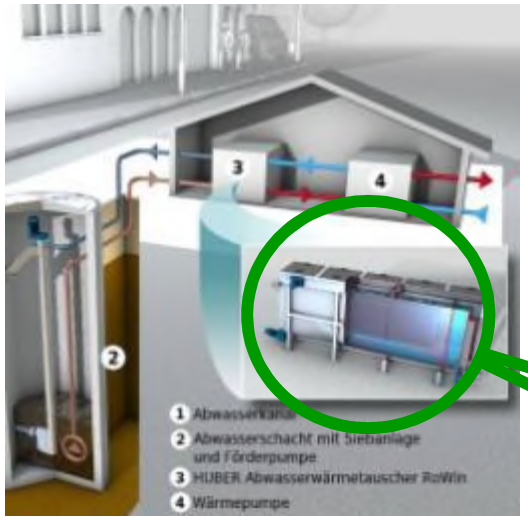
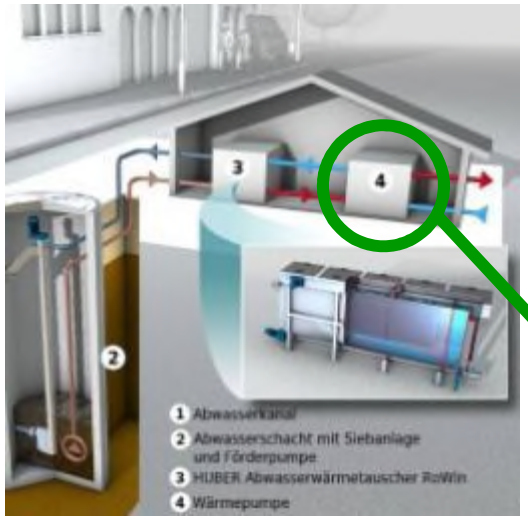


2 x heat exchanger RoWin BG 8

Wintower (Winterthur, CH)



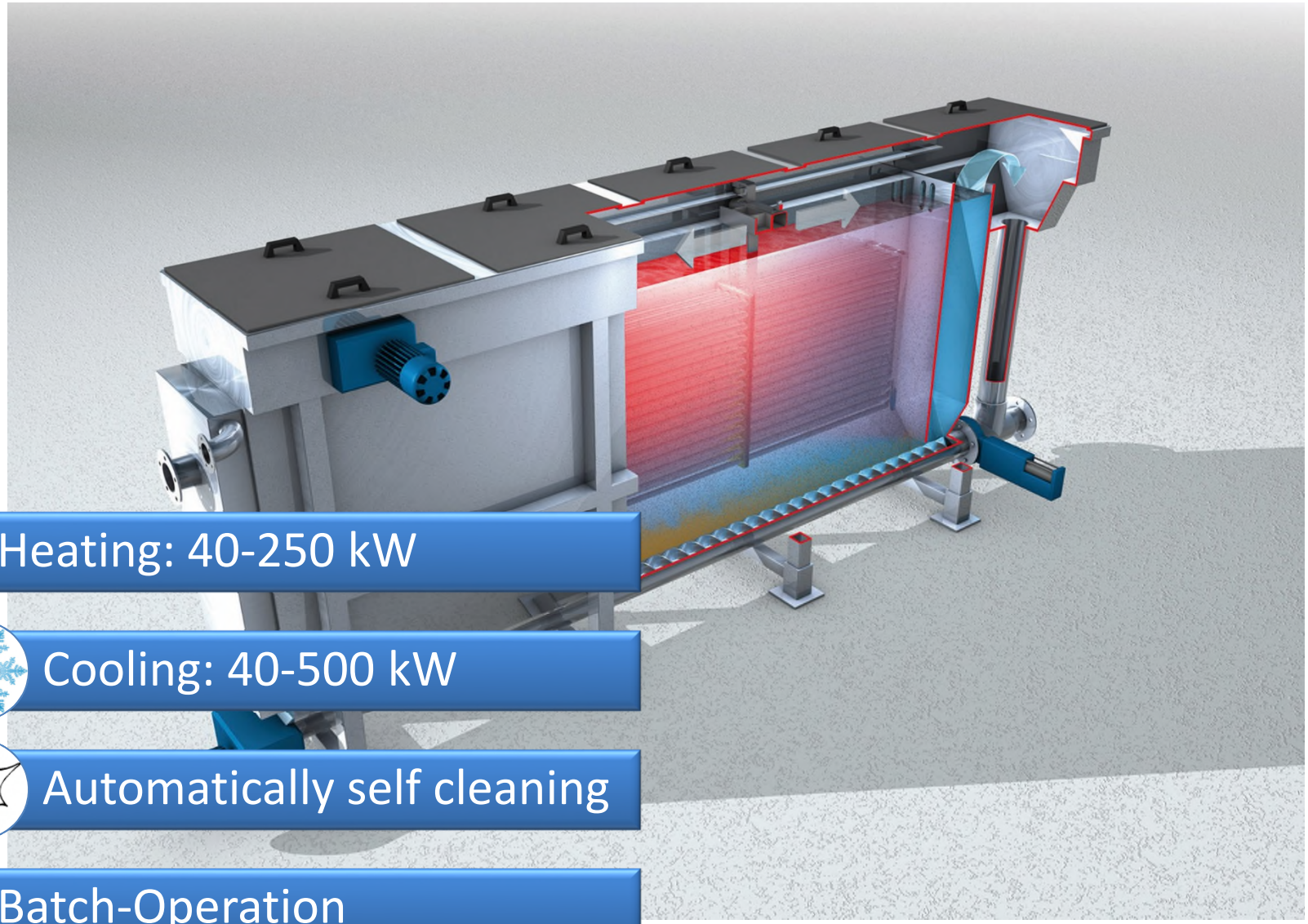
Heat pump

Wintower (Winterthur, CH)

- Sewer flow
  Q_{DW} ca. 160 l/s
- Flow: 60 l/s
- Therm. power: 605 kW
- Cooling: 480 kW

www.wintower-winterthur.com

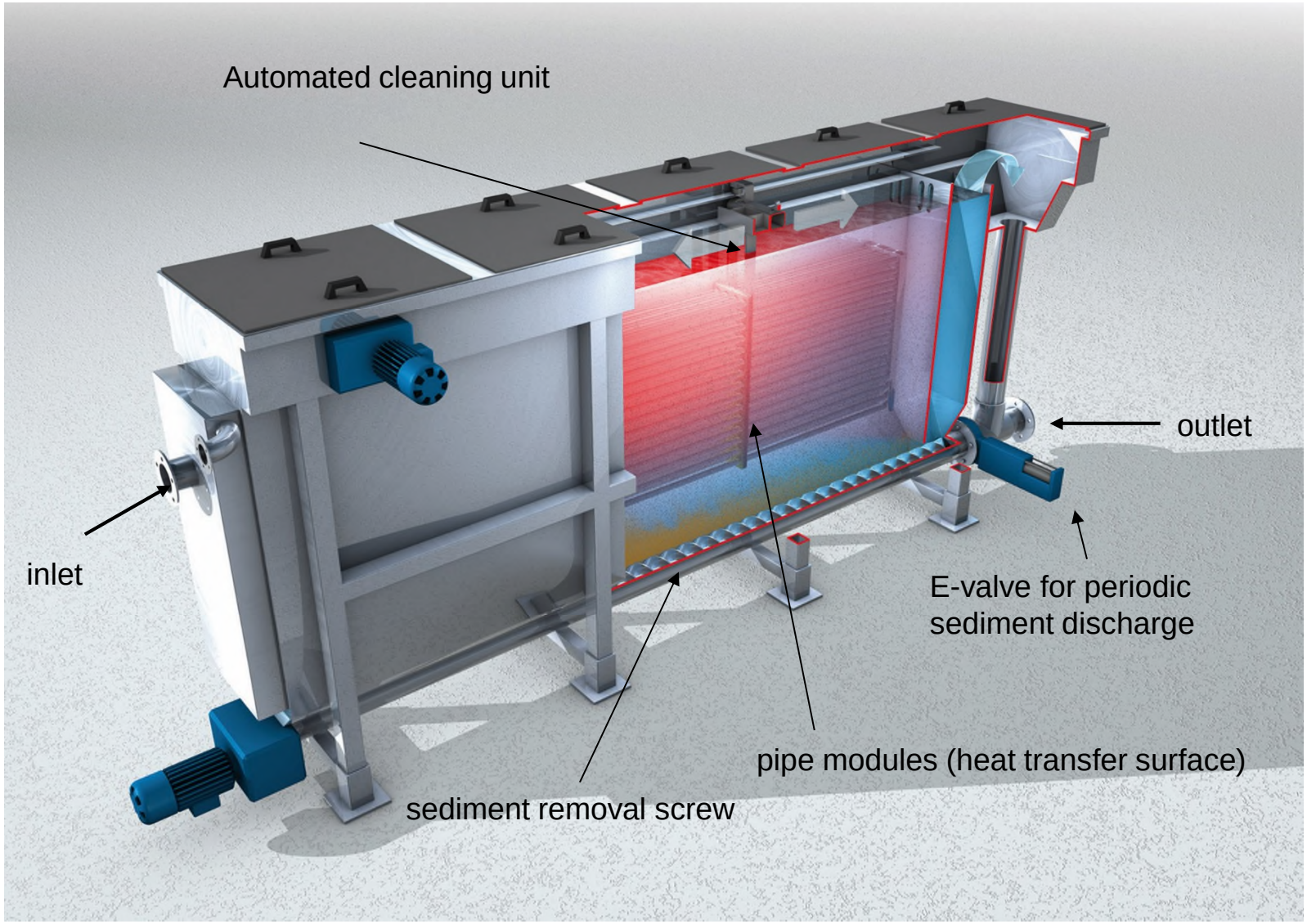
Huber Waste Water Heat Exchanger RoWin



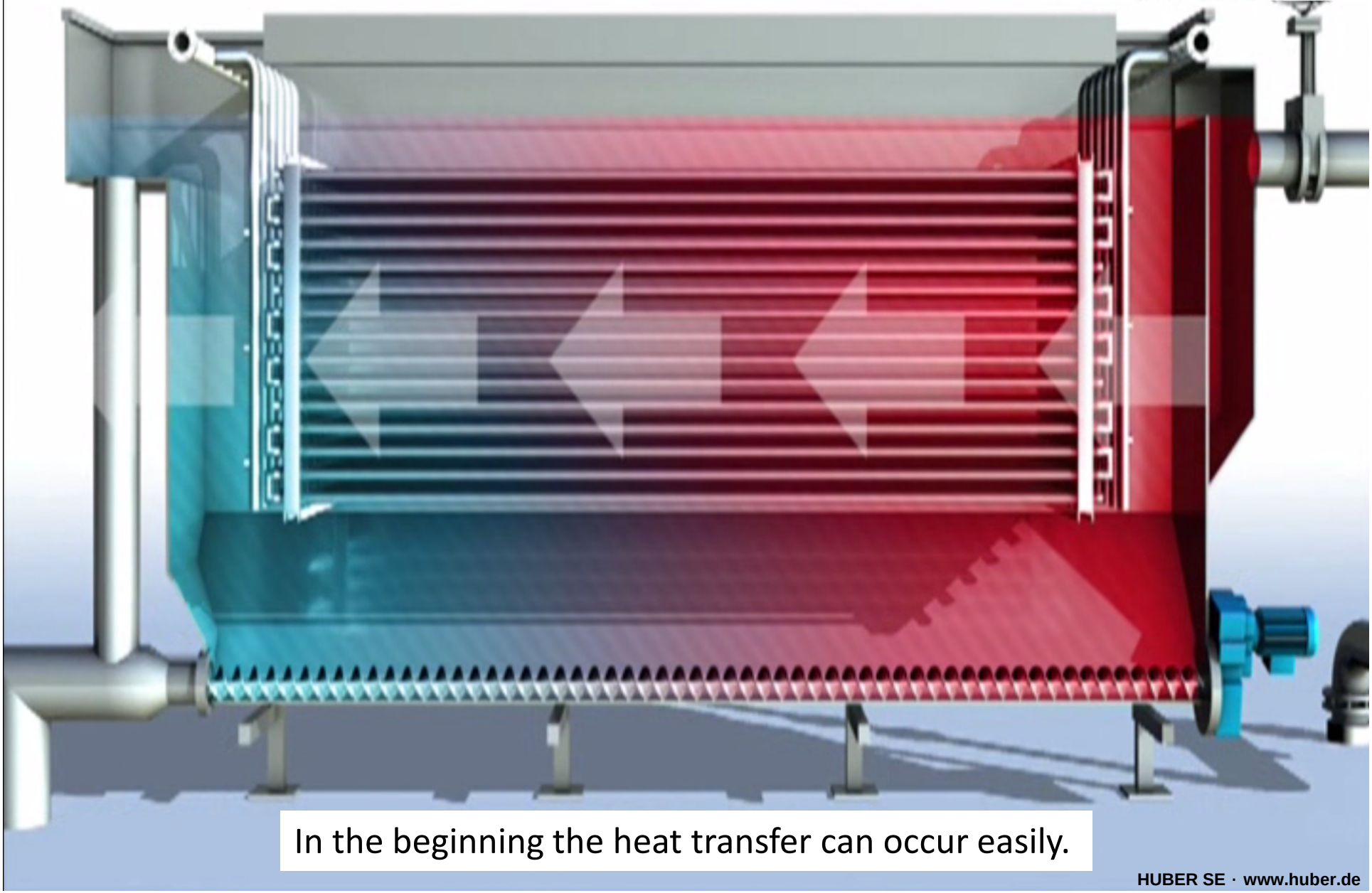
- Heating: 40-250 kW
- Cooling: 40-500 kW
- Automatically self cleaning
- Batch-Operation

Huber Waste Water Heat Exchanger RoWin

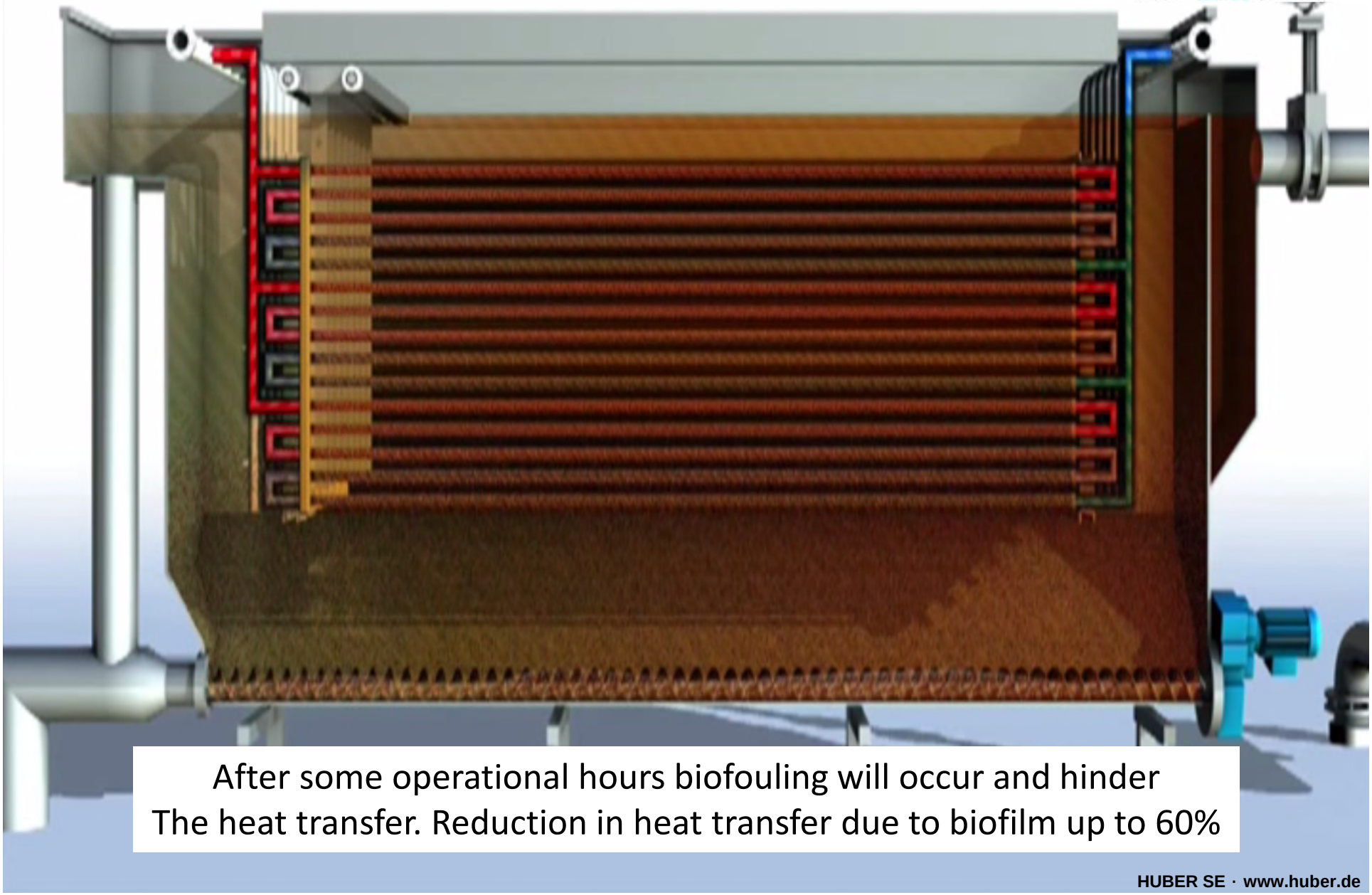
HUBER RoWin Heat Exchanger



Automatic cleaning unit

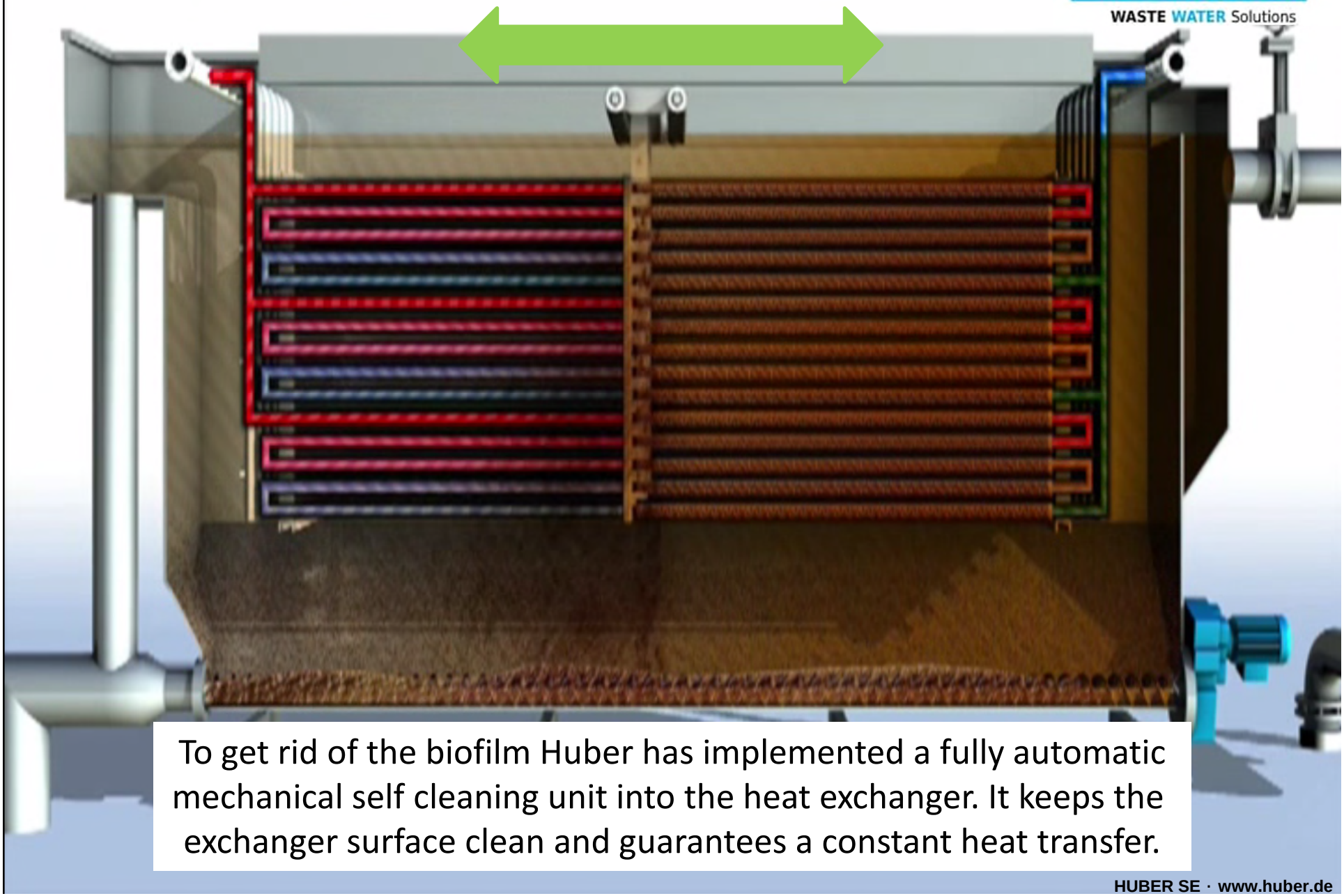


Automatic cleaning unit



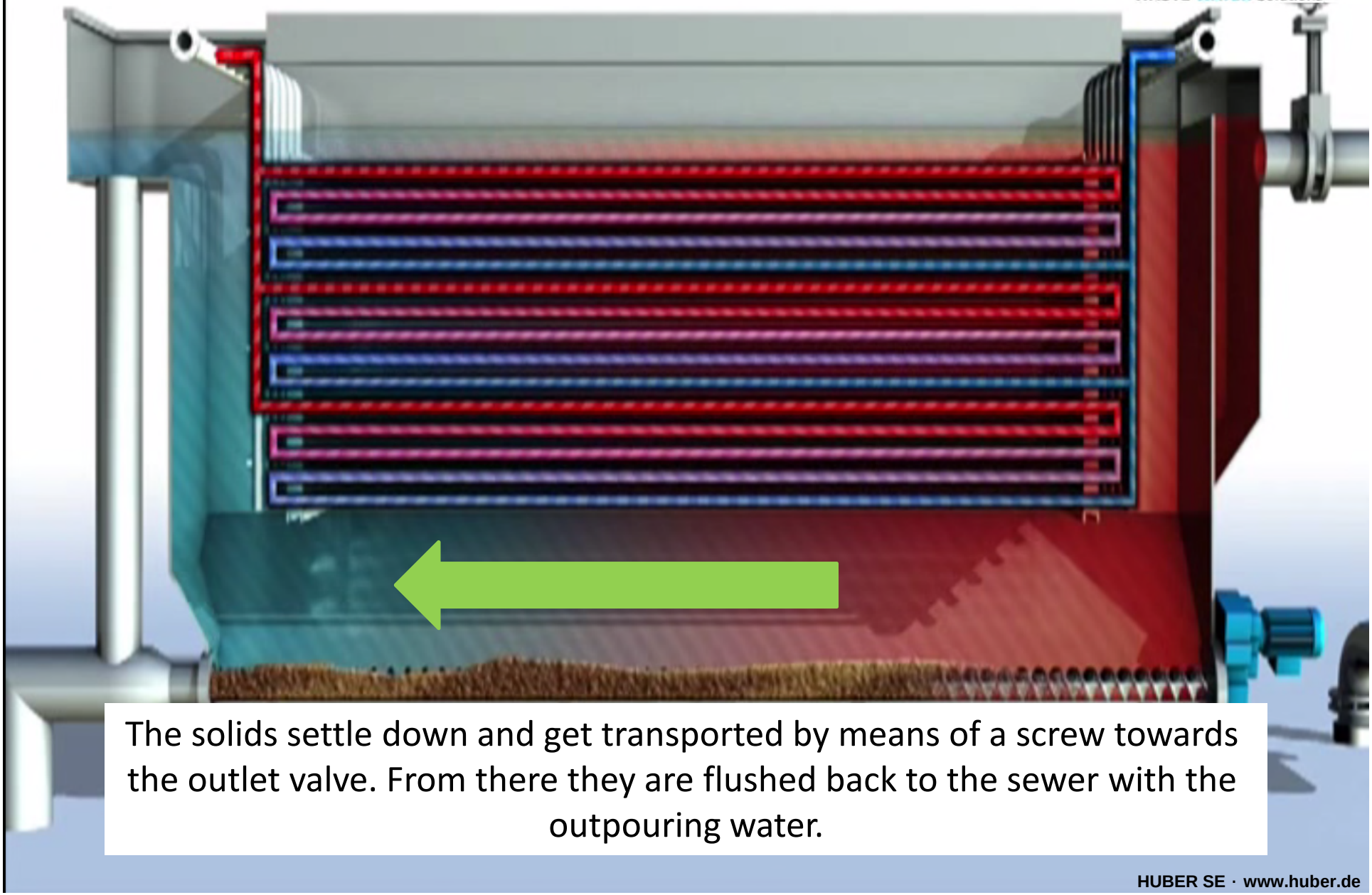
After some operational hours biofouling will occur and hinder
The heat transfer. Reduction in heat transfer due to biofilm up to 60%

Automatic cleaning unit



To get rid of the biofilm Huber has implemented a fully automatic mechanical self cleaning unit into the heat exchanger. It keeps the exchanger surface clean and guarantees a constant heat transfer.

Automatic cleaning unit



The solids settle down and get transported by means of a screw towards the outlet valve. From there they are flushed back to the sewer with the outpouring water.

Huber Waste Water Heat Exchanger RoWin

Impact of wastewater on heat exchangers

Biofilm:	Made up of microorganisms contained within wastewater which attach to any solid surface
Sediments:	Precipitated and settled solids on the heat exchanger surface
Effect:	Heat transfer capacity reduction up to 60 %
Solution:	Fully-automatic, mechanically cleaned heat exchanger for polluted media

HUBER TECHNOLOGY
WASTE WATER Solutions

Impact of the biofilm

cleaned heat exchanger surface

heat exchanger surface with biofilm

Plate Heat Exchanger RoWin

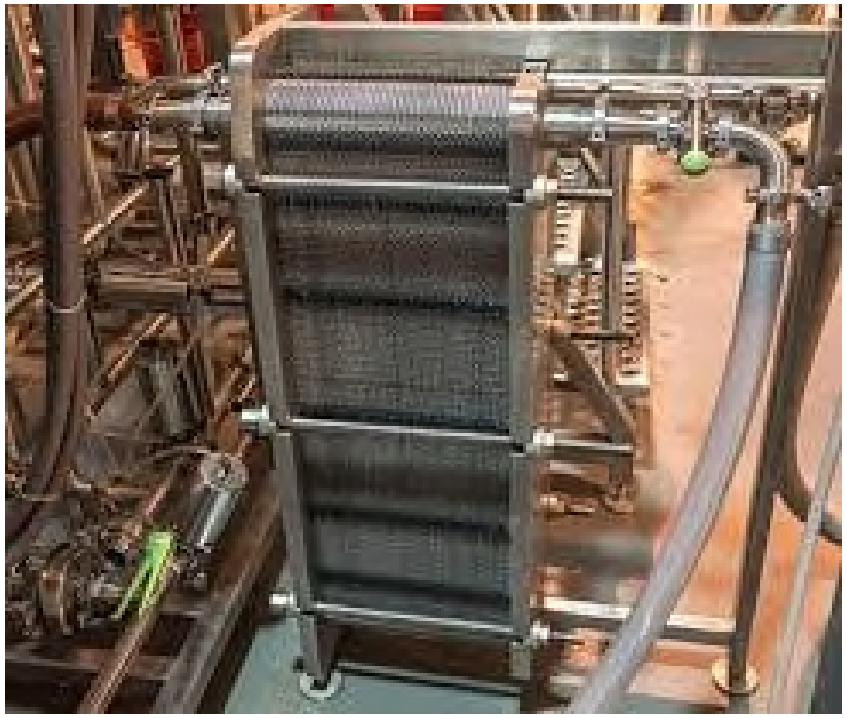


Plate Heat Exchanger RoWin blockage and biofilm

Impact of the biofilm

Places of use

Producer
(municipal/industrial)

Sewer

Pumping station

Treatment
plant

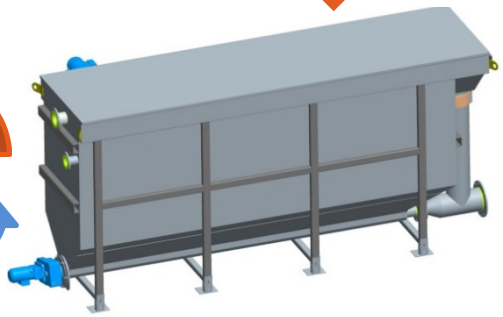
Receiving waters

Nursing home Hofmatt (Münchenstein, CH)

Rest Home, Hofmatt (Münchenstein, CH)

Buffer tank, pre-screening

WP



In-house application

Buffered operation for higher energy recovery

Wastewater flow 40 m^3/d

Therm. power: ca. 50 kW

Nursing Home Hofmatt (Münchenstein, CH)

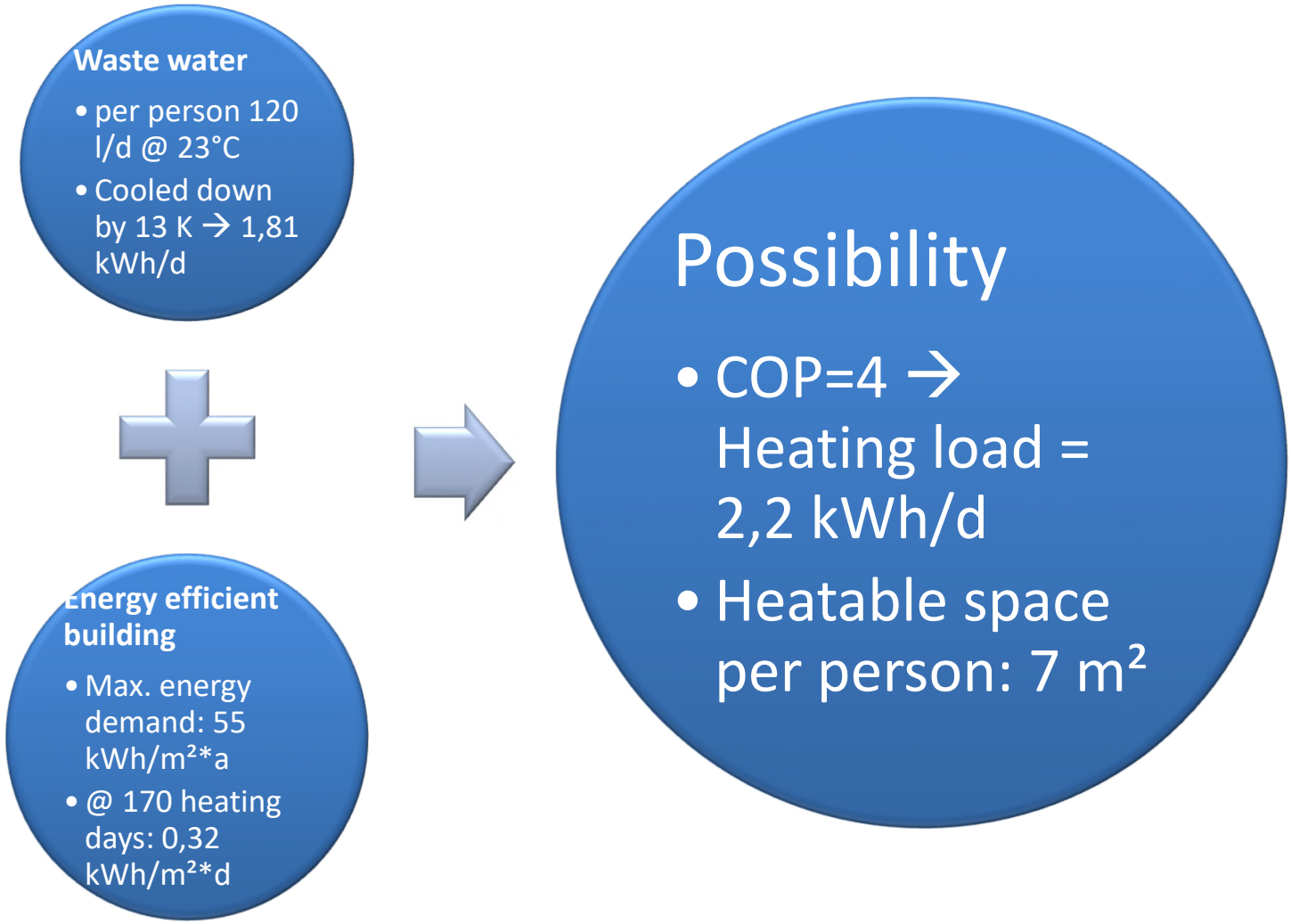
Buffer with integrated screen

- „In-House“ solution
- „Batch-operation“ enables us to draw more energy from the same amount of waste water
- Integrated turbulence generator for maximum heat exchange rate
- Power: approx. 50 kW

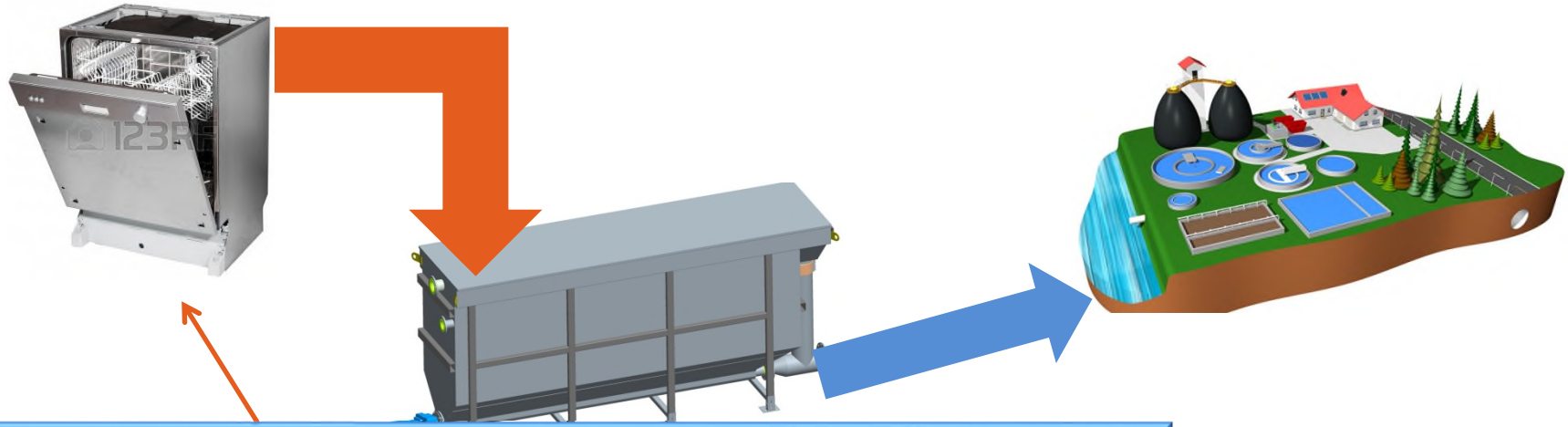
Nursing Home Hofmatt (Münchenstein, CH)

Nursing home Hofmatt (Münchenstein, CH)

Rule of thumb for planning



Klinikum rechts der Isar (Munich)

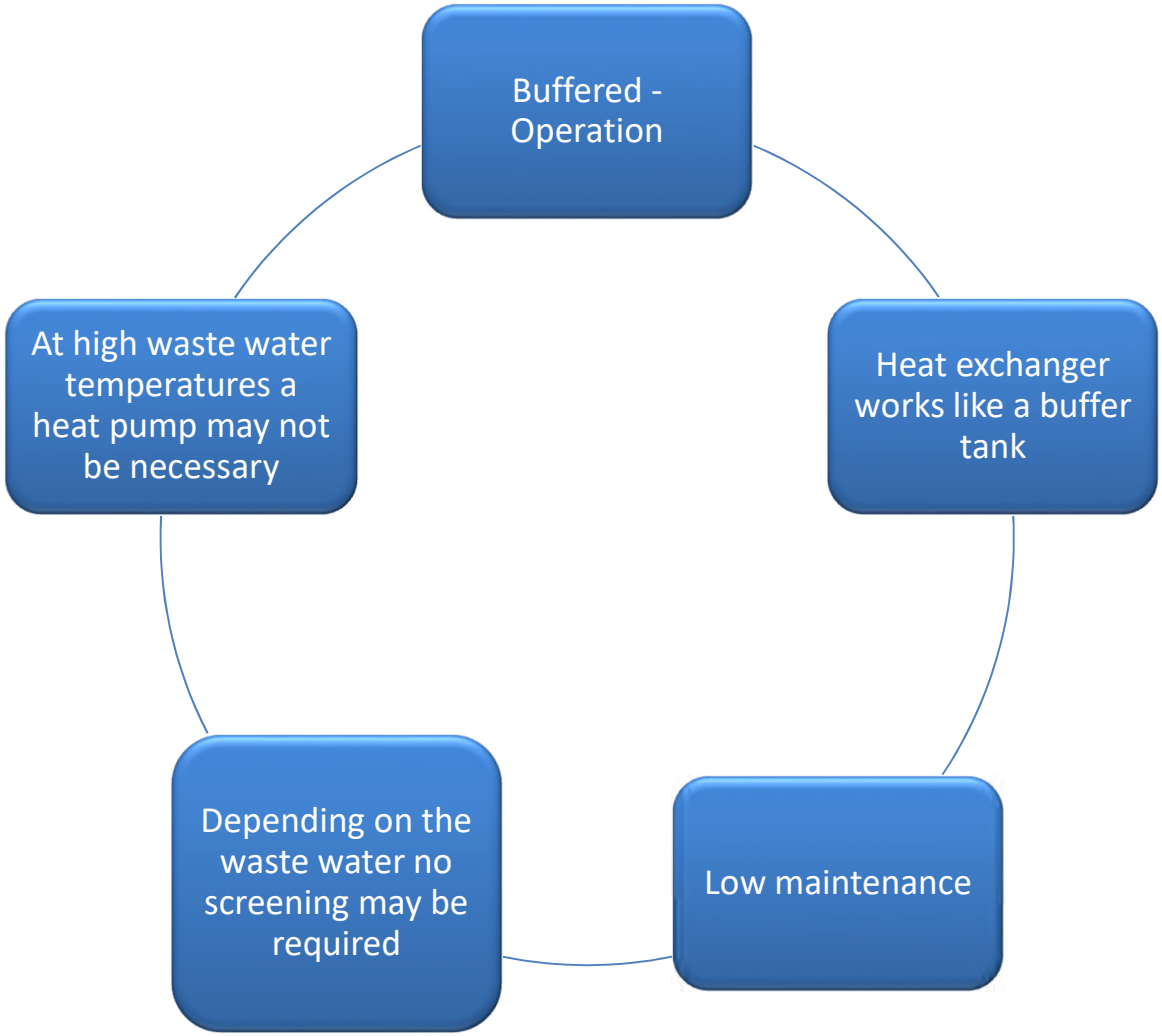


- During modernisation the energy concept was overhauled
- Waste water from the central sterilisation for tools
- Heat exchanger had to be separated because of the confined space in the basement
- Direct pre-warming of the fresh water via a second plate heat exchanger
- Power ca. 60 kW

Klinikum rechts der Isar (Munich)

Klinikum rechts der Isar (Munich)

Advantages of the ThermWin System for In-House Solutions



Applications

Hotels and Apartments

Public Institutions

Breweries and other industries

Hospitals

Swimming Pool

Waste Water Treatment Plants

Target industries for the Huber ThermWin System

Textile industry

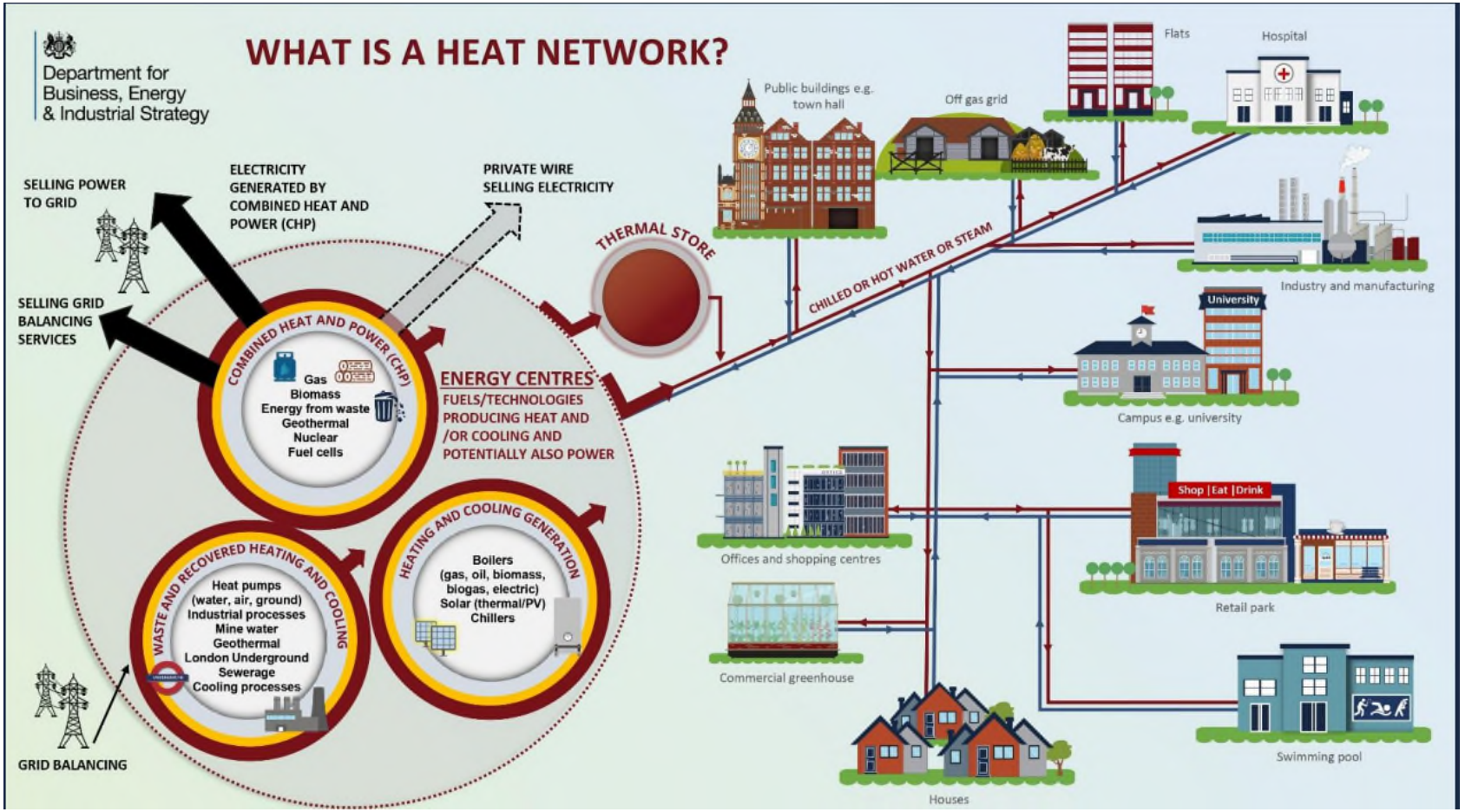
Paper ills

Food industry

Meat processing

Cleaning facilities

Heat Networks



Worldwide References – NONE IN THE UK

quantity	size	project	country
1.00	4	Nice RoWin Veolia, FR	France
1.00	4	Berlin - Oderstraße	Germany
2.00	8	Straubing, ThermWin	Germany
2.00	8	Winterthur Wintower, CH	Switzerland
1.00	6	Lindenschmidt KG	Germany
2.00	8	Stuttgart, ThermWin	Germany
2.00	8	Burgerbad-Leukerbad, CH	Switzerland
1.00	4	Hofmatt APH Münchenstein, CH	Switzerland
1.00	4	ESPACE GITTON, FR	France
1.00	4	Bremen-Findorff KA	Germany
1.00	4	Witzenhausen KA	Germany
1.00	8	Hälg Building Services Group,	Switzerland
1.00	8	Wärmeverbund Rheinfelden AG,CH	Switzerland
1.00	4	Klinikum R.d.I. ZSVA	Germany
1.00		Ecoquartier Alpha, CA	Canada
1.00	8	Herrenschwanden ARA Bern, CH	Switzerland
1.00	8	Herrenschwanden ARA Bern, CH	Switzerland
2.00	8	Herrenschwanden ARA Bern	Switzerland
1.00	8	Kolding WWTP, DK	Denmark
1.00	4	Valsana Resort, Arosa; CH	Switzerland
1.00	4	SRS Västeras, SE	Sweden
2.00	8	Museum d. Bayr. Geschichte Rgb.	Germany
1.00	8	Interpark Großmehring - RoWin	Germany
2.00	8	Fürth KA - RoWin	Germany
1.00	8	Sovalp - ThermWin, CH	Switzerland
1.00	8	Sovalp - ThermWin, CH	Switzerland
1.00	8	AGU Washington / DC, US	United States
1.00	8	Davos, CH	Switzerland
1.00	4	Radymno, PL	Poland
1.00	4	RoWin Pilot Project, KR	South Korea
1.00	4	GRUMA RoWin 4, MX	Mexico
1.00	4	Universitätsspital ZH, CH	Switzerland
1.00	4	Fjellvar Storanipa, NO	Norway
1.00	8	Kalte Nahwärme Schallstadt	Germany
1.00	8	Kalte Nahwärme Schallstadt	Germany
1.00	6	Vincenz Hospital Paderborn	Germany
1.00	8S	Arla Foods Pronsfeld	Germany
1.00	6	Rheingarten Konstanz	Germany
45.00			

References – Why none in the UK

- No Government Incentive – often a long payback
- Need underfloor heating at 45C – difficult with conventional
- Diverse ownership of Assets - who pays
  - Water company
  - Land Owner
  - Building owner/operator
  - Building occupants
- ‘Can’t do attitude’ – e.g. WCs worry about the temp drop in the sewage – (typically 3C in the volume in the RoWin)
- Corporate inability to just have a go, and do the right thing

Scotland Experience

- Government Driven through Scottish Water
- Incentive/Tarriffs
- Used Plate Heat exchangers – no evidence how or if it worked

Summary

- Proven and simple Technology
- Interfaces are complex
  - Different Asset owners
  - Civil interventions and construction tie ins
  - Existing Heat
- Cooling is as important as heating and helps justify the cost
- Each Project is different
- Package bespoke to application and needs

Advice on packages from Landmark

www.Land-mark.co.uk

Link to Canadian project write up

Innovative wastewater energy tech to be installed at Toronto Western Hospital - constructconnect.com

date of order	quantity	size	project	country
29/01/2010	1.00	4	Nice RoWin Veolia, FR	France
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15/06/2012	1.00	4	ESPACE GITTON, FR	France
11/07/2012	1.00	4	Bremen-Findorff KA	Germany
25/09/2013	1.00	4	Witzenhausen KA	Germany
27/09/2013	1.00	8	Hälg Building Services Group,	Switzerland
23/10/2013	1.00	8	Wärmeverbund Rheinfelden AG,CH	Switzerland
19/12/2013	1.00	4	Klinikum R.d.I. ZSVA	Germany
30/04/2014	1.00	8	Ecoquartier Alpha, CA	Canada
11/09/2014	1.00	8	Herrenschwanden ARA Bern, CH	Switzerland
11/09/2014	1.00	8	Herrenschwanden ARA Bern, CH	Switzerland
11/09/2014	2.00	8	Herrenschwanden ARA Bern	Switzerland
15/06/2015	1.00	8	Kolding WWTP, DK	Denmark
24/05/2016	1.00	4	Valsana Resort, Arosa; CH	Switzerland
23/06/2016	1.00	4	SRS Västeras, SE	Sweden
07/12/2016	2.00	8	Museum d. Bayr. Geschichte Rgb.	Germany
10/03/2017	1.00	8	Interpark Großmehring - RoWin	Germany
31/03/2017	2.00	8	Fürth KA - RoWin	Germany
31/03/2017	1.00	8	Sovalp - ThermWin, CH	Switzerland
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12/01/2018	1.00	4	RoWin Pilot Project, KR	South Korea
27/08/2018	1.00	4	GRUMA RoWin 4, MX	Mexico
09/11/2018	1.00	4	Universitätsspital ZH, CH	Switzerland
12/03/2019	1.00	4	Fjellvar Storanipa, NO	Norway
09/05/2019	1.00	8	Kalte Nahwärme Schallstadt	Germany
09/05/2019	1.00	8	Kalte Nahwärme Schallstadt	Germany
13/06/2019	1.00	6	Vincenz Hospital Paderborn	Germany
09/08/2019	1.00	8S	Arla Foods Pronsfeld	Germany
29/10/2019	1.00	6	Rheingarten Konstanz	Germany
23/05/2020	2.00	6		Germany
14/08/2020	1.00	4		Germany
10/09/2020	1.00	4		Germany
08/13/2021	1.00	4		Switzerland
12/04/2021	8.00	8	Toronto	Canada
Total worldwide:	58.00			

Landmark Environmental
Our Nature, Your Business

HUBER TECHNOLOGY
WASTE WATER Solutions

HUBER approved Delivery Partner in the UK

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Landmark provide bespoke package to meet specific client needs

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