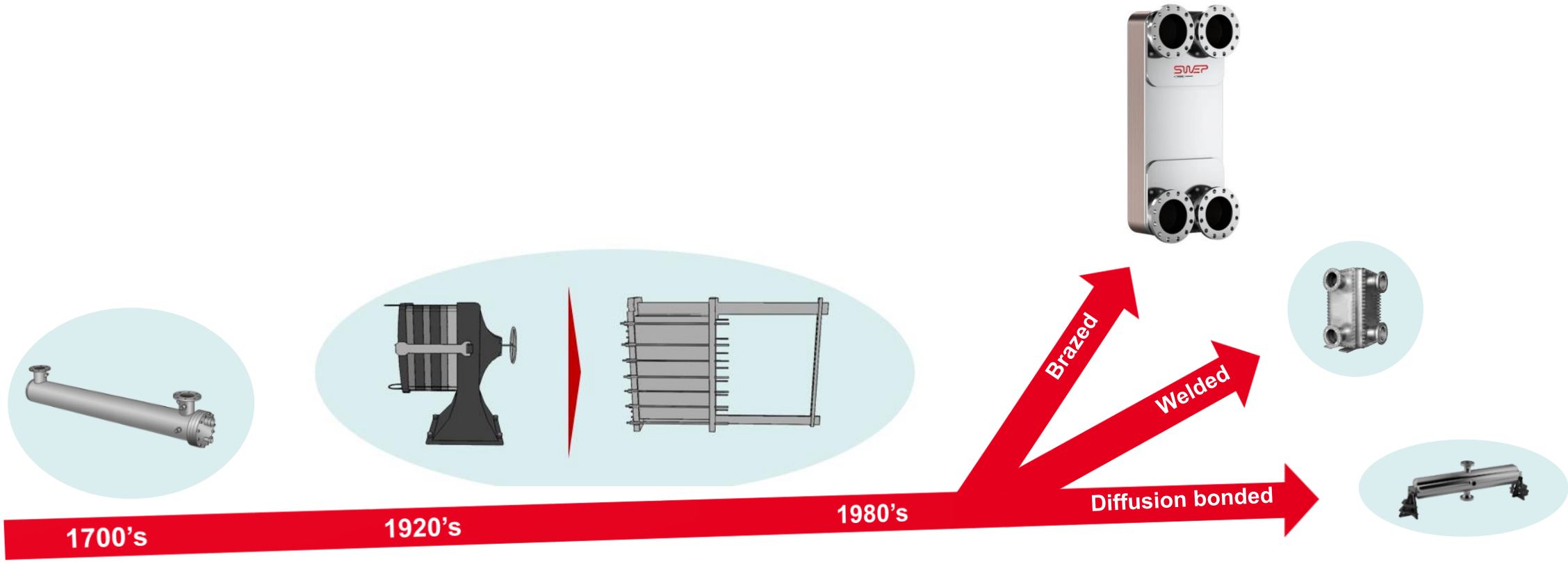
Selecting the Most Efficient Heat Exchanger
or
“Bigger Isn’t Better”

Henrik Rietz
Systems Manager
SWEP International AB
henrik.rietz@swep.net

CHALLENGE EFFICIENCY

Evolution of plate type HEX technologies



Tubular heat-exchangers
Invented with the steam engine

Plate heat exchangers was of gasketed/bolted type using cast gunmetal plates → basic construction has essentially remained intact

In the 1980's, self contained plate heat exchanger offering the benefits of the plate technology to even more applications.

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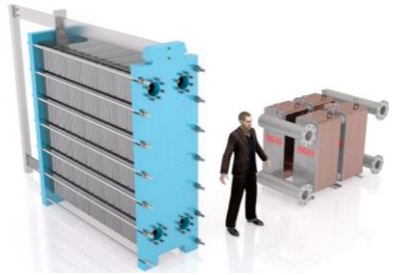
Brazed Plate Heat Exchanger Advantages

BPHE vs tubular HEX (S&T)

80% Lower weight	**80%** Smaller physical size	**80%** Reduced hold-up volume	**75%** less carbon footprint

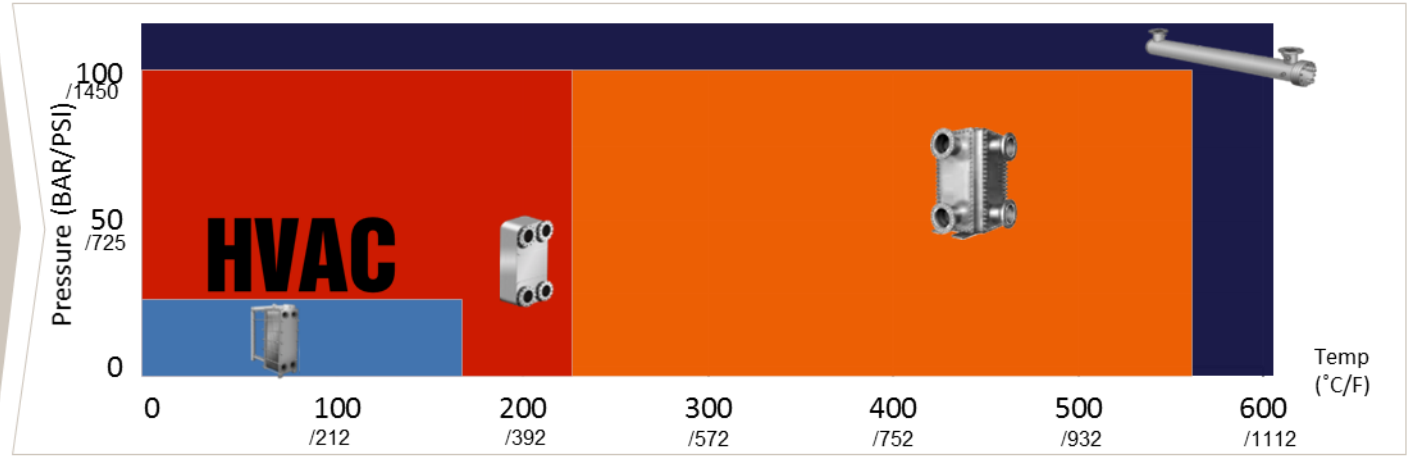
BPHE vs Plate and Frame HEX (PHE)

50% Lower weight	**60%** Smaller physical size	**40%** Reduced Life Cycle Costs	**45%** less carbon footprint



Techc's and their sweet spots

- S&T losing shares to all plate types
- GPHE, most mature plate technology, losing shares to BPHEs



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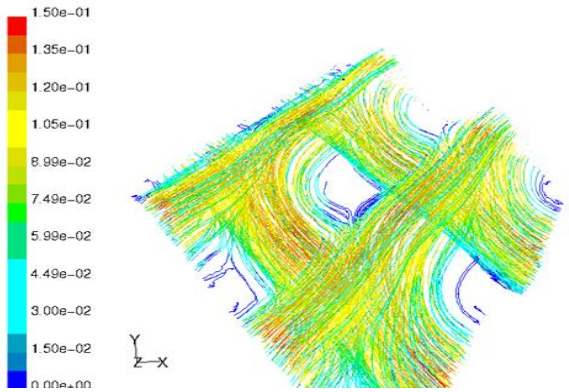
Efficient by design



Designs created by CFD and experience
No dead areas and minimized pressure drop

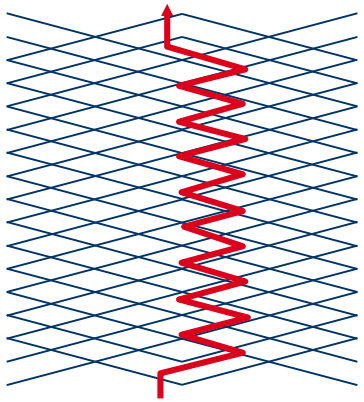


Plate geometry cause flow to whirl,
Flow is turbulent already at Re 150

Self-containing structure
>95% of material used for heat transfer

Brazing points stabilize the structure
Operating pressure from vacuum to 450+ PSI
Temperatures -324/440 °F

½” port size
2.3” x 4.6”
7 GPM

6” port size
22” x 49”
1500 GPM

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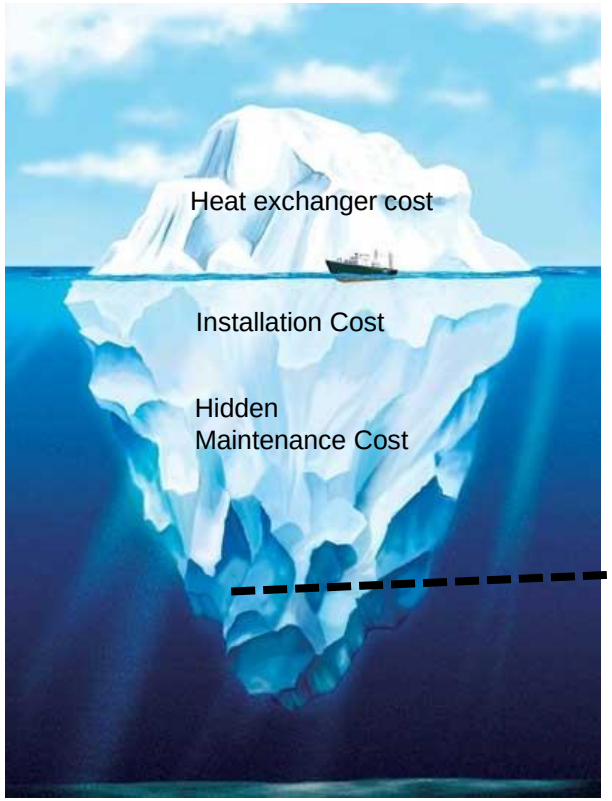
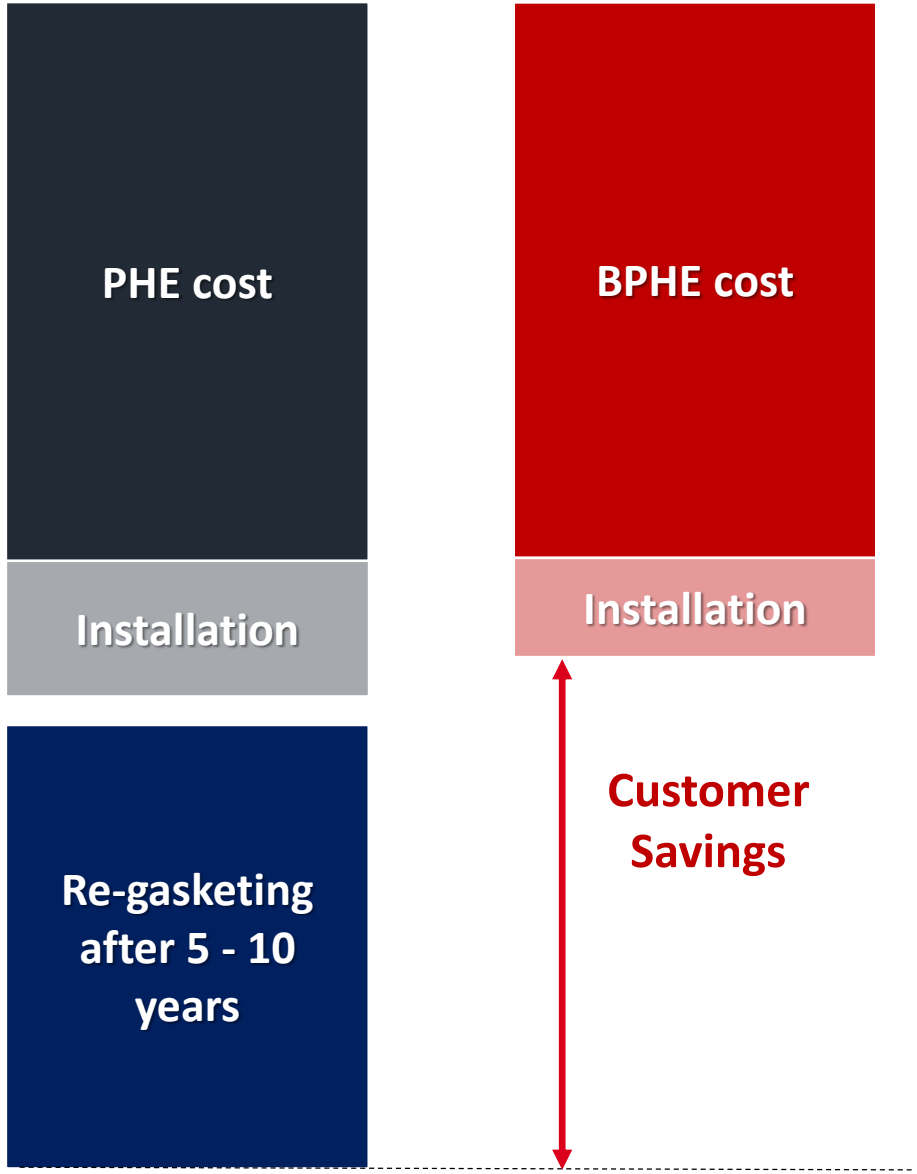
Low Life Cycle Cost





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Low Life Cycle Cost

- Servicing a PHE requires complete dismantling and a service area.
- Regasketing of a BPHE will never be needed.
- BPHE’s are sealed units, helium and pressure tested at the factory.
- All certifications, ratings and testing is done at the factory for the BPHE.
- Cleaning a BPHE is performed through the ports.

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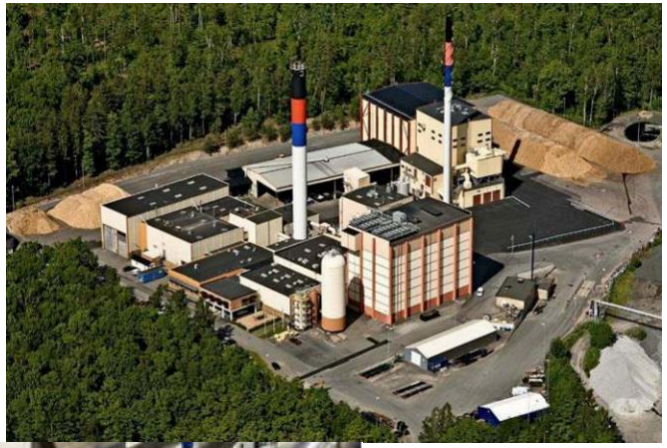
Low Life Cycle Cost – Case Story



Hässleholm Miljö AB is a commercial company wholly owned by the Municipality in Southern Sweden.
They company's district heating operation needed heat exchangers with a capacity of **10MW (34MBtu/h)**, something brazed plates could not provide until now.
The customer reported that using Brazed Plate Heat Exchangers gave them the following benefits.

- Reduced maintenance costs and down time with no gaskets to replace
- More flexible solution the makes it easy to expand capacity as needed with the module design concept.
- The heat exchangers don't leak at start-up and when the temperature varies.

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Modular concept for large capacities

- Compact installation footprint allow for modular design
- Subsystem design can be varied to meet preferences in height/footprint
- Easy transportation and installation into ETS room
- Modular capacity with with remained turbulence
- Built in redundancy
- No service downtime as one set can operate as the other is cleaned

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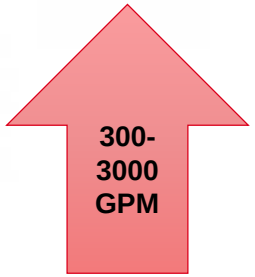
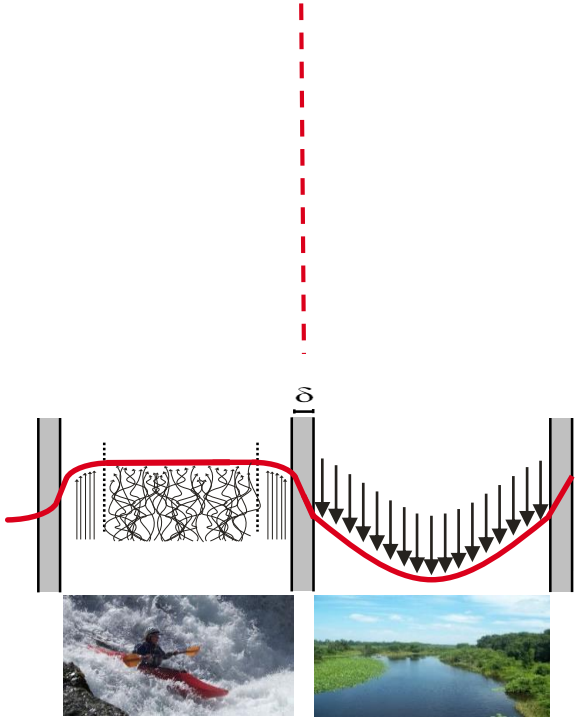
Bigger isn't Better – Modular solutions

VFD

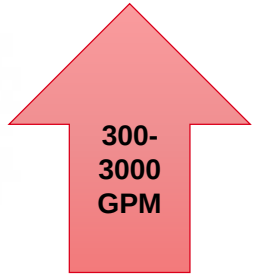




Turbulent

Laminar

VFD



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Adding Capacity

Modular Design – Case Story

At the award-winning Tele2 Arena in Stockholm Sweden. Tele 2 converted their football field to an ice rink. The needed heat exchangers would have to provide **2600 kW** (**740 RT**) of cooling capacity in a very small existing space. BPHEs made this possible.

- SWEP provided 4 series parallel units to provide the 2600 kW (8.9MBtu/h or 740 tons) of cooling capacity
- The available space had very strict height and space limitations.
- It only took one hour to position all the needed heat exchangers in the mechanical room through the existing 36” door

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Self Cleaning

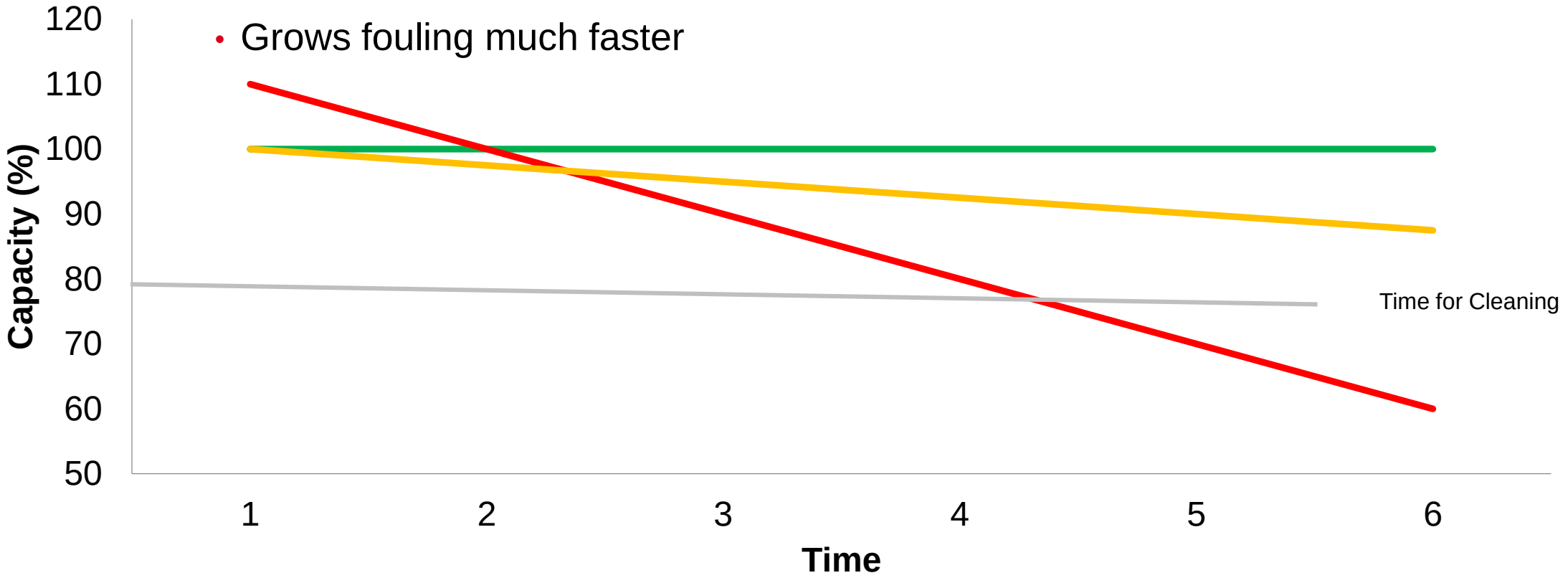
Just like turbulent water on river – sediment is less likely to build up in in a HEX that creates high turbulence by the plate design which is achieved in a BPHE

If the system is designed properly with the right flow, filters, strainers and/or water treatment the BPHE fouling should not be an issue

Bigger isn't Better

Oversizing the heat exchanger can temporarily increase performance but:

- Lowers the flow velocity and turbulence
- Grows fouling much faster



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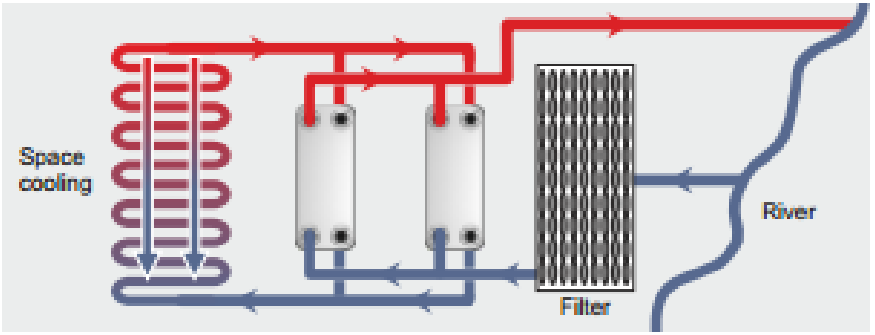
Self Cleaning – Case Story

At Outokumpu rolling mill machine shop in Sweden uses river water for cooling for its operation. They needed heat exchangers to remove up to **1.2MWH (4.1Mbtu/h)** of excess heat. Normally only about 20% of the capacity is needed. Brazed Plate heat exchangers was the right fit, with strainers installed.

- Modularized and correctly sized BPHEs maintain the self cleaning affect when using natural river water.
- The capacity of the BPHE works in available space in the machine room.
- “The dependability is the key to preventing costly downtime”



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