

Heat reuse and the importance of every degree

Today's speakers

Rolf Jönsson
Business Development
Alfa Laval



Thomas Parker
Founder
WA3RM



From 1883 to 2024

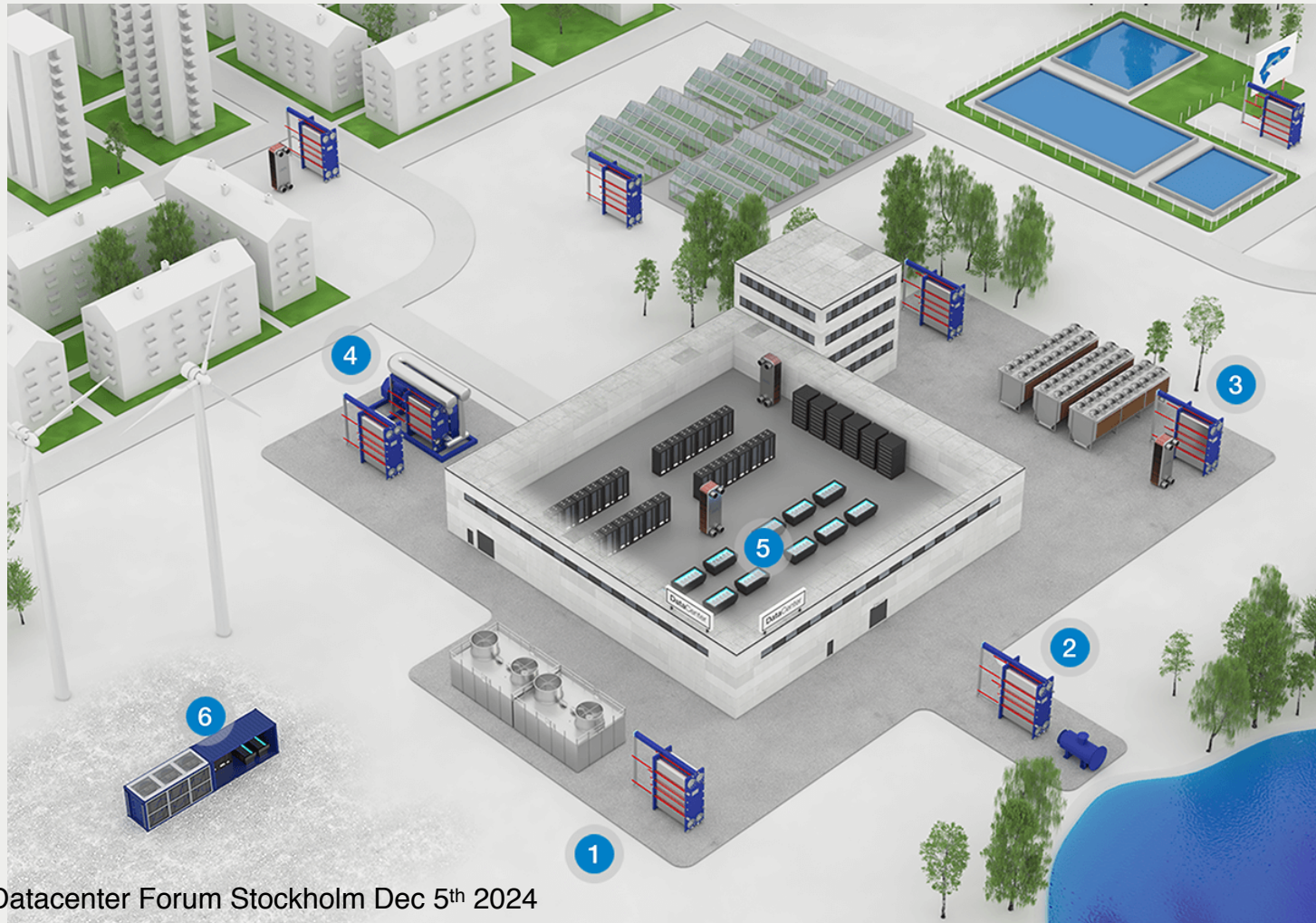
Gustaf de Laval invented the milk separator in 1878 which laid the foundation for Alfa Laval.

In the 1930s we introduced the first plate heat exchanger to the world.

Today we are the global market leader in heat transfer, separation and fluid handling.



Overview of Alfa Laval solutions



Heat management positions

1. Plate heat exchanger as interchanger with an open or closed cooling tower
2. Plate heat exchanger and filter for sea water/lake/river cooling
3. Dry coolers and hybrid coolers for heat rejection
4. Plate heat exchangers for heat reuse connection and in heat pumps
5. Plate heat exchangers in CDUs
6. Containerized cooling solution

Heat Reuse Opportunities

Operator Heat producer	Heat receiver Heat user	
<p>HIGH TEMP (>45°C)</p> <ul style="list-style-type: none"> • Immersion 	<p>HIGH TEMP (>80°C) (High lift heat pump)</p> <ul style="list-style-type: none"> • F&B pasteurization • F&B cooking • Process hot water • 3rd generation district heating • Power-to-X 	<p>High lift heat pump</p>
<p>MEDIUM TEMP (20-45°C)</p> <ul style="list-style-type: none"> • Direct-to-chip • CRAH 	<p>MEDIUM TEMP (50-80°C)</p> <ul style="list-style-type: none"> • 4th generation district heating • Fan coil / AHU • Radiator • Domestic water • Boiler feedwater • Process wash water • Process pre-heat 	<p>Medium lift heat pump</p>
<p>LOW TEMP (<20°C)</p> <ul style="list-style-type: none"> • DX • CRAC 	<p>LOW TEMP (<50°C)</p> <ul style="list-style-type: none"> • Greenhouse • Underfloor heating • 5th generation district heating • Aquaculture • Snow melting • Swimming pool/Spa 	<p>Low lift heat pump alt. No heat pump</p>



From big science to industrial scale impact



WA3RM was founded as a spin-off from ESS in Lund with a mission to change global industrial development by bringing waste to life on an industrial scale.



From paper to pomodoro.

Regenergy Frövi reuses industrial waste heat from Billerud's carton factory to responsibly produce tomatoes in greenhouses, all year round

Key figures: One ten-hectare module tomato (Peppers and cucumber are similar. Leafy greens are not; WA3RM is developing that concept.)



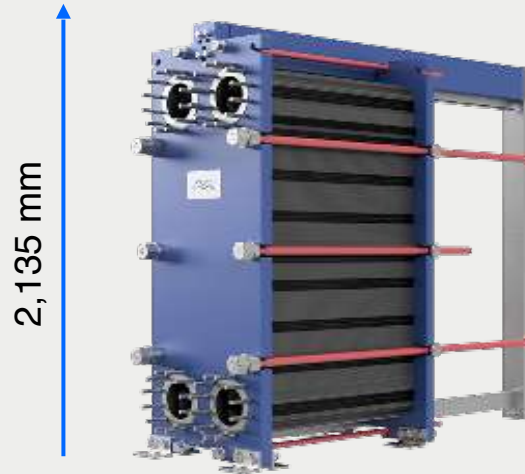
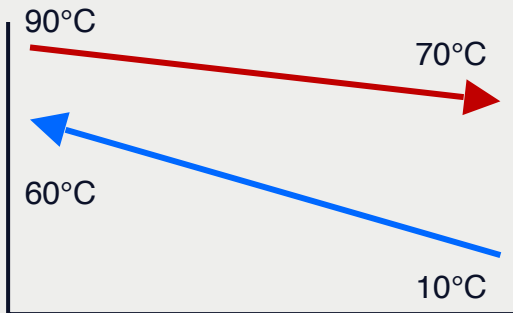
- Growing area: 10 ha
- Total area: 14 ha
- Decent, sustainable full time jobs: 100
- Annual heat demand: 40 GWh
- Minimum useful temperature: 45°C
- Annual production: 8000 tons (1-2 truckloads per day)

Effect of approach temperature

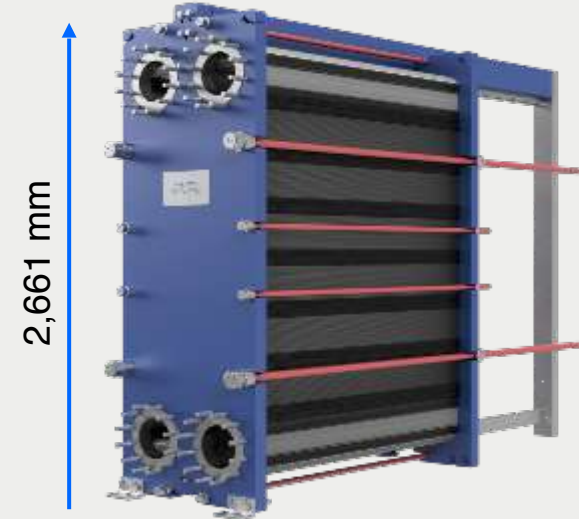
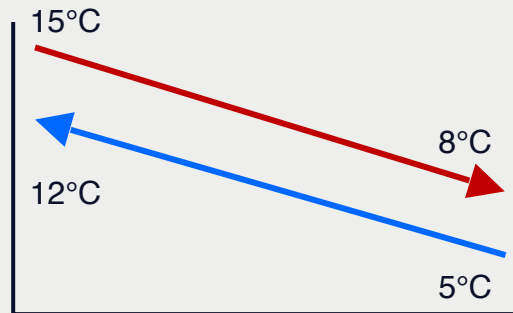
It is not the kilowatt determining the Plate Heat Exchanger (PHE) size



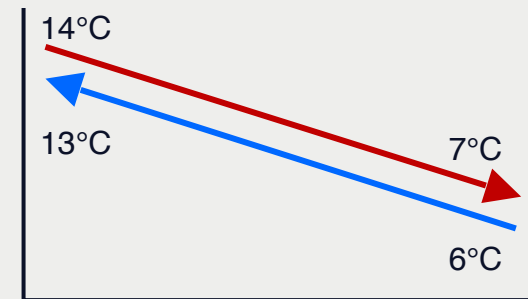
4,000 kW LMTD **43°C**
T10-MFG 16 m²



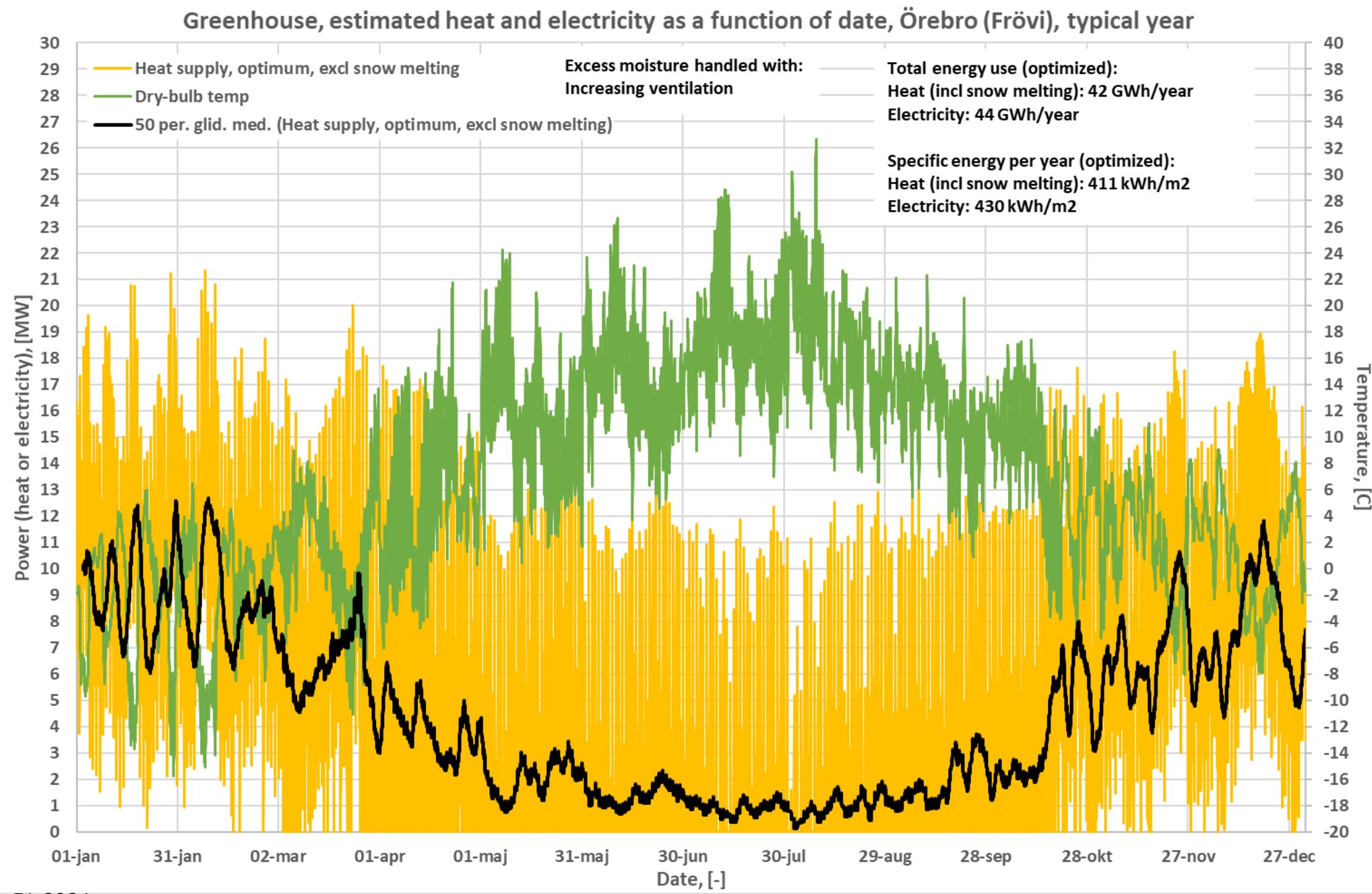
4,000 kW LMTD **3°C**
T21-PFG 275 m²



4,000 kW LMTD **1°C**
T25-BFG 879 m²



When connecting a data center with a greenhouse, remember that one of these is a high-tech energy facility ;-)



What is third party Performance Certification?

It is the best way to ensure that you get what you specify!

- AHRI is a global certification program for plate heat exchangers
- Guarantees performance based on heat load and pressure drop
- Minimizes the electricity consumption of other system components
- No extra cost!



Supplier A

=



Supplier B

=



Supplier C



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Alfa Laval &
WA3RM present

**Heat reuse and
the importance
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Datacenter Forum
Stockholm 5 December

Summary

Multiple opportunities for use of heat from datacenters
Direct or Indirect through heat pumps

Thank You! Questions?