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# The necessity of performance certification of plate heat exchangers in district cooling net works

## How to easily reduce the operational cost in the network

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# Performance certification pays

- With the use of performance certified plate heat exchangers, you will save energy, environment and money!
- Investment in performance certified plate heat exchangers is economically sound!



# What is AHRI?



- AHRI is the Air Conditioning, Heating and Refrigeration Institute based in Arlington, USA. It is a trade organisation – not an authority.
- Develops and publishes technical standards for industry products.
- Establishes rating criteria and procedures for measuring and certifying plate heat exchanger performance.
- Strives to help customers save energy, improve their productivity and help to ensure a better environment.



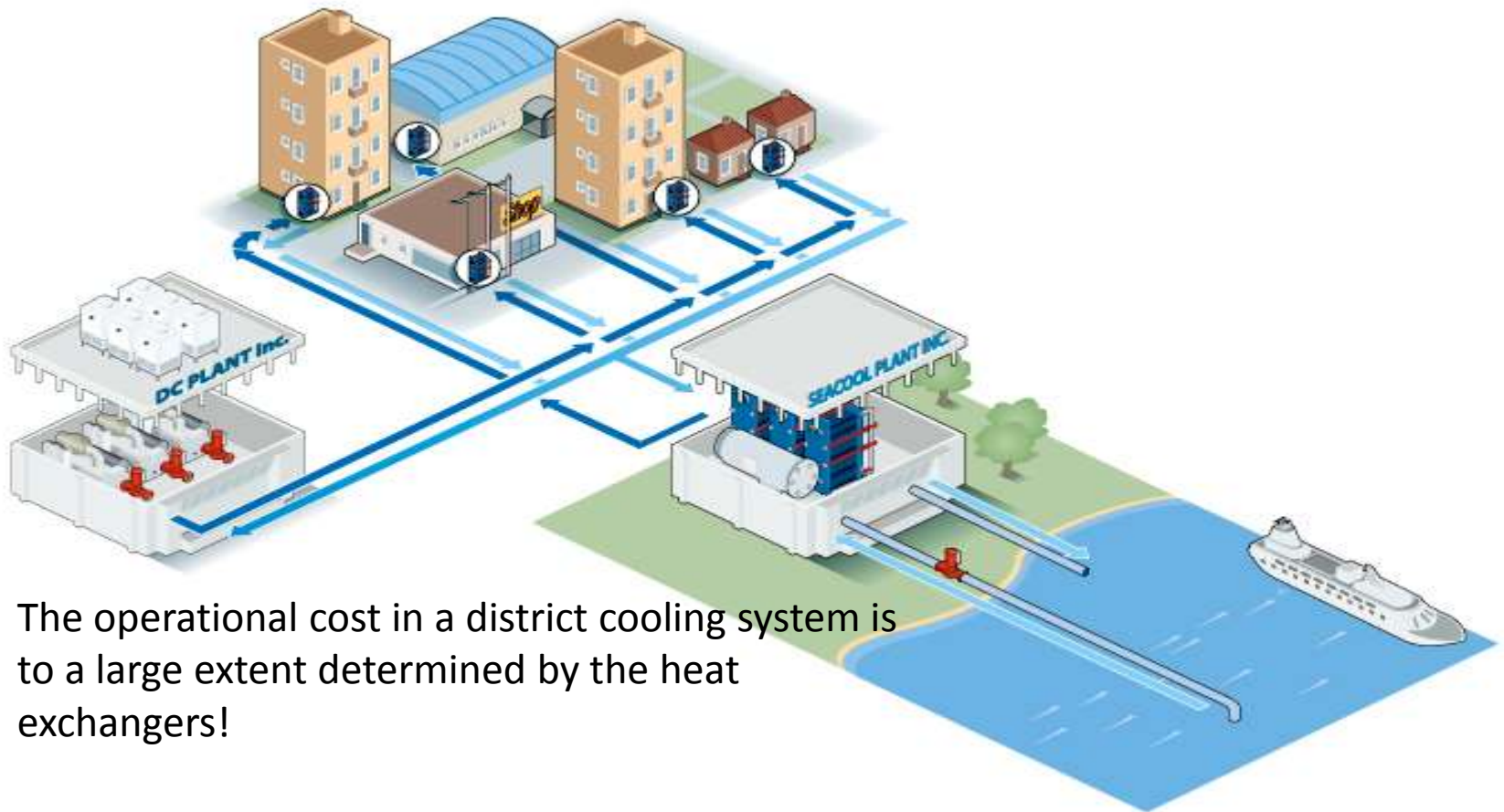
# AHRI Standard 400 and the LLHE certification program



- AHRI Standard 400 is a global standard on how to rate thermal performance in liquid-to-liquid heat exchangers.
- Independent, third-party verification of thermal performance in the “ AHRI Liquid To Liquid Heat Exchangers(LLHE) Certification Program”.



# District Cooling Network

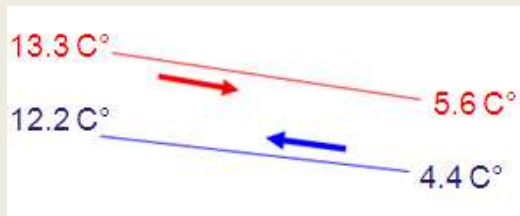


The operational cost in a district cooling system is to a large extent determined by the heat exchangers!

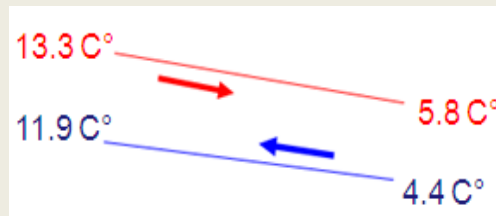
# Small thermal alterations can have huge impact on the price of a PHE



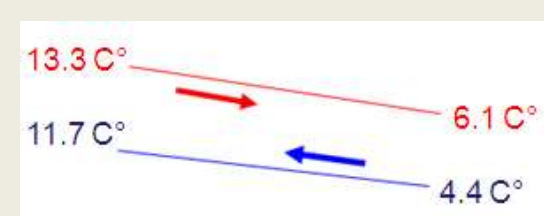
Specified



Offer version 1



Offer version 2



LMTD: 1.1 C°

Heat transfer area: 596 m<sup>2</sup>

Heat load: 3517 kW

Price relation: **100%**

<0.3 C°

>29%

>3.9%

>27%

LMTD: 1.4 C°

Heat transfer area: 423 m<sup>2</sup>

Heat load: 3382 kW

Price relation: **73%**

<0.6 C°

>42%

>7.2%

>40%

LMTD: 1.7 C°

Heat transfer area: 345 m<sup>2</sup>

Heat load: 3256 kW

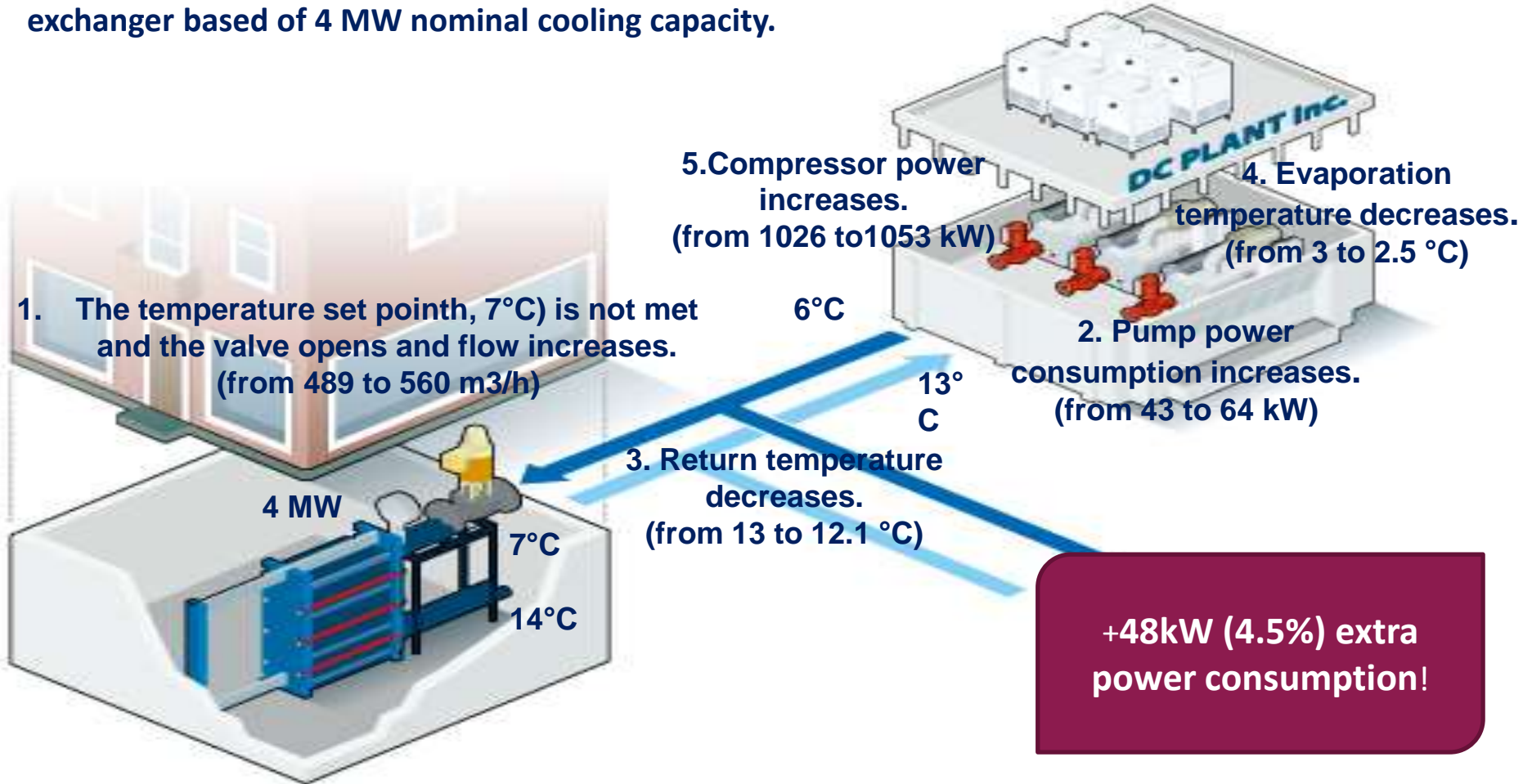
Price relation: **60%**

but...



# What happens if the PHE is undersurfaced in a district cooling energy transfer station?

Comparison between a properly designed and a typically undersurfaced (-30%) plate heat exchanger based of 4 MW nominal cooling capacity.



## Typical pay back time in the previous example



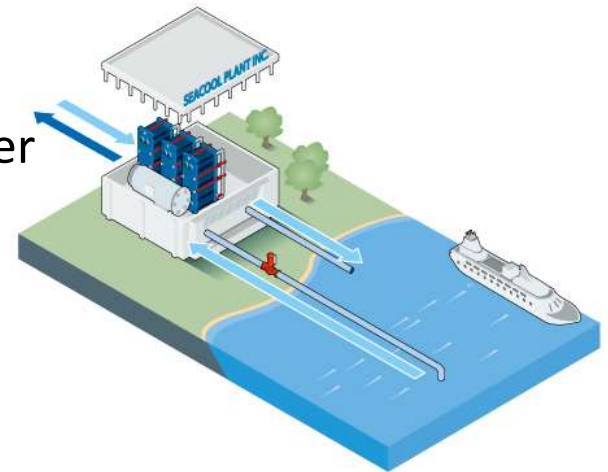
- Assumptions:  
Average power saving: 15 kW  
Power cost: 0.08 €/kWh
- Annual savings  
 $8760 \text{ h PY} * 15 \text{ kW} * 0.08 \text{ €/kWh} = 10512 \text{ € PY}$
- Additional price of certified PHE( approx 40% larger HTA): 10000 €
- Pay back time: approx 1 year!!!!



# What happens if a plate heat exchanger is undersurfaced in a free cooling system?



- Causes losses of free energy
- Needs typically to be compensated by a chiller and/or additional pump energy
- Increases power consumption



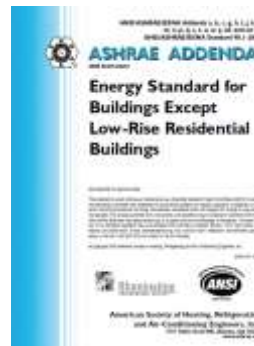
# AHRI certification and Green Building Standards



The LLHE certification standard is normally a prerequisite to receive LEED certification of a building in North America



USGBC has four levels of LEED:



# Cost effective for everyone

End-users



- Reduces lifetime operating costs significantly by assuring a more energy-efficient system.
- Ensures full investment value by reducing costs for field tests and additional component performance margins.



# Cost effective for everyone

## Consultants



- Ensures that the building's targets on power consumption and climate control can be met.
- Provides a verifiable basis for heat exchanger selection.
- Protects from performance concerns during commissioning and after installation.



# Cost effective for everyone

## Contractors



- Eliminates field acceptance tests.
- Reduces troubleshooting time during commissioning and after start-up.



# Why performance certification

## Summary



- Investment in performance certified heat exchangers is a good investment from pure financial point of view!
- The use of performance certification is a "Green" solution.
- All major stake holders in the industry such as operators, end users, consultants and contractors benefit from it.





# Alfa Laval's corporate mission



To optimize the performance  
of our customers' processes.  
Time and time again.

