



REWARDHeat

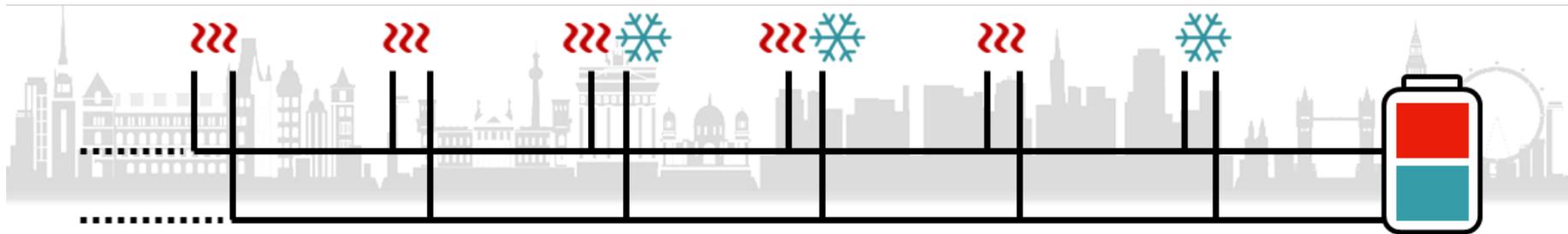
The role of the heat pump in a 5DHDC grid

Helen Carlström

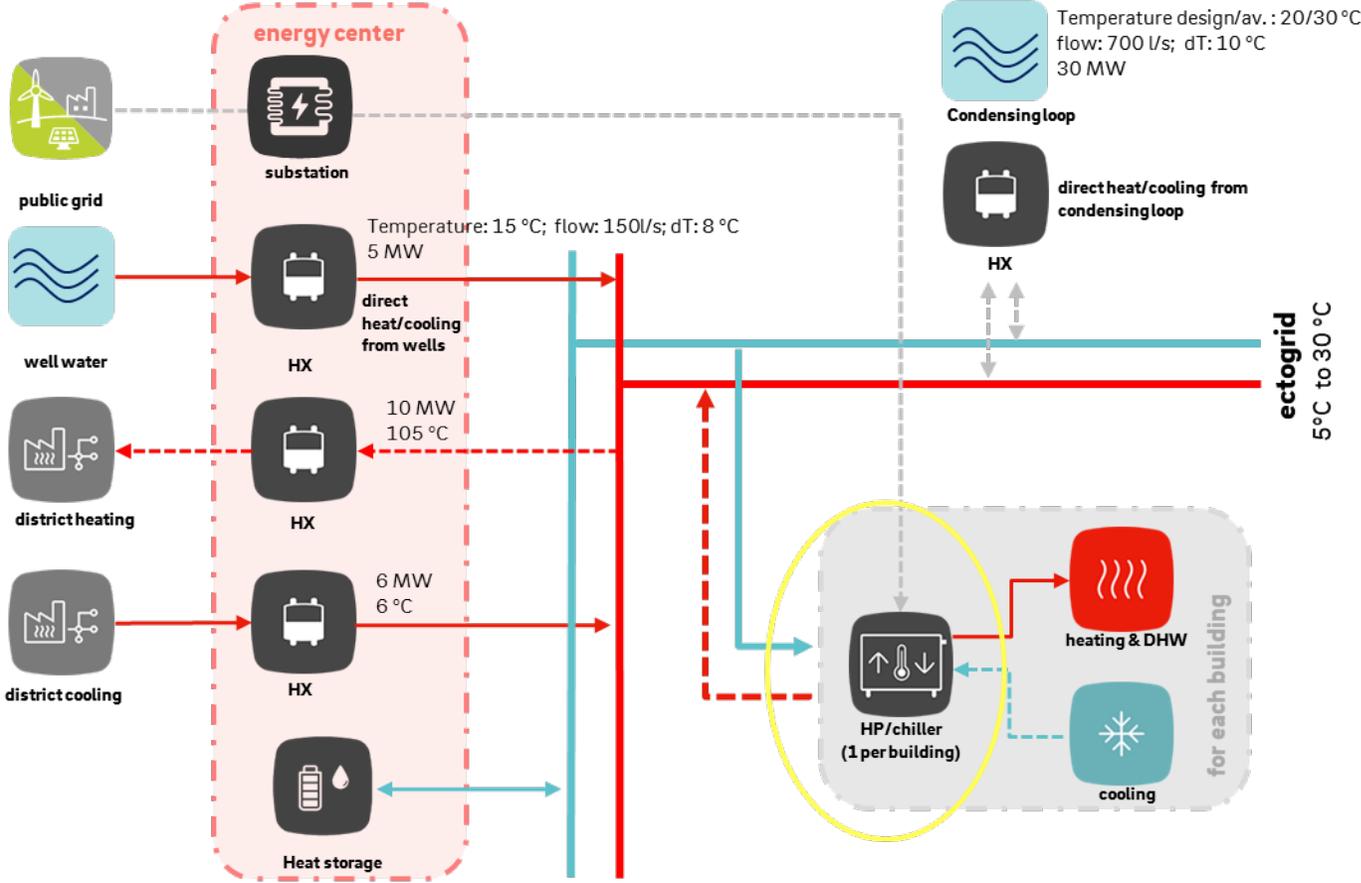
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ectogrid™

By connecting buildings with different needs and balancing the energy between them, E.ON ectogrid™ effectively uses all available energy flows and makes it possible to decrease both pollution and the energy consumption in a city.



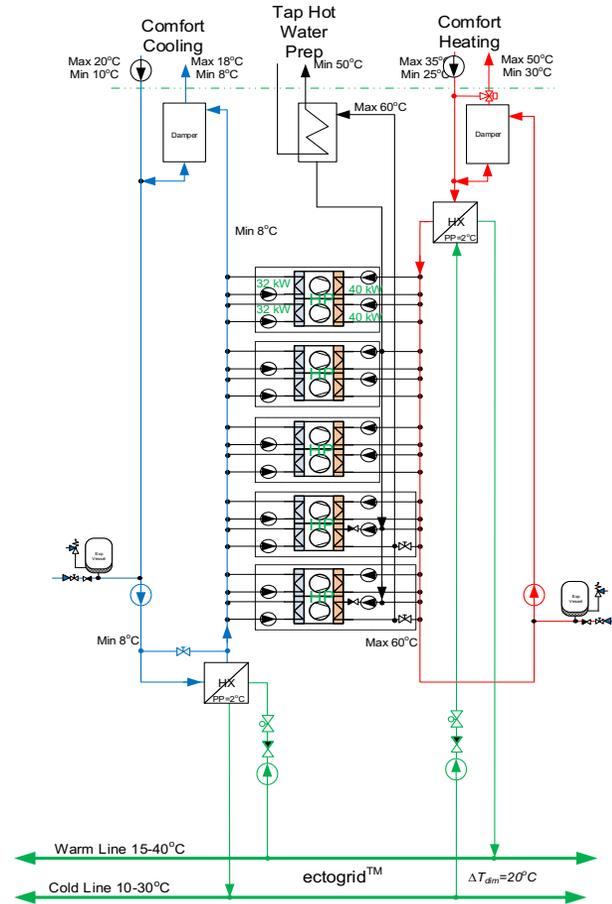
About the test site



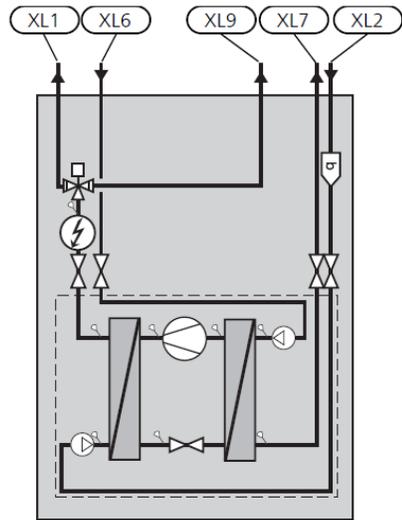
Why we want to develop a new kind of substation

- Standard machines can be used. No customized components are needed.
- The number of machines can decrease compared to standard settings where there is a need of both heat pumps and cooling machines.
- The interplay of the machines will be optimized based on smart control. The first machine in the train will have better working conditions but also need to deliver a higher output while the last one will have less good working conditions but also a lower need for output which constitutes overall higher efficiency.
- If one compressor breaks, there are still nine in operation, impacting the overall capacity to only a limited extent and ensuring security of supply.
- The compressors are “off the shelf kind” and can easily be replaced by local personnel.

Substation development



Setup of the two Nibe F1145 ground source heat pumps



- XL 1 Connection, heating medium flow
- XL 2 Connection, heating medium return
- XL 6 Connection, brine in
- XL 7 Connection, brine out
- XL 9 Connection, hot water heater

From Nibe Installer manual

HP2 receives the source circulation return and the pre-heated source circulation: **warmer temperatures**

Sink circulation (heating)

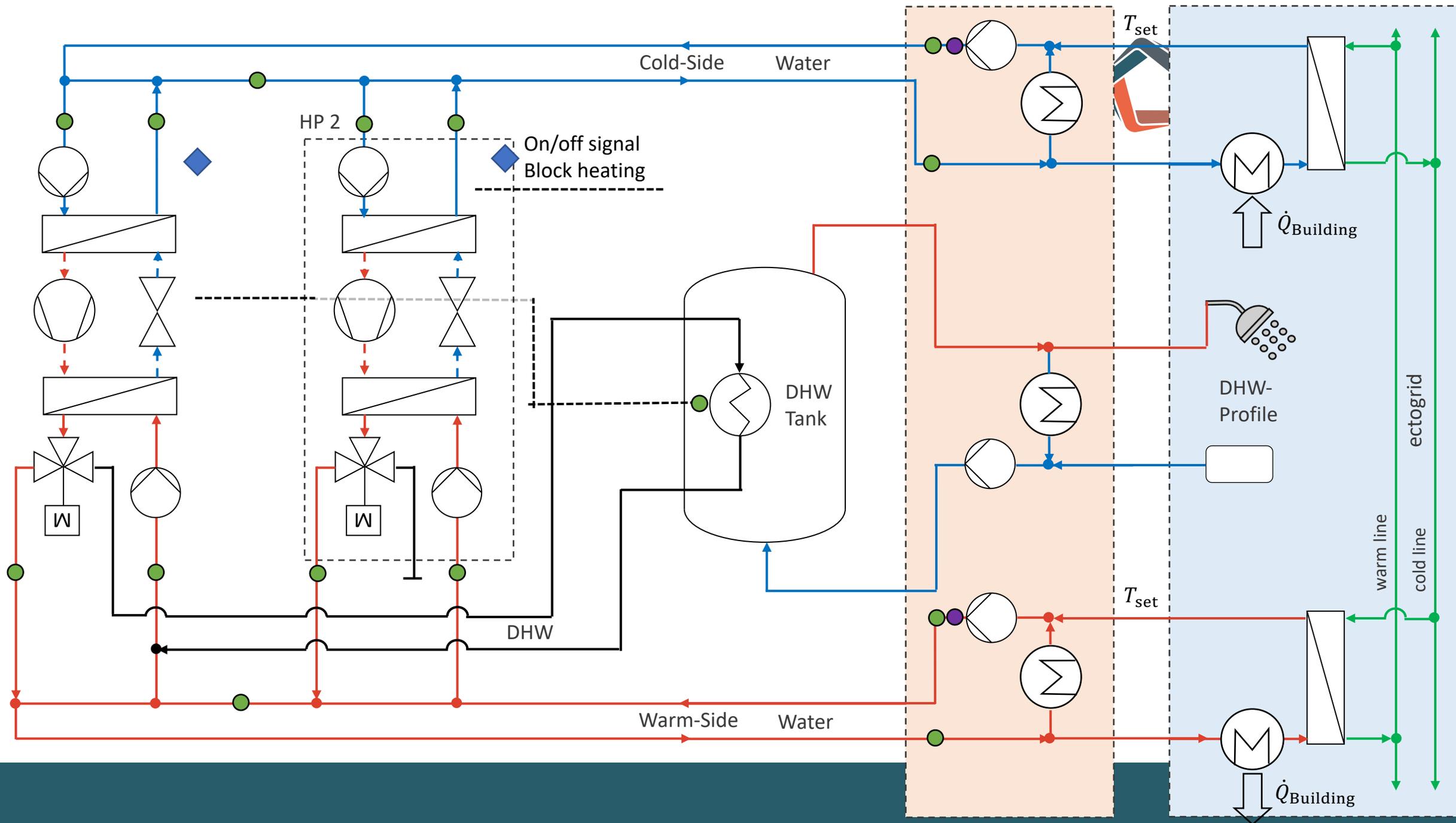
Source circulation (cooling)



to/from HiL

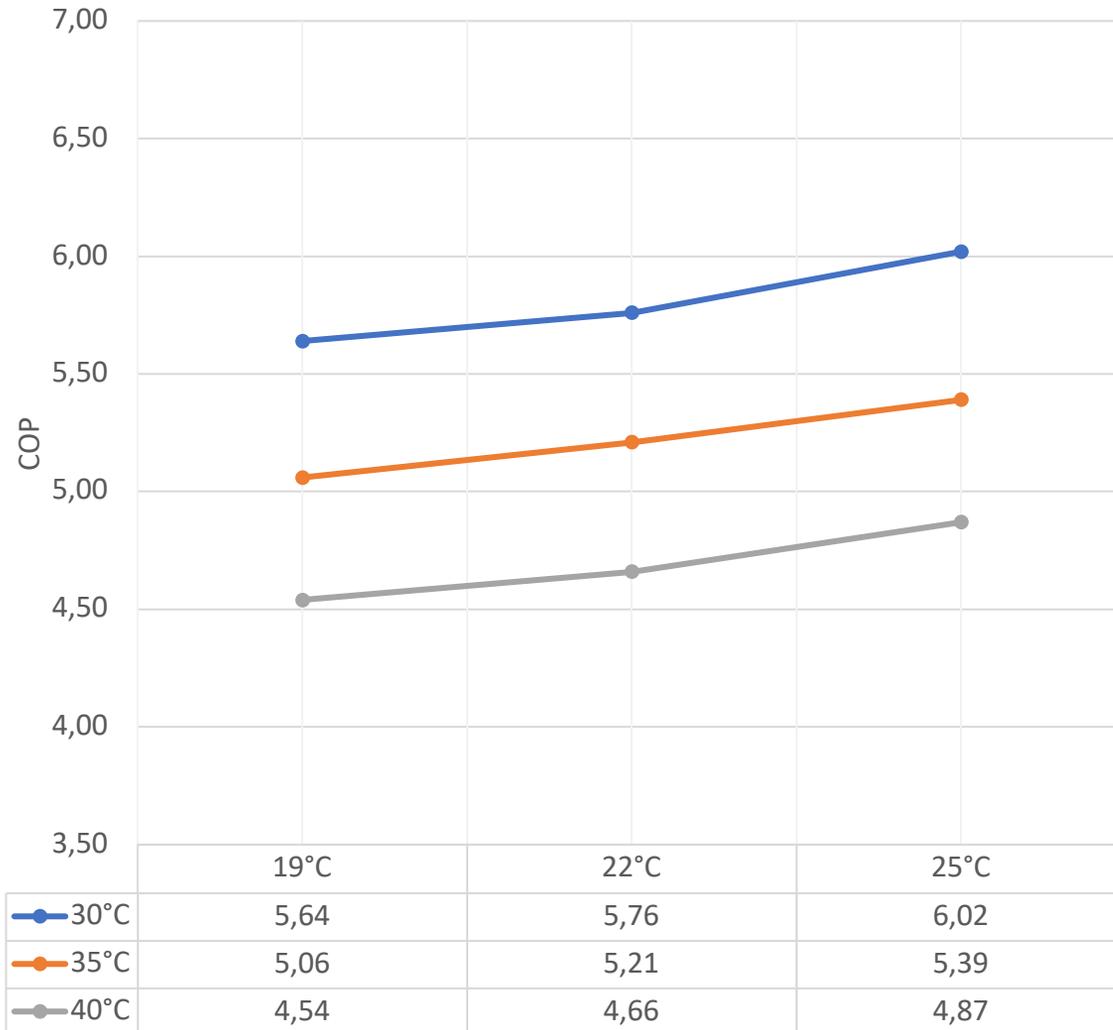
to/from HiL

HP1 receives the heat circulation return and the pre-chilled source circulation: **colder temperatures**

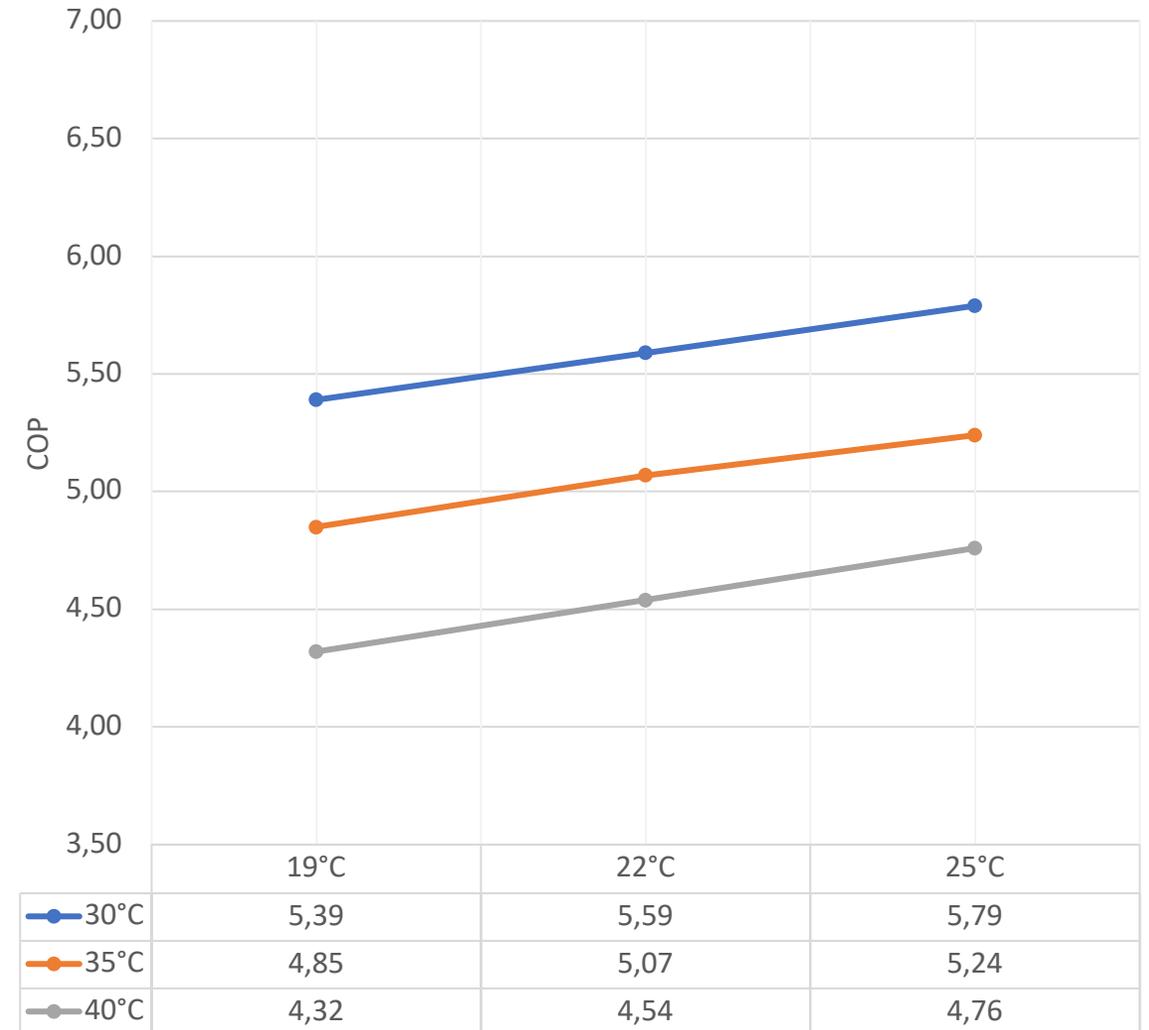


*Combined COP for both heat pumps
with an temperature spread of 10 & 14 K (HiL sink & source circulation)*

Combined COP for Δ 10 K

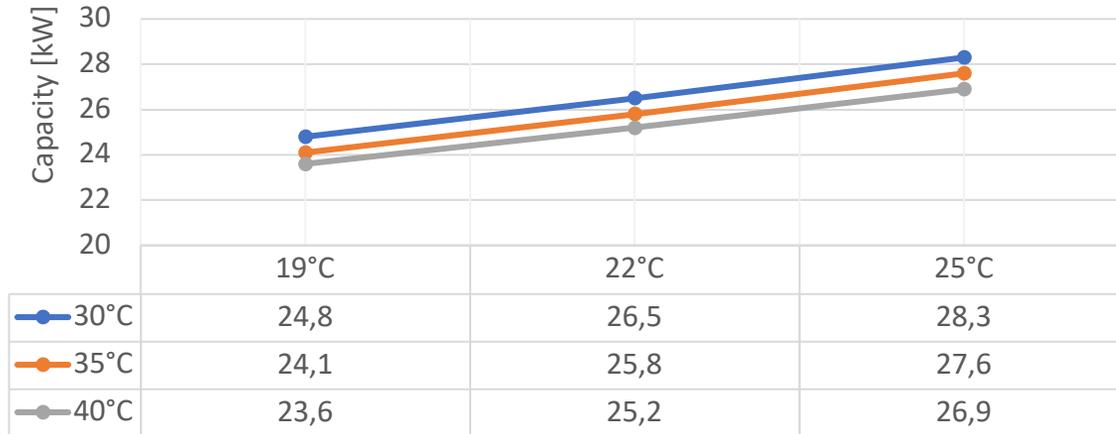


Combined COP for Δ 14 K

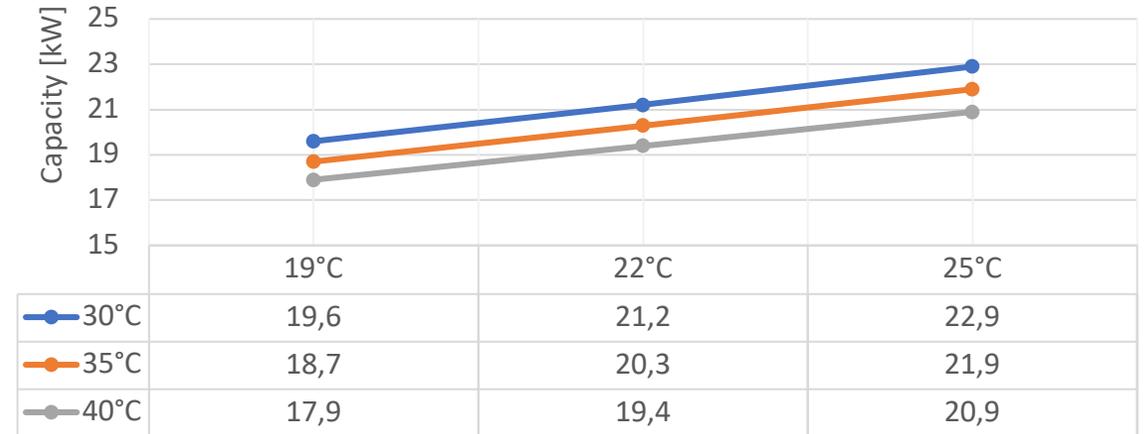


*Combined heating & cooling capacity for both heat pumps
with an temperature spread of 10 & 14 K (HiL sink & source circulation)*

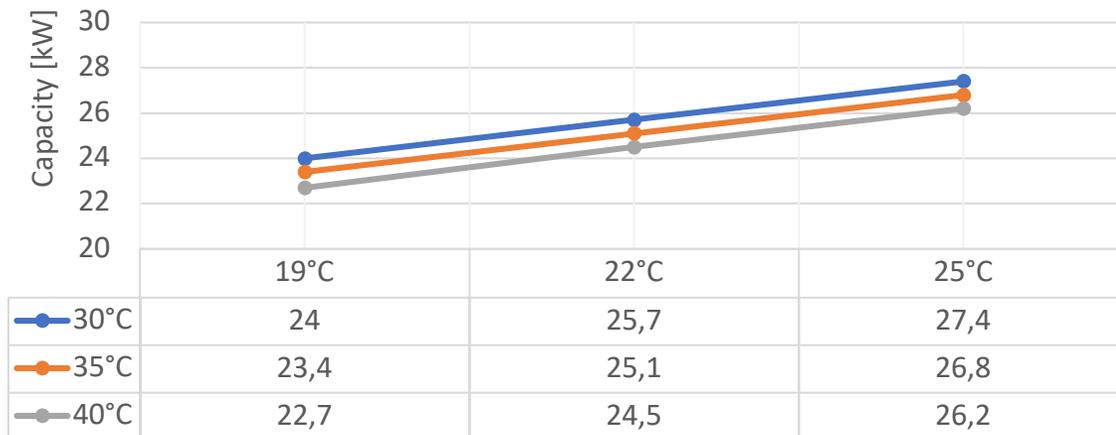
Combined Heating Capacity for Δ 10 K



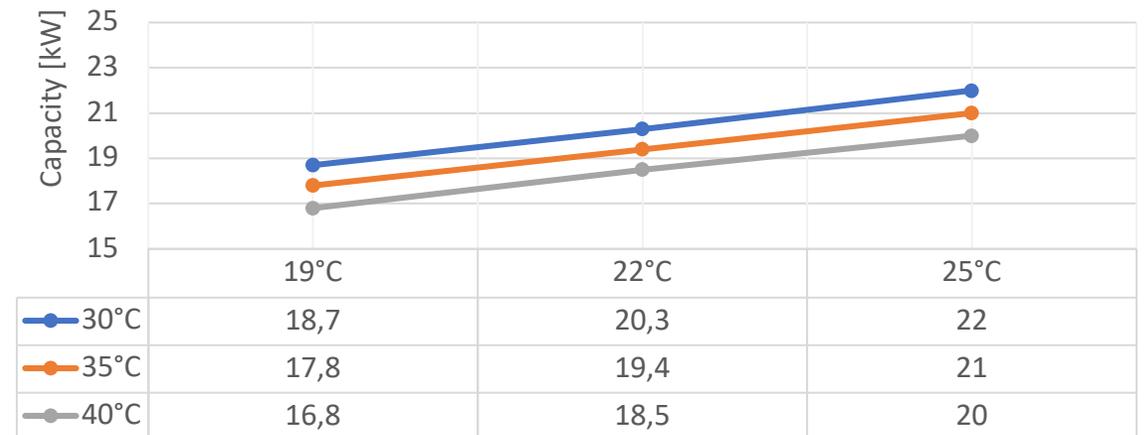
Combined Cooling Capacity for Δ 10 K



Combined Heating Capacity for Δ 14 K



Combined Cooling Capacity for Δ 14 K





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Thank you

www.rewardheat.eu



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