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IDEAS
www.horizon2020ideas.eu

Is my heat pump realistic?

oemof user meeting: mini TESPy project

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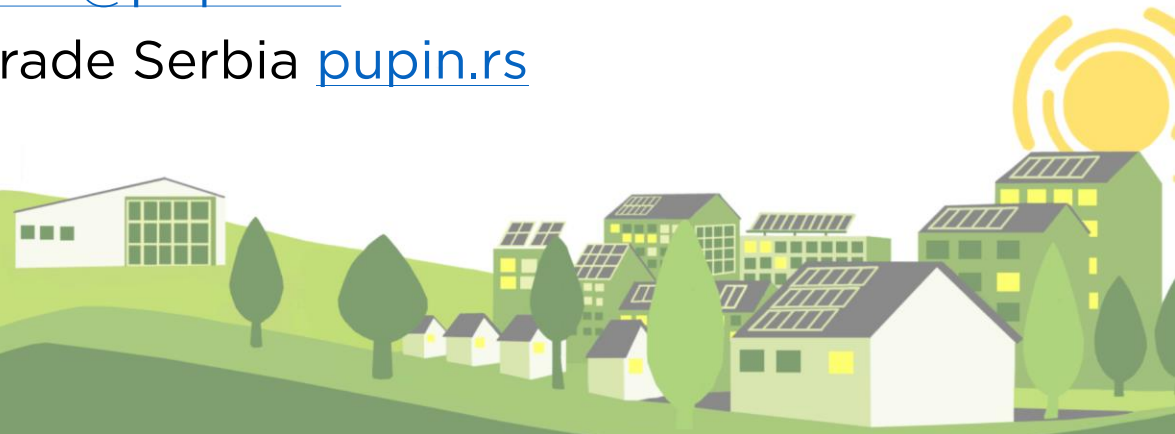

This project Is funded by the European Union's Horizon 2020 research and innovation programme under grant agreement No. 815271

HVAC system proposed by H2020 IDEAS project

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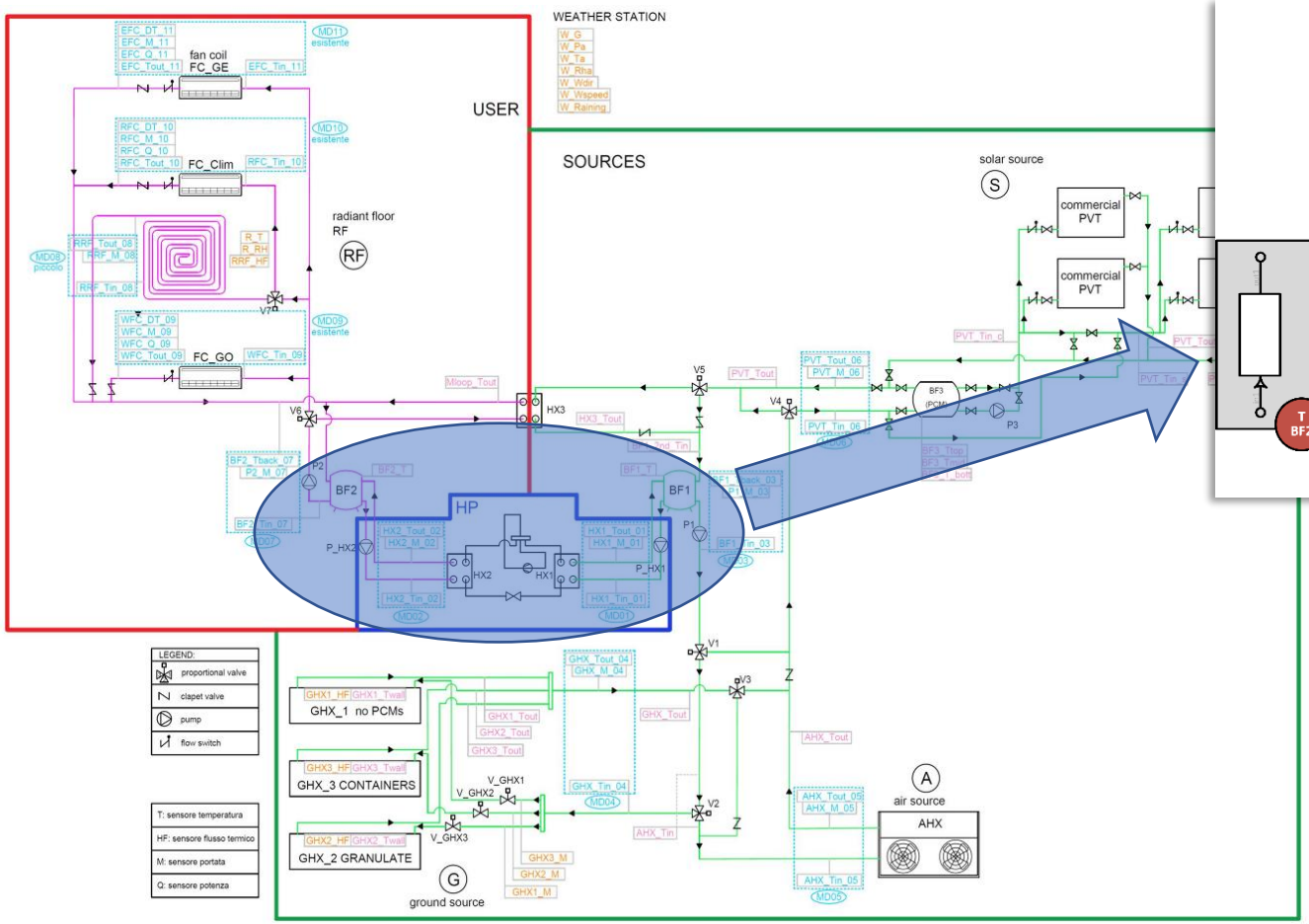

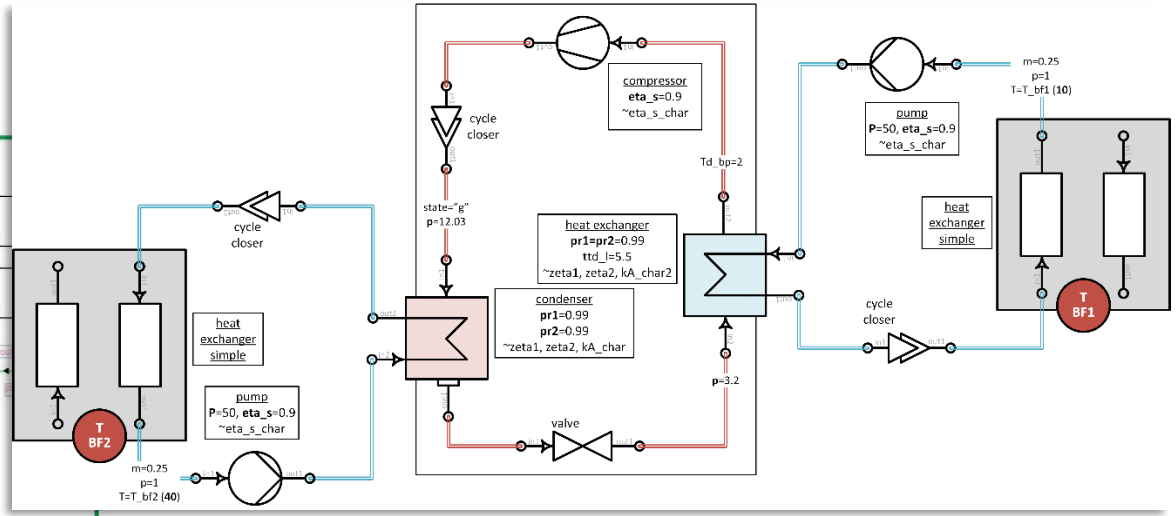

[1] IDEAS Deliverable 3.5 – Experimental results of the small-scale prototype

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How to verify a HP?

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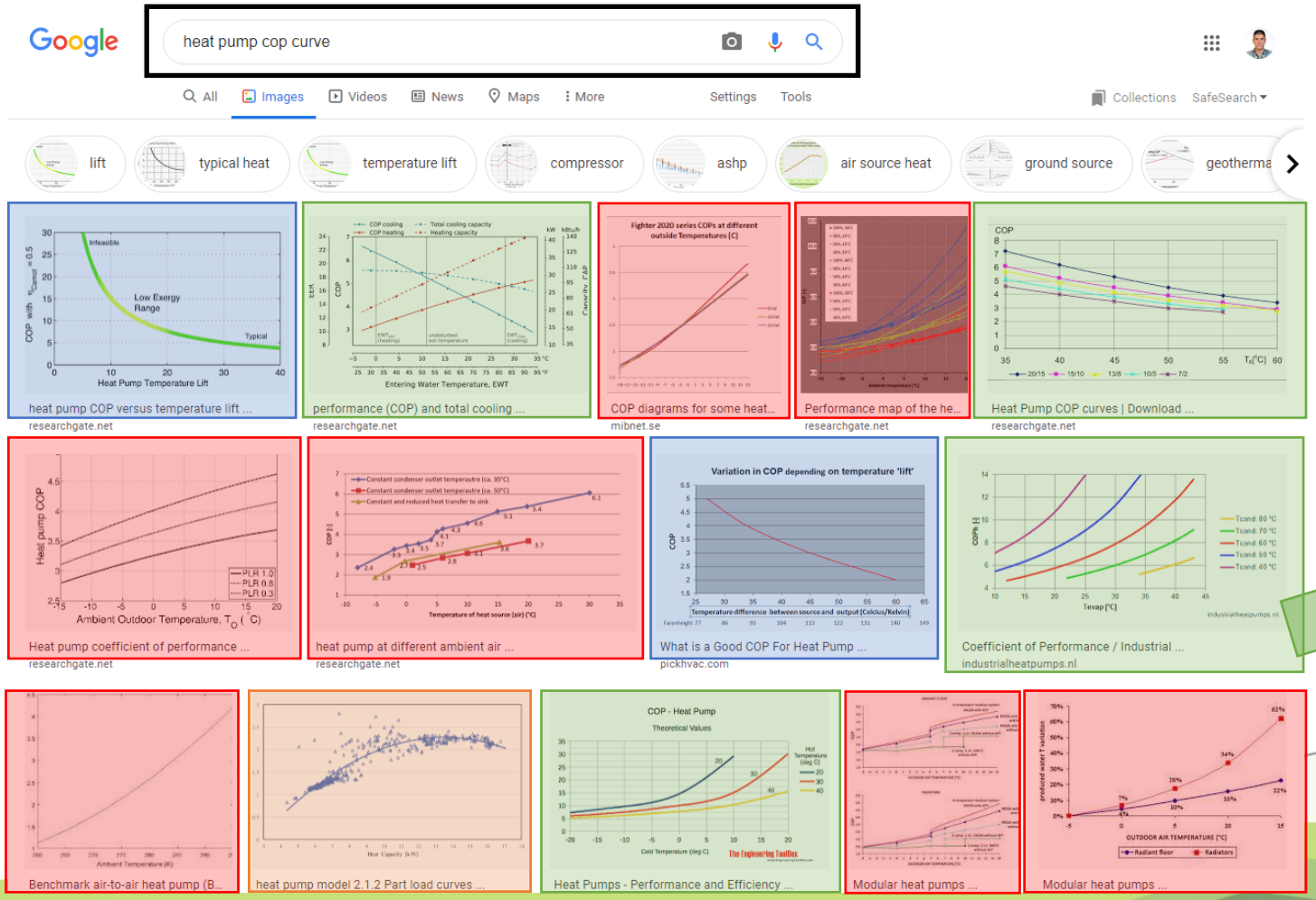
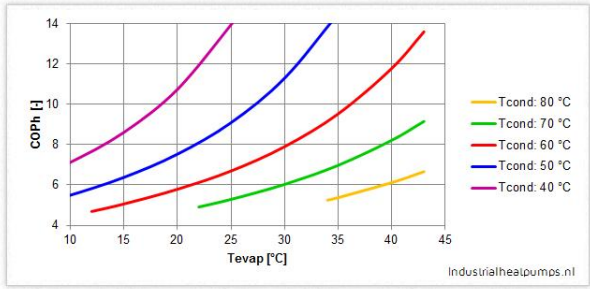
COP = f(T lift)

COP = f(T cond/evap)

COP = f(T air/ground)

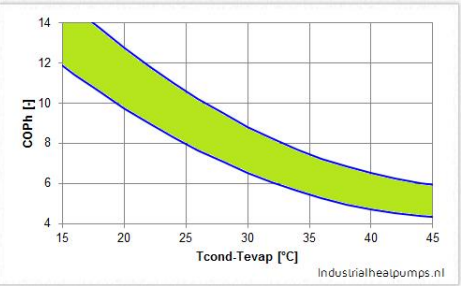
COP = f(power)





The efficiency of a heat pump, COPh, depends on several factors. Especially the temperature difference between waste heat source and potential user is an important factor. The temperature difference between condensation and evaporation temperature mainly determines the efficiency: the smaller the difference, the higher the COPh. The figure on the left shows the influence of this temperature difference on the COPh value. These values are based on figures from a Grasso 65HP compressor with the refrigerant Ammonia. The figure shows an increase in COPh with an increasing evaporation temperature. Futhermore it shows a decrease in COPh with a decreasing condensation temperature. In general the COPh decreases with an increase in temperature difference between condensation and evaporation. The figure below gives an indication of the dependence of the COPh of an Ammonia heat pump as a function of this temperature difference.

Another important factor that influences efficiency is the applied refrigerant. Ammonia, for example, is a very efficient refrigerant with a COPh of 6 for a evaportion temperature of 30 °C and condensation temperature of 70 °C. These same conditions only give a COPh of 4,5 for refrigerant R134A. Other factors that will effect the efficiency of a heat pump are system controls, efficiency of pheripheral equipement like fans, pumps, etc.



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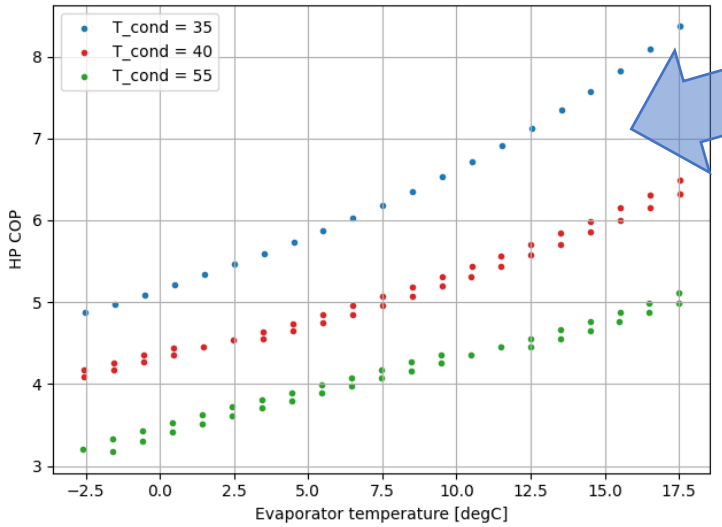
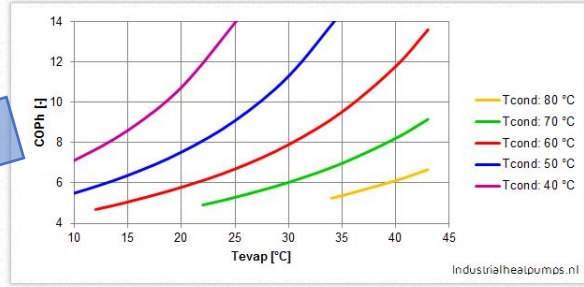
https://industrialheatpumps.nl/en/how_it_works/cop_heat_pump/

Model results/comparison





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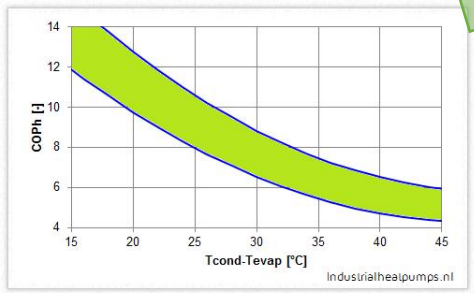

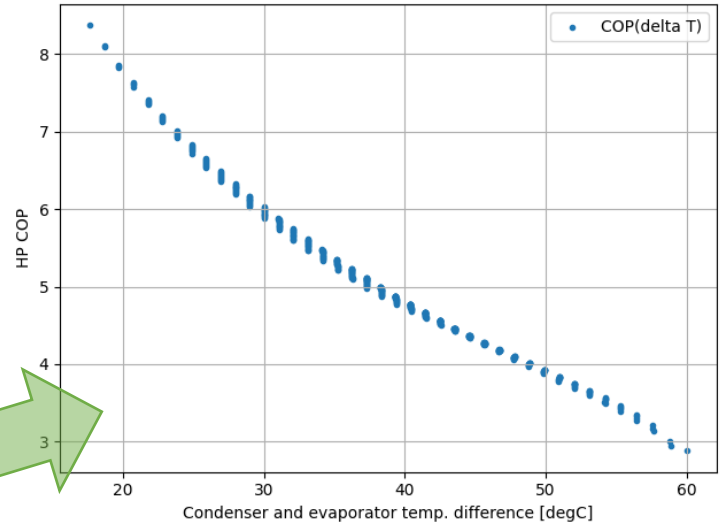

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