

Summer comfort in Belgian dwellings without active cooling: case studies

Margot De Pauw

Thomas More, Energy Knowledge Center

1 | 20/09/2022 | CORNET SCoolS

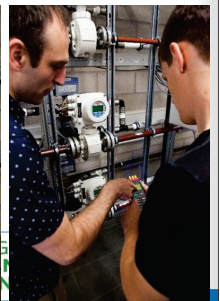


KCE: Energy Knowledge Center

- Energy systems in buildings
- Energy systems in greenhouse horticulture

kce.thomasmore.be

www.cornet-scools.com

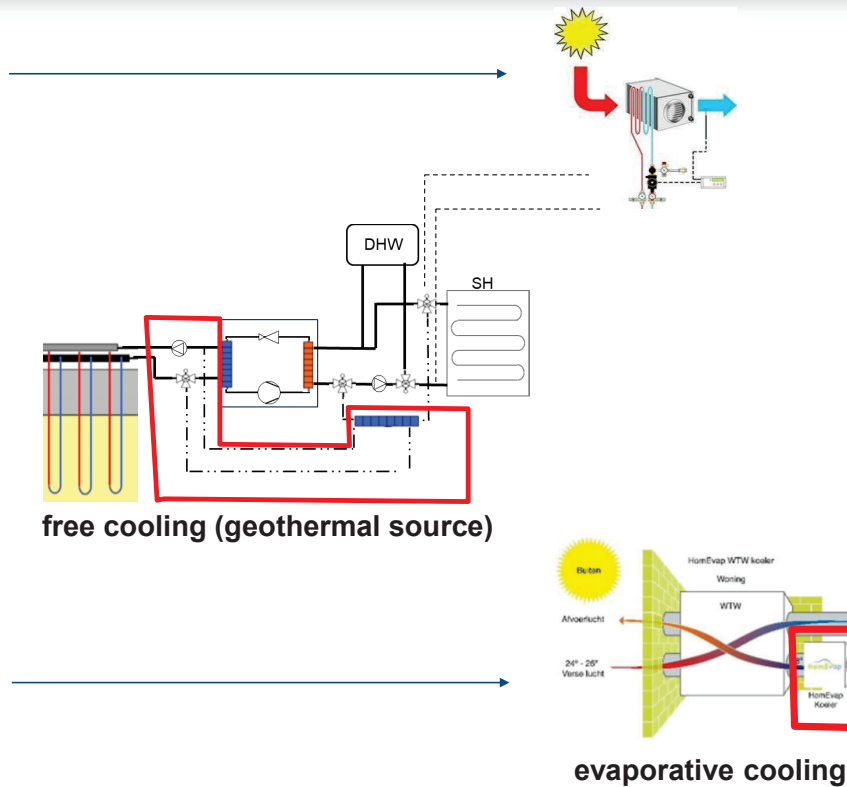




Case1 (Geel)



Case2 (Mol)



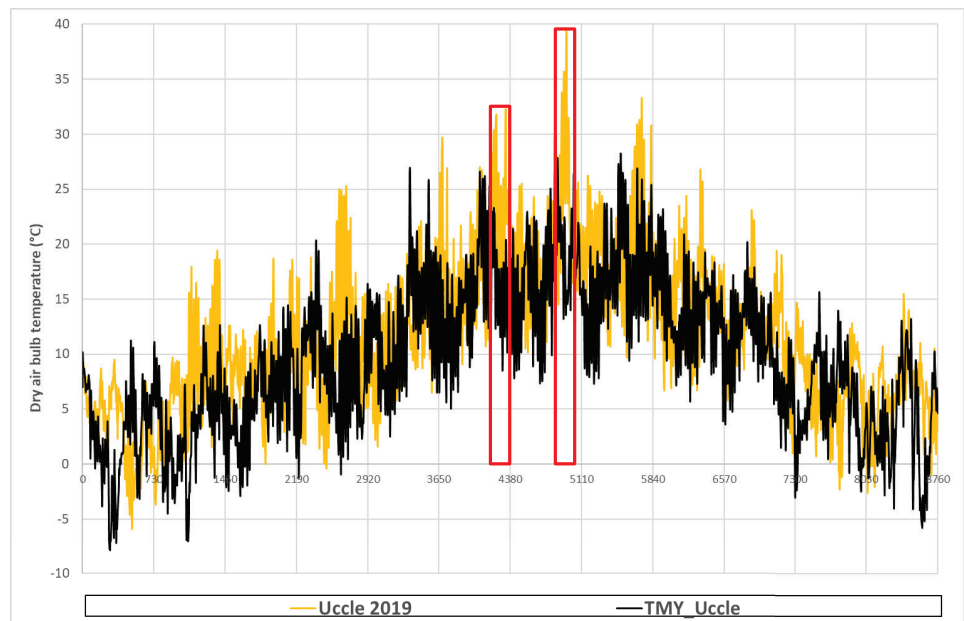
Cases were measured during summer 2019 and 2020

Heat waves:

23/06-30/06/2019 mean Tmax 28,4°C

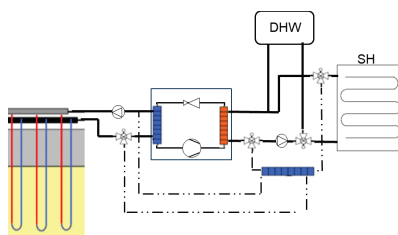
22/07-26/07/2019 mean Tmax 33,8°C

05/08-16/08/2020 mean Tmax 31,3°C



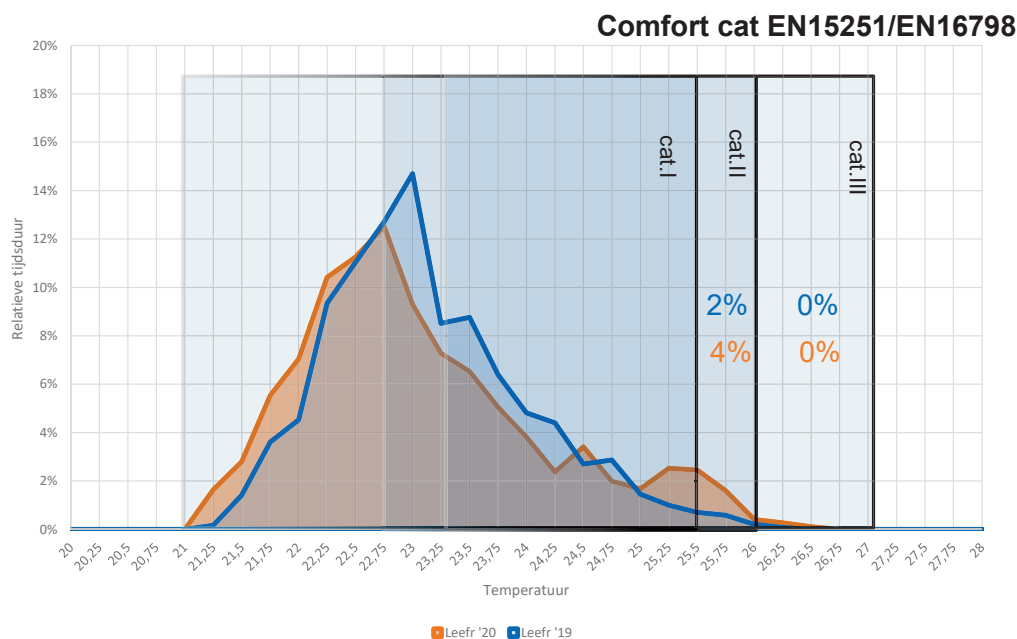


Case1 (2015, Geel)

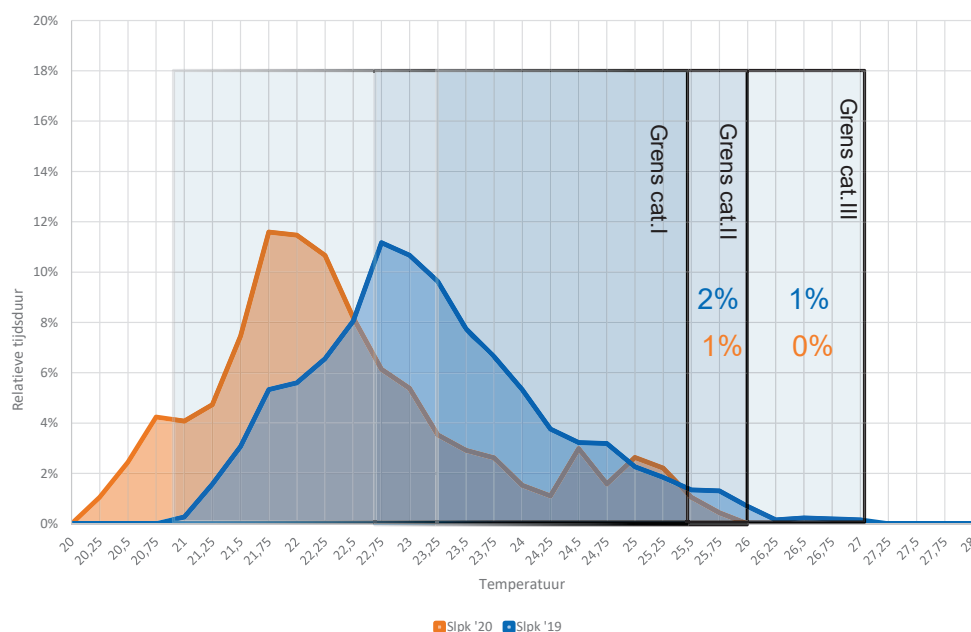


- 2015
- orientation facade: SW
- glass to floor ratio: 14%
- No screens
- boreholes 2*100 m
- floor cooling (all floors)
- cooling coil in supply air (2020)

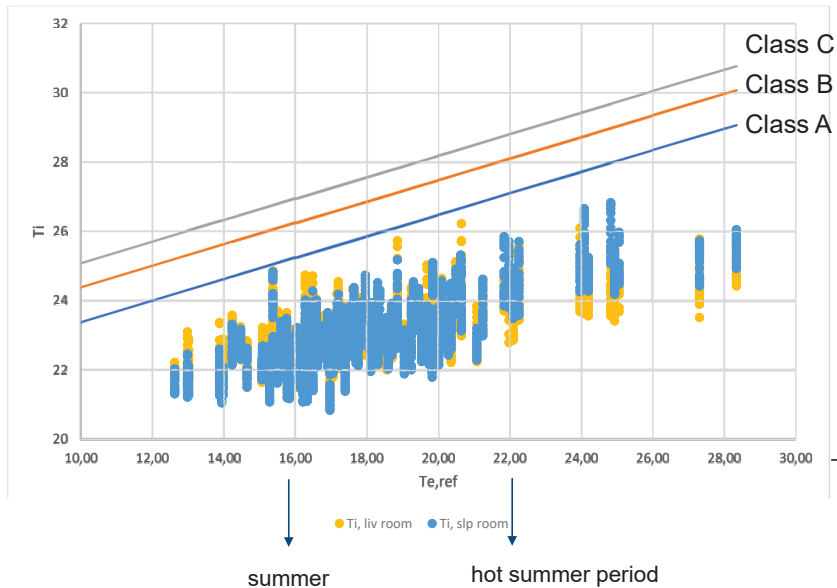
Temperature measurements living room (2019 and 2020)



Temperature measurements sleeping room (2019 and 2020)



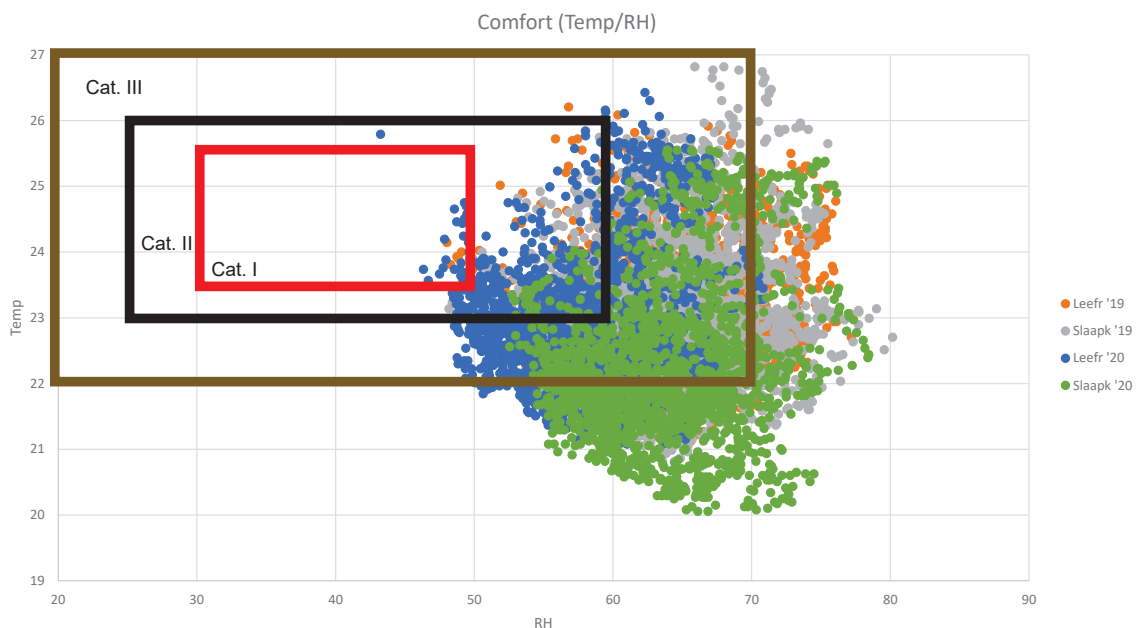
Temperature measurements (2019)



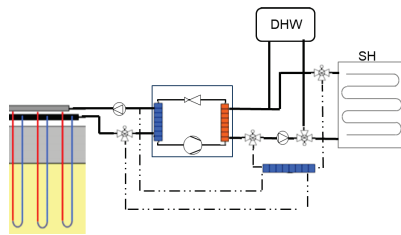
Alpha building =>
Adaptive temperature limits
 A.C. van der Linden et al

running mean outdoor temp

Temperature and relative humidity

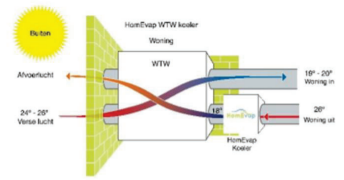


Case2 (2016, Mol)



borehole 1* 120 m

floor cooling
(all floors)

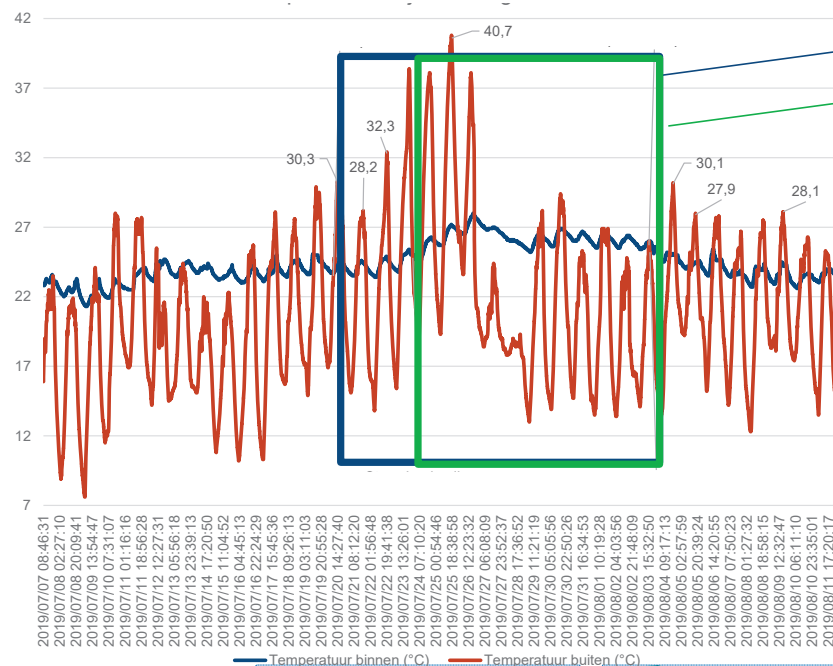


ventilation system D
with adiabatic cooling

- 2016
- orientation facade: W
- glass to floor ratio: 12%
- External, automatic solar shading S & W

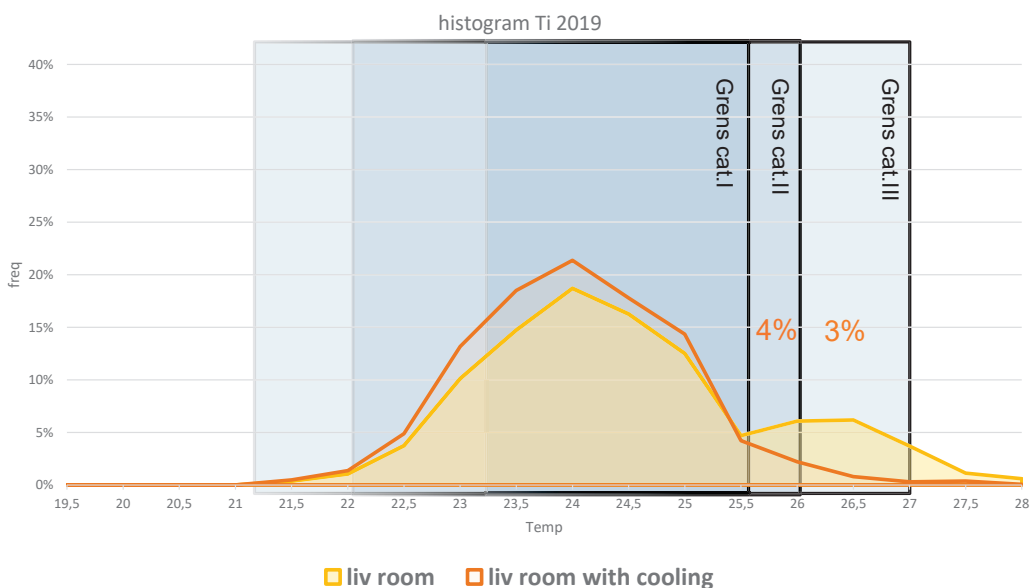
Case2 (2016, Mol)

Temp 8/07 – 8/0//2019

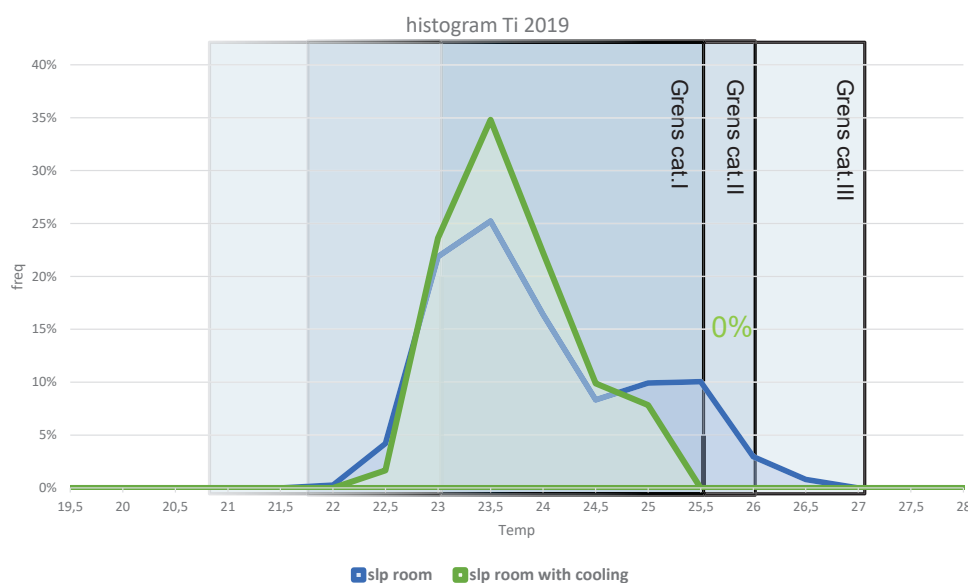


no sun shading
no floor cooling

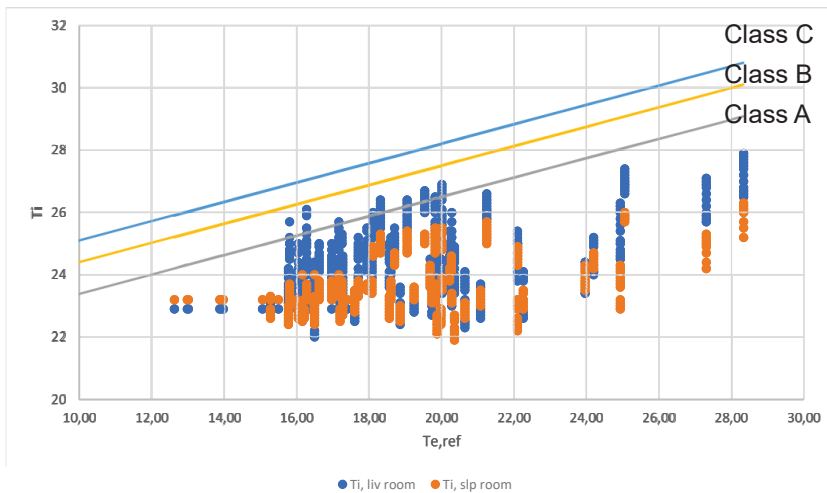
Temperature measurements living room (2019)



Temperature measurements sleeping room (2019)



Temperature measurements (2019)



Alpha building =>
Adaptive temperature limits
A.C. van der Linden et al

Case2 (2016, Mol)

Temp 8/07 – 8/0//2019



Comfort under future weather scenario's?

Ref:

Abantika Sengupta et al.

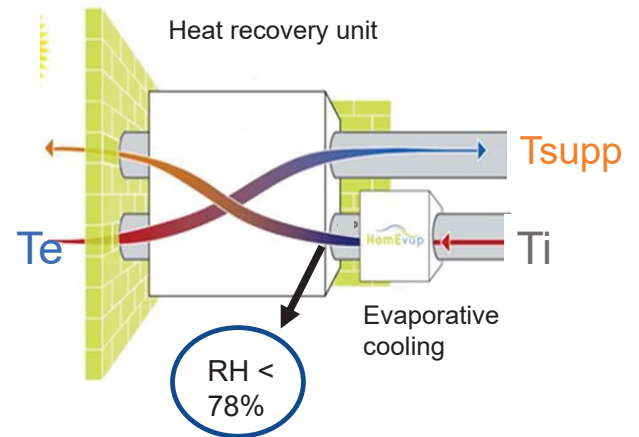
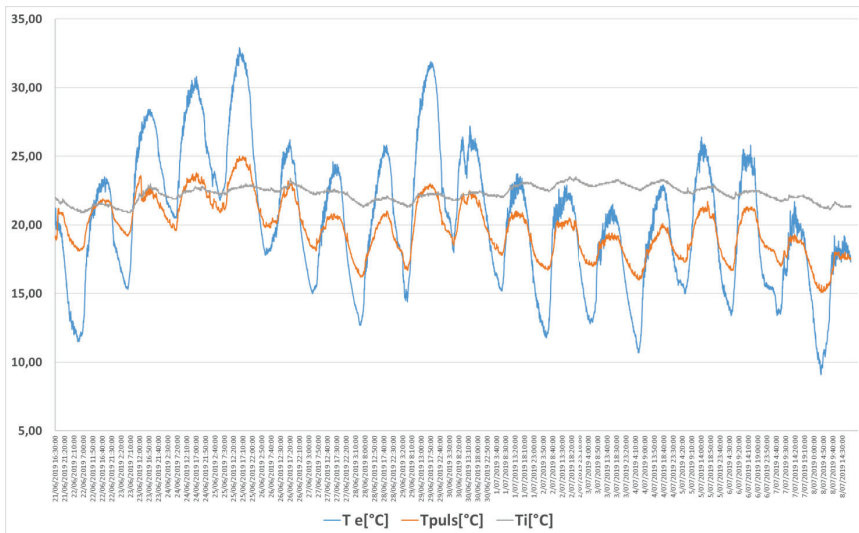
Impact of future climate on the performance of ground source cooling system.



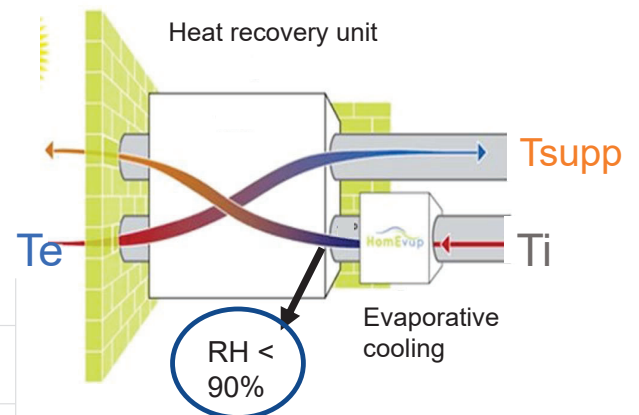
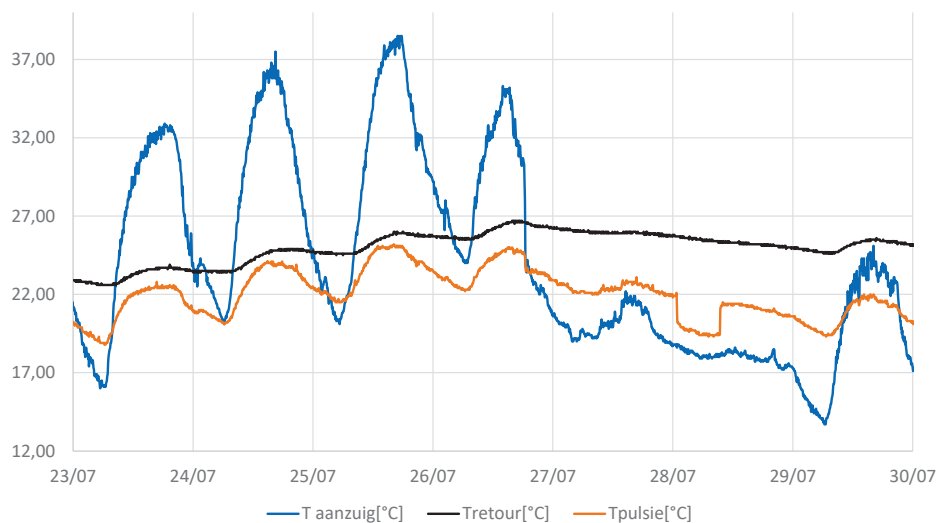
2020 versus future mid-term scenario (2050)?



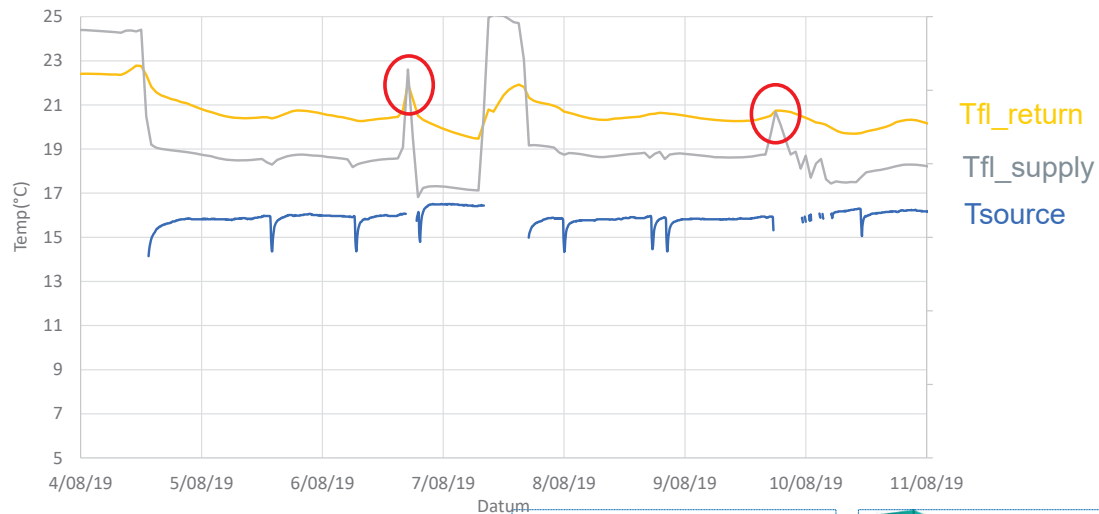
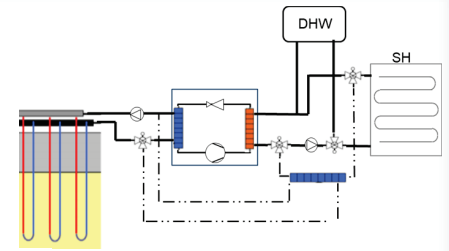
Condensation risk & evaporative cooling



Condensation risk & evaporative cooling



Floor cooling & risk of condensation: dew point control



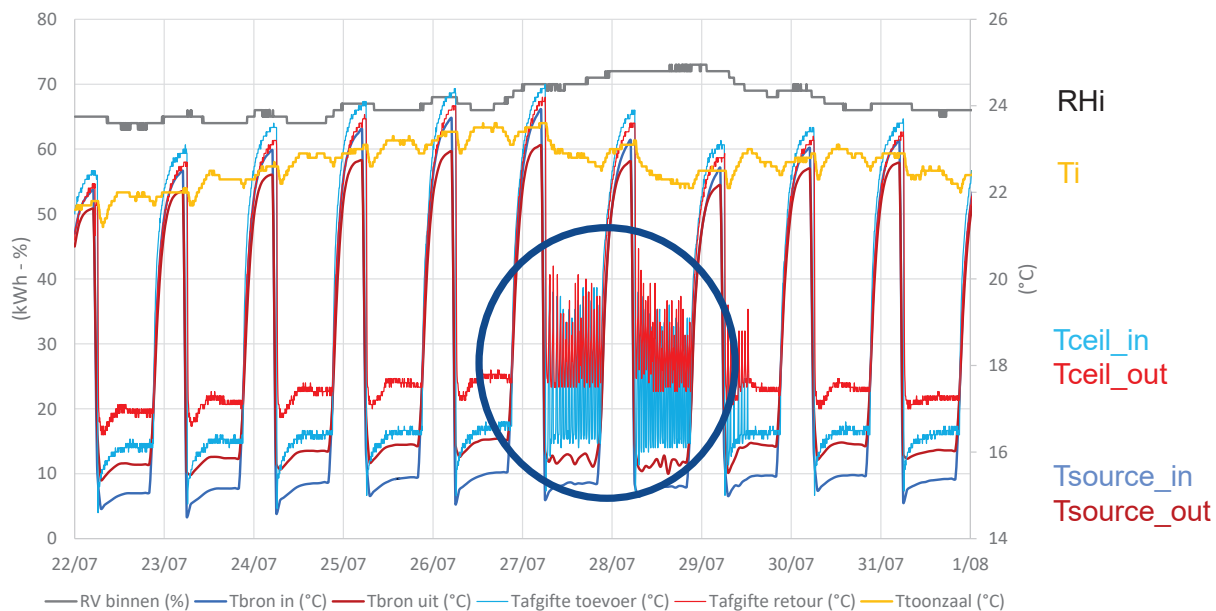
25 | 20/09/2022 | CORNET SCoolS

KCE KENNISCENTRUM
ENERGIE
@THOMAS MORE

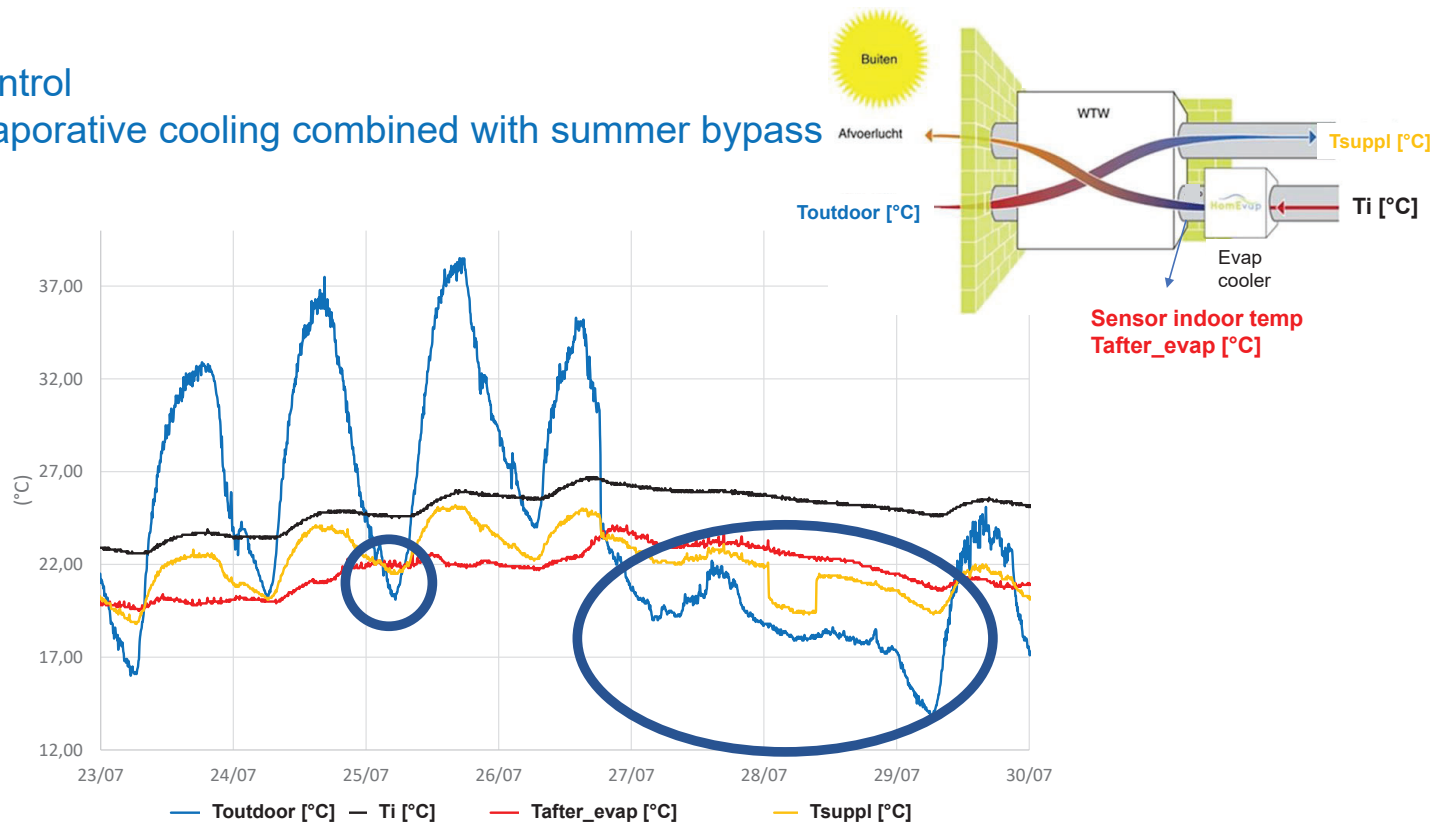
bbri.be
Researches • Develops • Informs

AGENTSCHAP
INNOVEREN &
ONDERNEMEN

ceiling cooling with dew point control in office room



Control evaporative cooling combined with summer bypass



margot.depauw@thomasmore.be