

## Room comfort and energy efficiency of an active double skin façade (ADF)

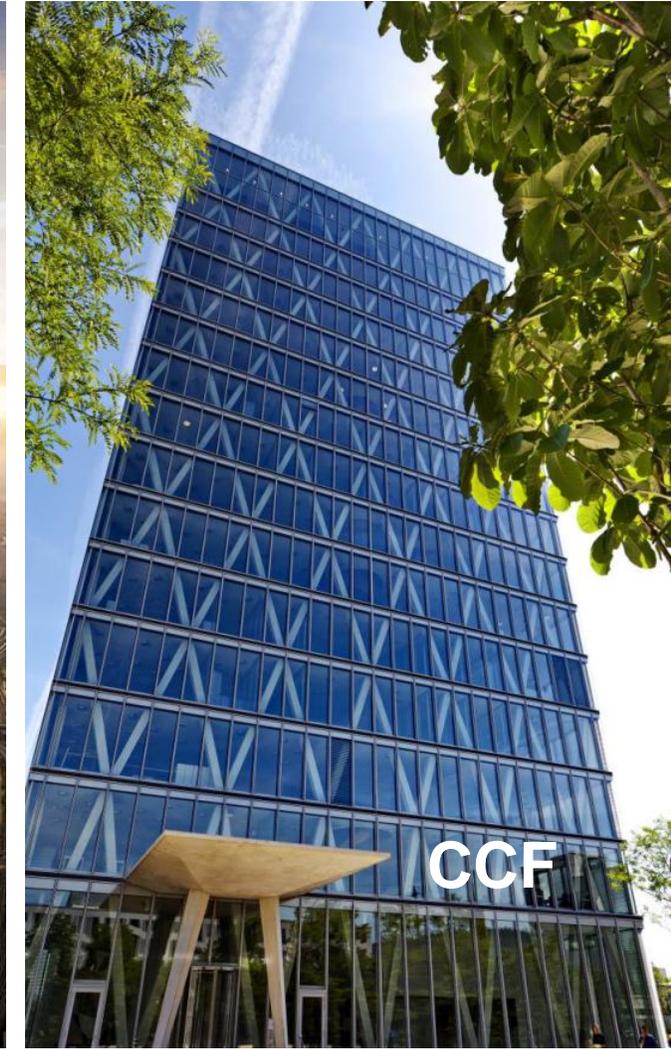
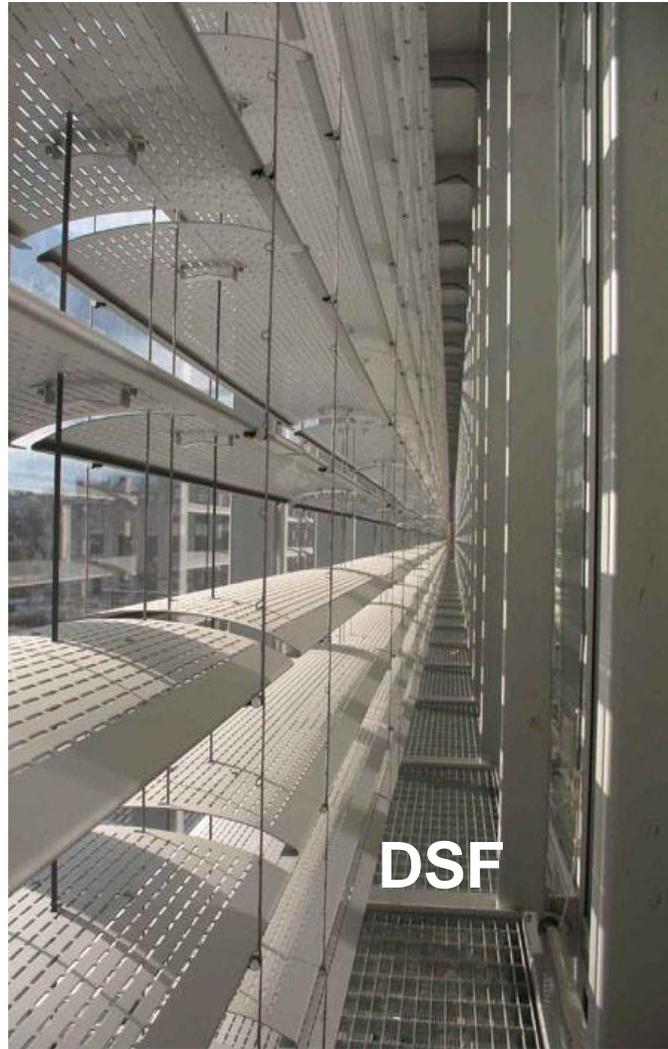
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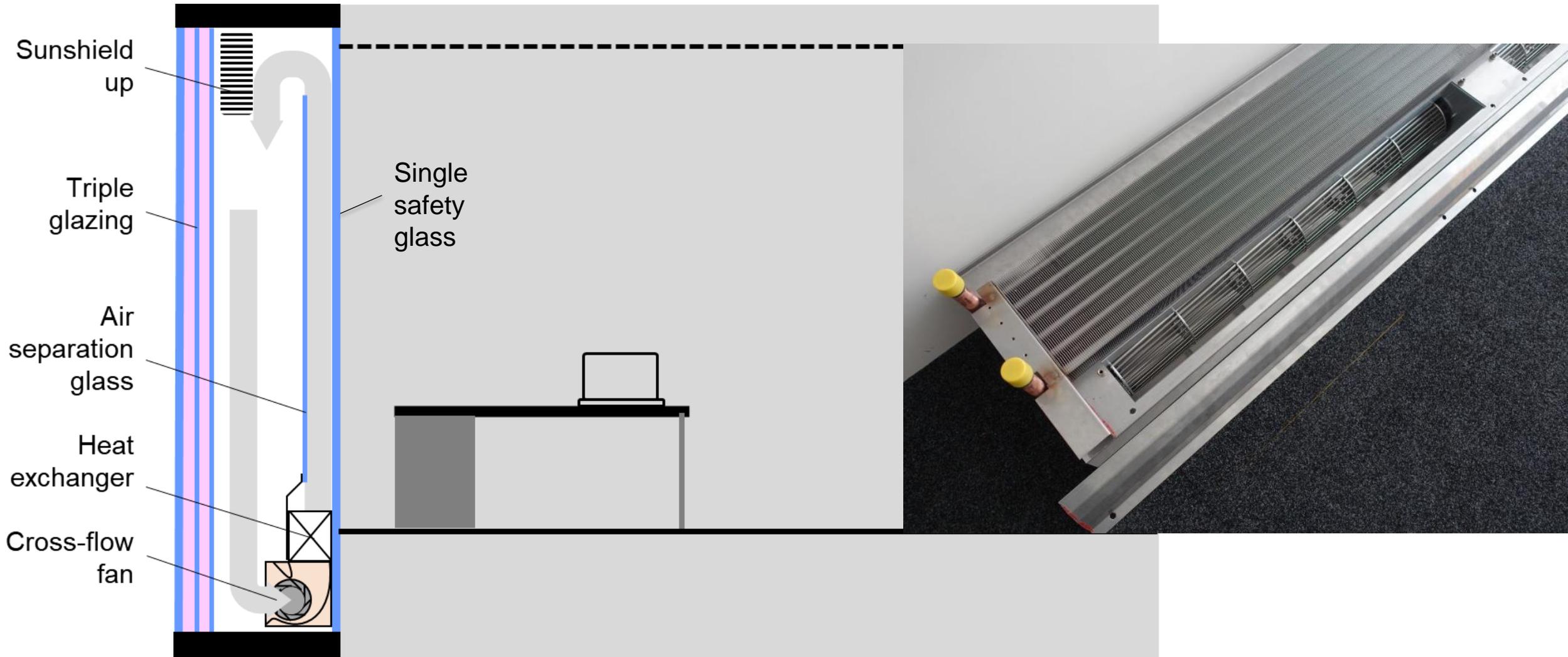
# Urban Architecture



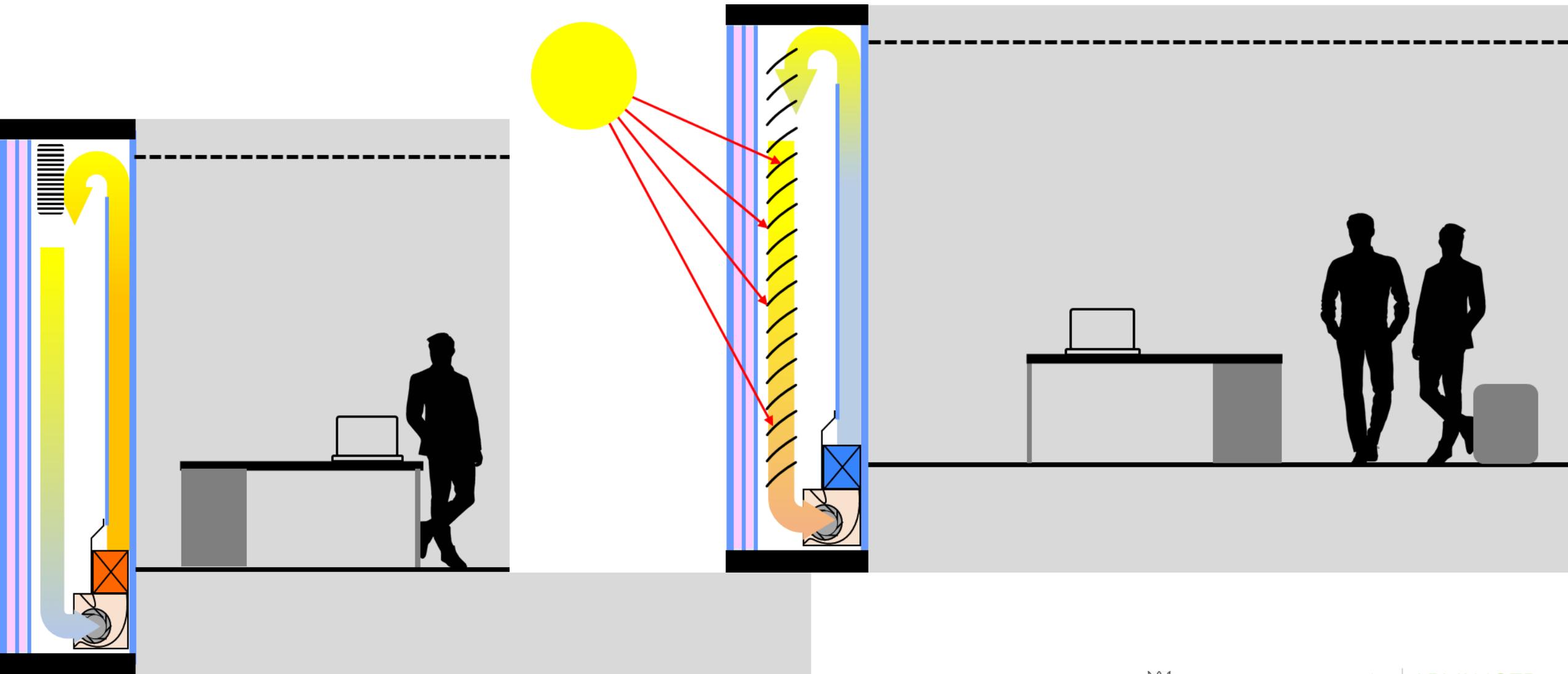
# Glass Façades



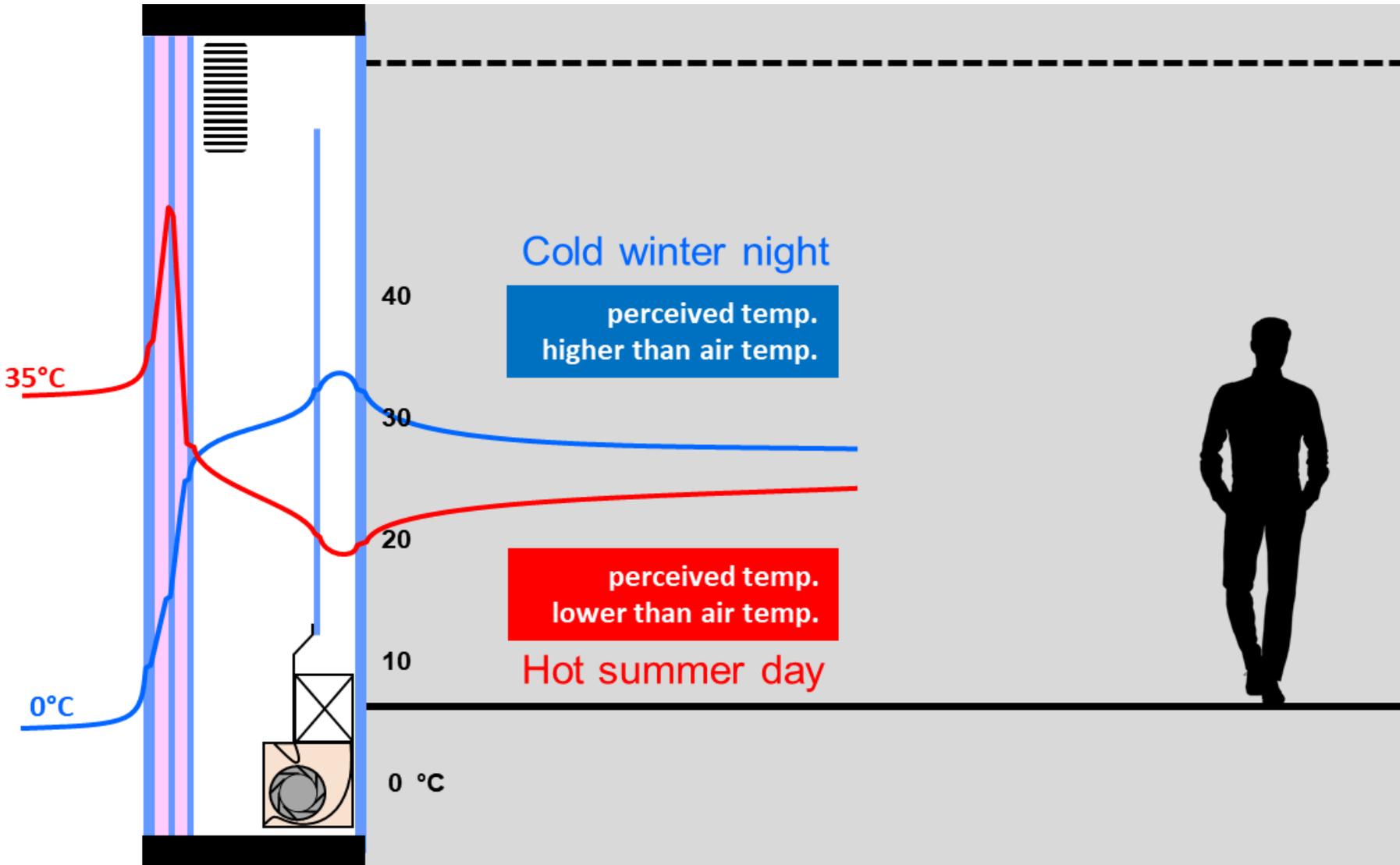
# ADF Design or the HyWin concept



# HyWin - Winter and summer operation



# From a negative to a positive radiation effect



# Test Unit: Supported by Swiss Climate Foundation (1)

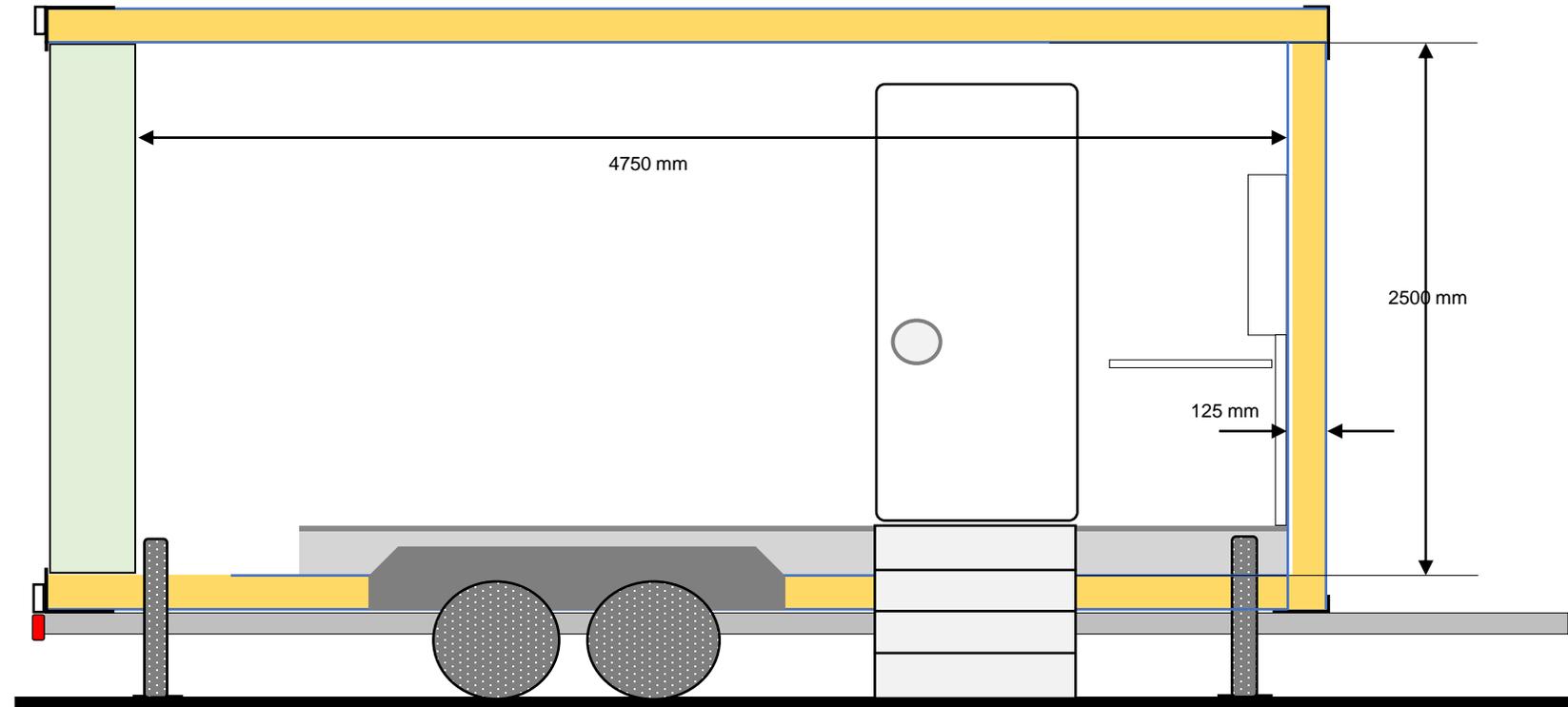
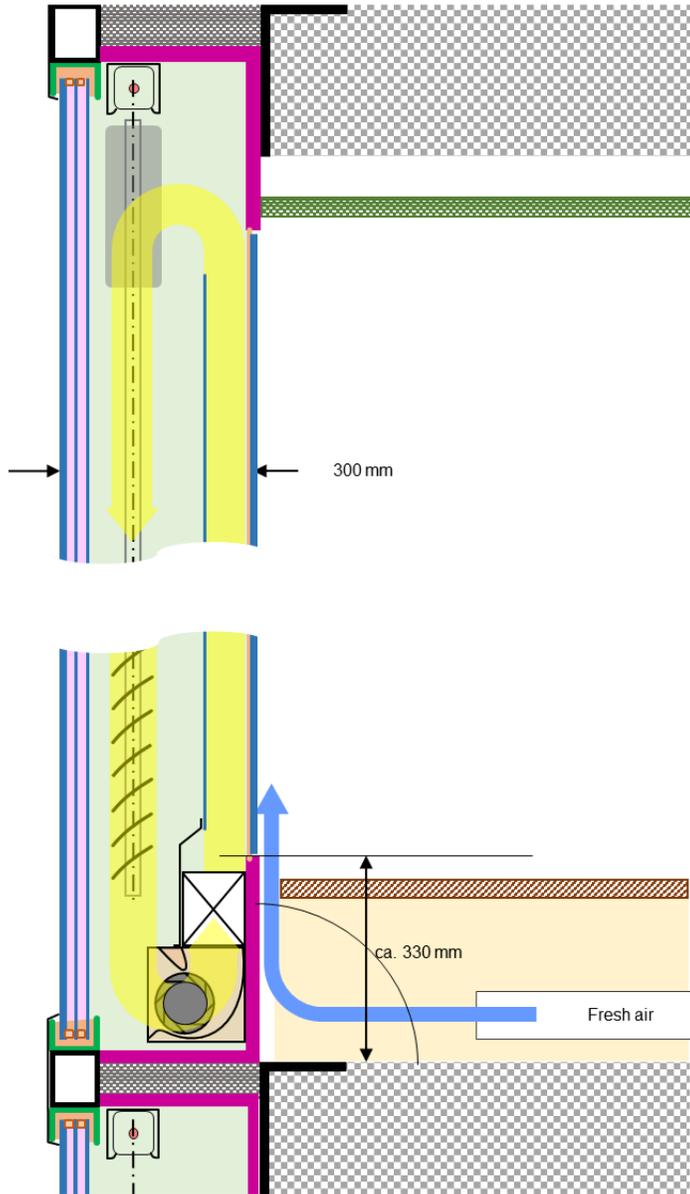


Kanton Bern  
Canton de Berne



ADVANCED  
BUILDING SKINS

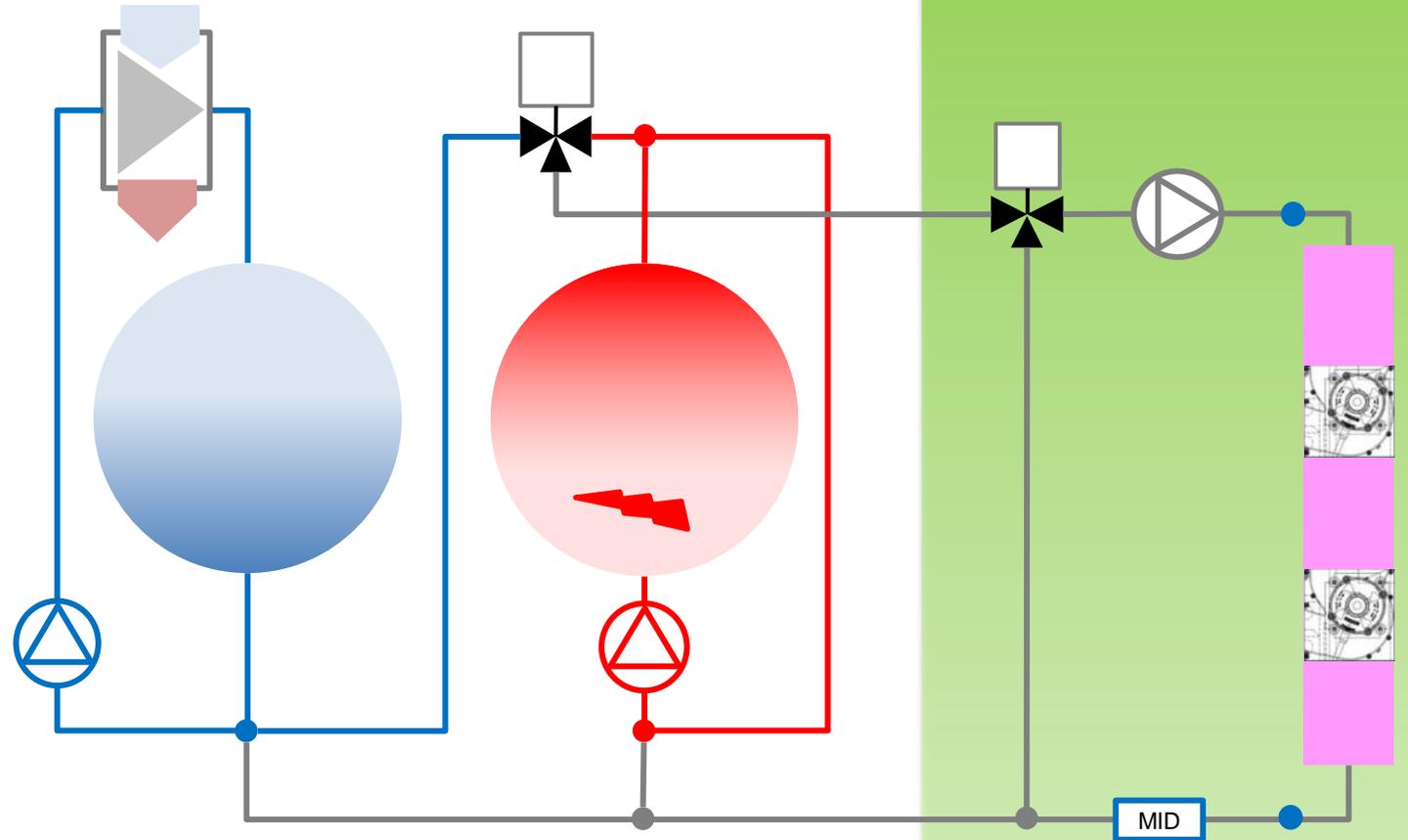
# HyWin Test Unit: Supported by Swiss Climate Foundation (2)



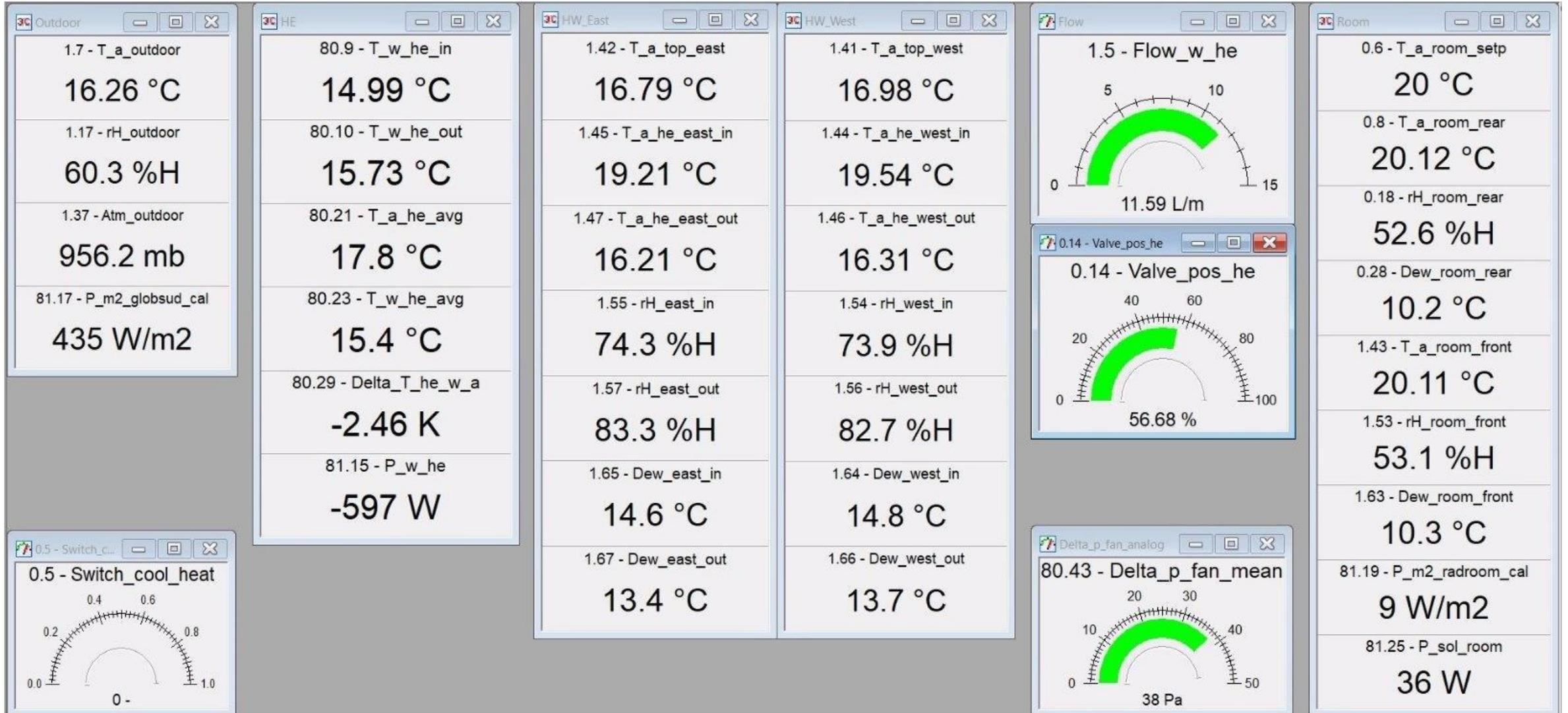
# HyWin Test Unit: Supported by Swiss Climate Foundation (3)



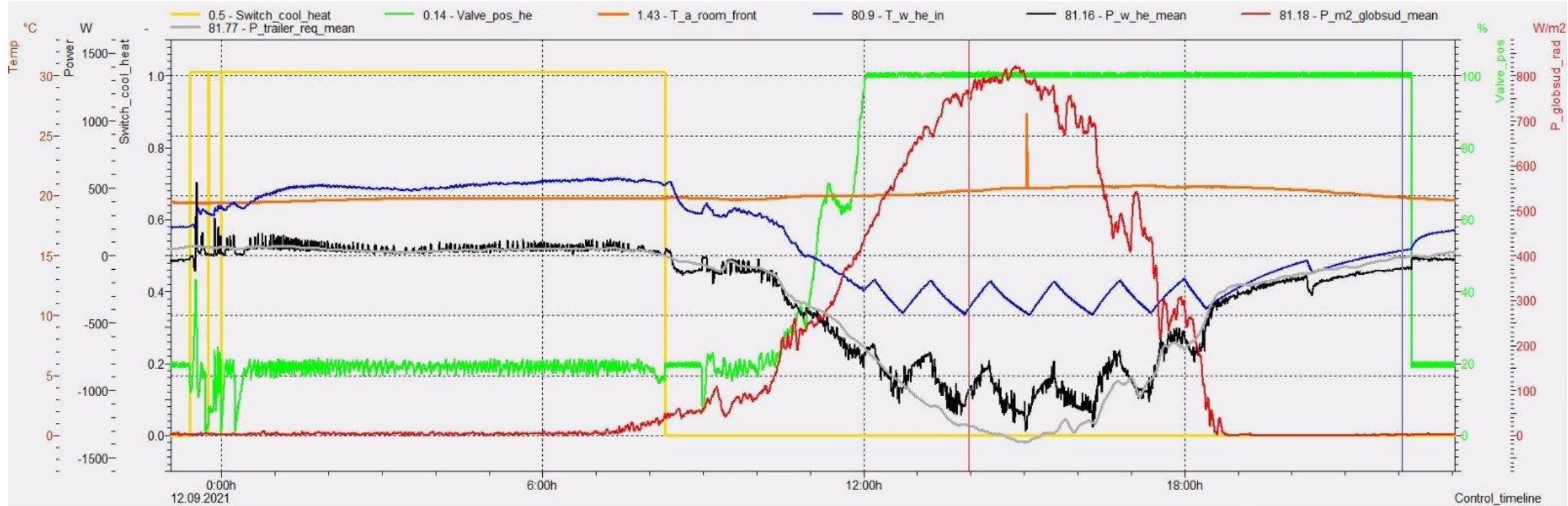
# HyWin Test Unit: Hydraulic equipment



# Datalogger with > 50 sensors

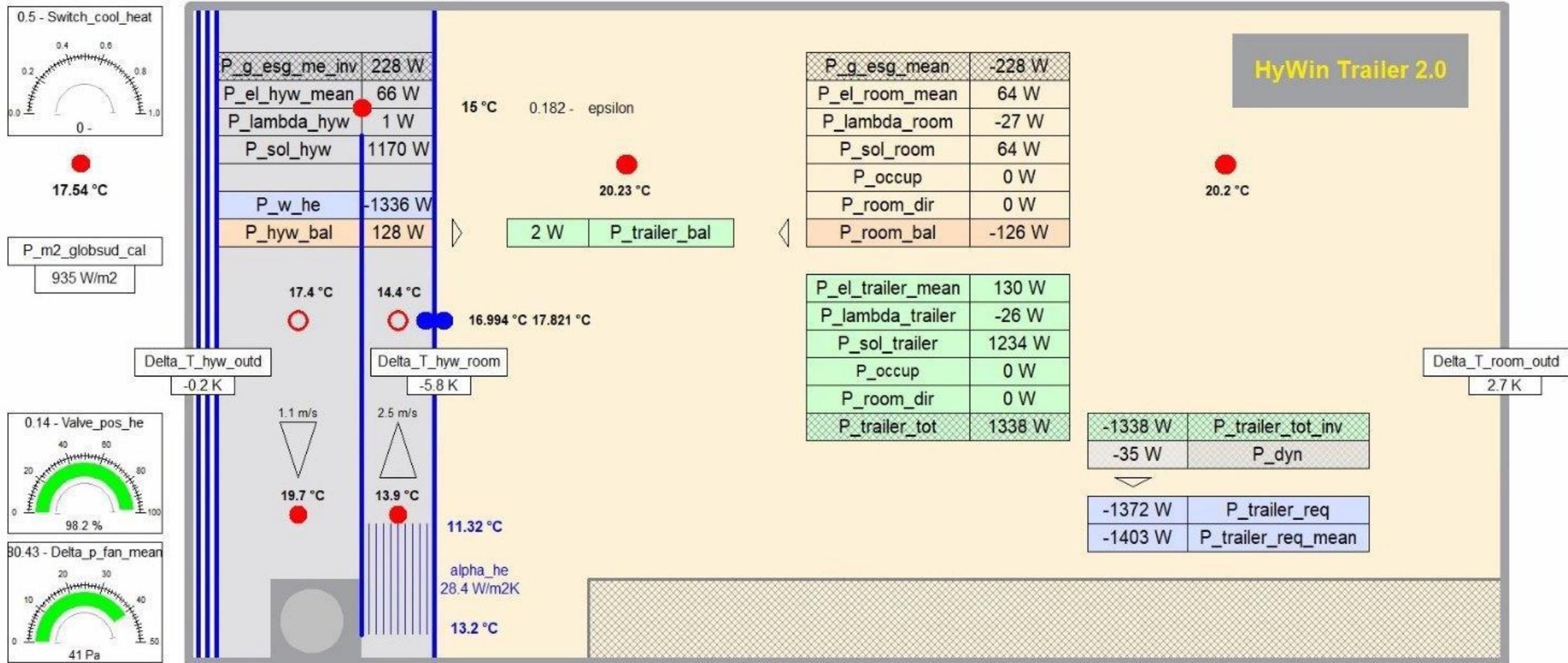


# Process control

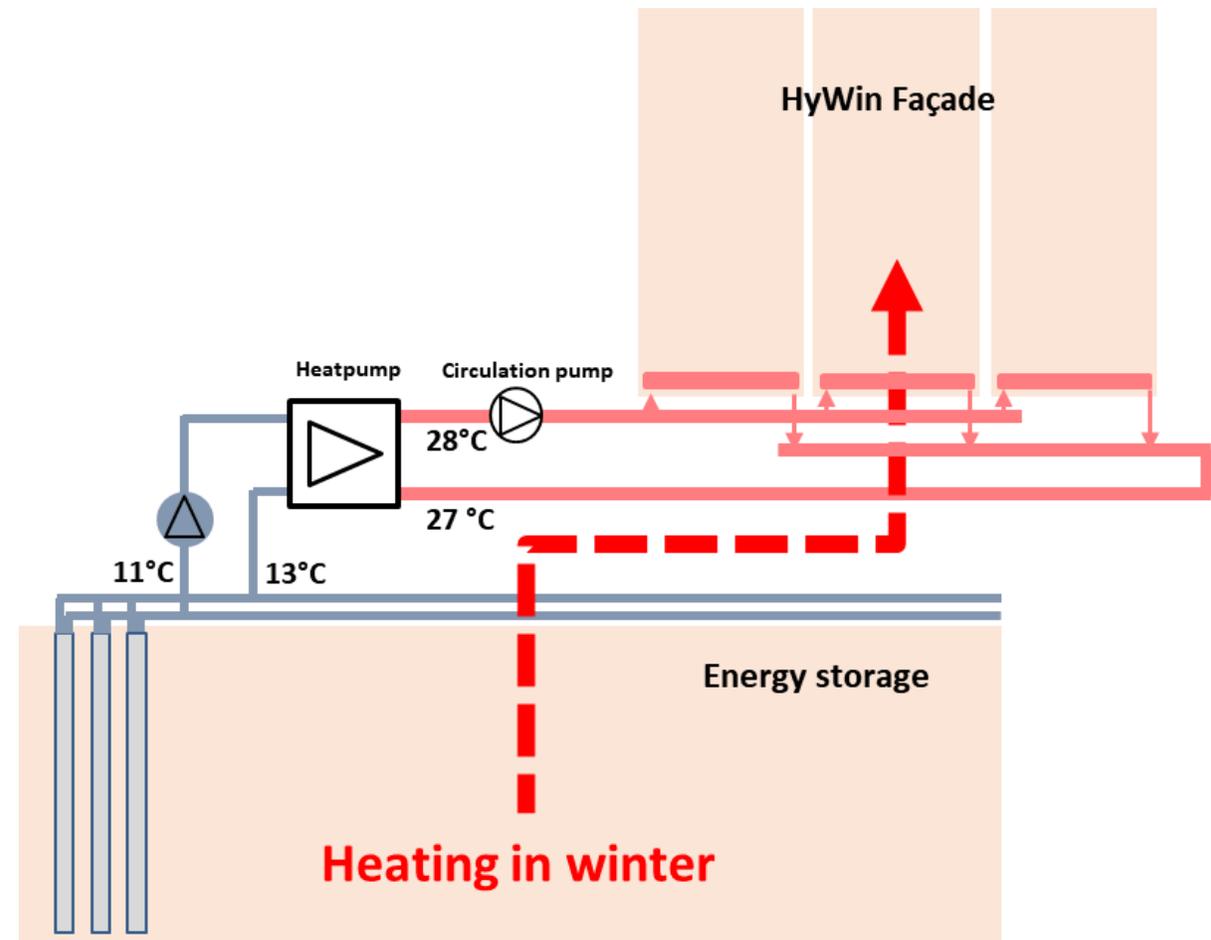
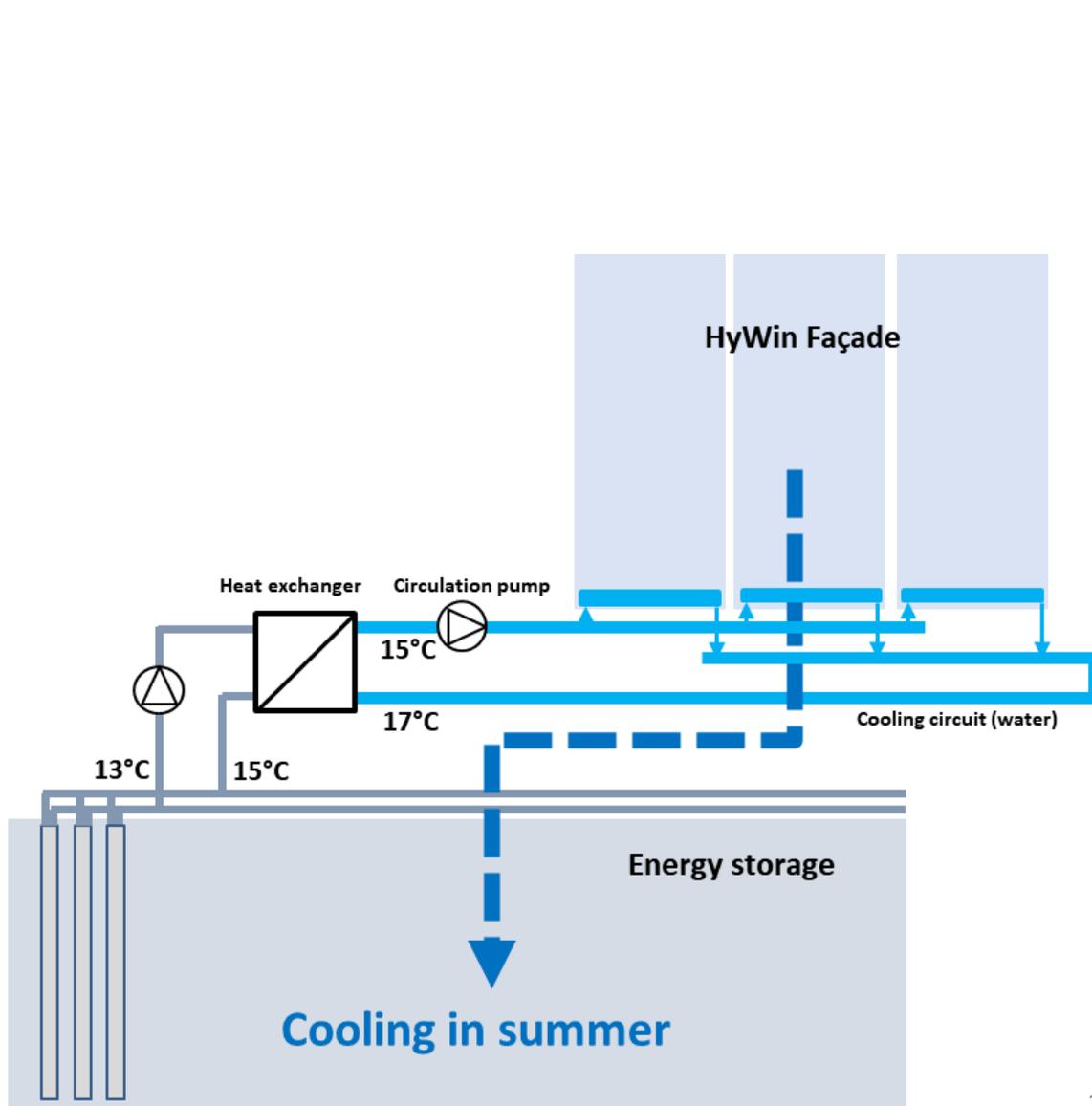


Channel	Left Cursor		Right Cursor		Difference	
Time	13.09.2021, 13:57:41	13.09.2021, 22:03:33	13.09.2021, 22:03:33	13.09.2021, 22:03:33	08:05:51	08:05:51
0.5 - Switch_cool_heat	0	-	0	-	0	-
0.14 - Valve_pos_he	99.79	%	99.95	%	0.16	%
1.43 - T_a_room_front	20.4	°C	19.84	°C	-0.56	°C
80.9 - T_w_he_in	10.54	°C	15.38	°C	4.84	°C
81.16 - P_w_he_mean	-1001	W	-97	W	904	W
81.18 - P_m2_globsud_mean	753	W/m2	1	W/m2	-752	W/m2
81.77 - P_trailer_req_mean	-1264	W	-13	W	1251	W

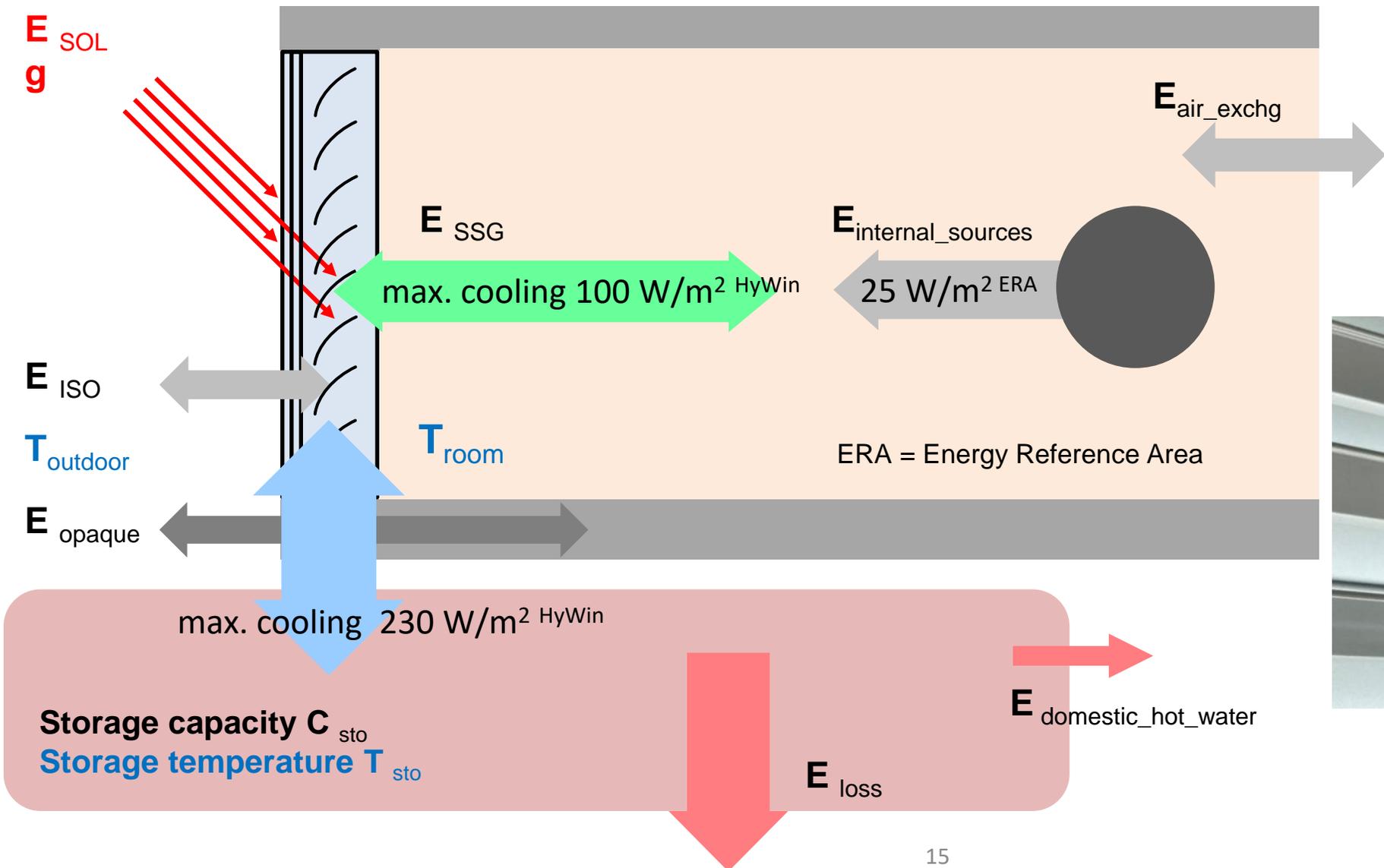
# Processchart



# Seasonal storage

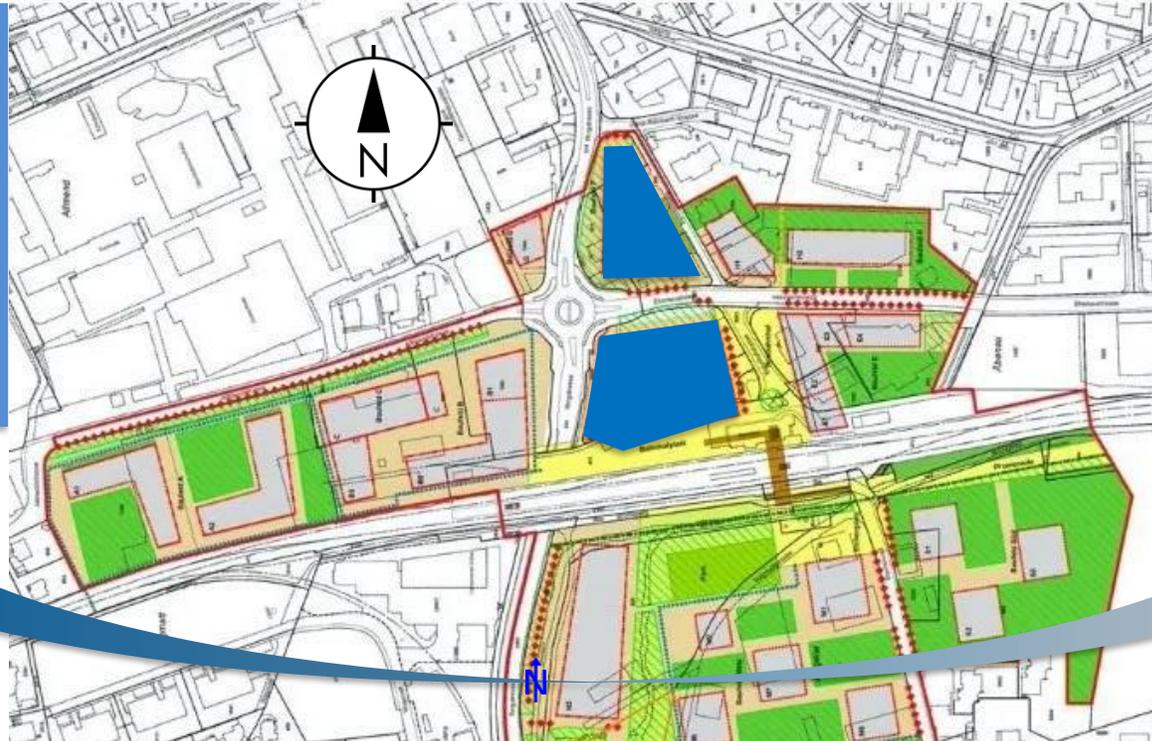


# HyWin - Energy flows



# Development plan with HyWin building(s)

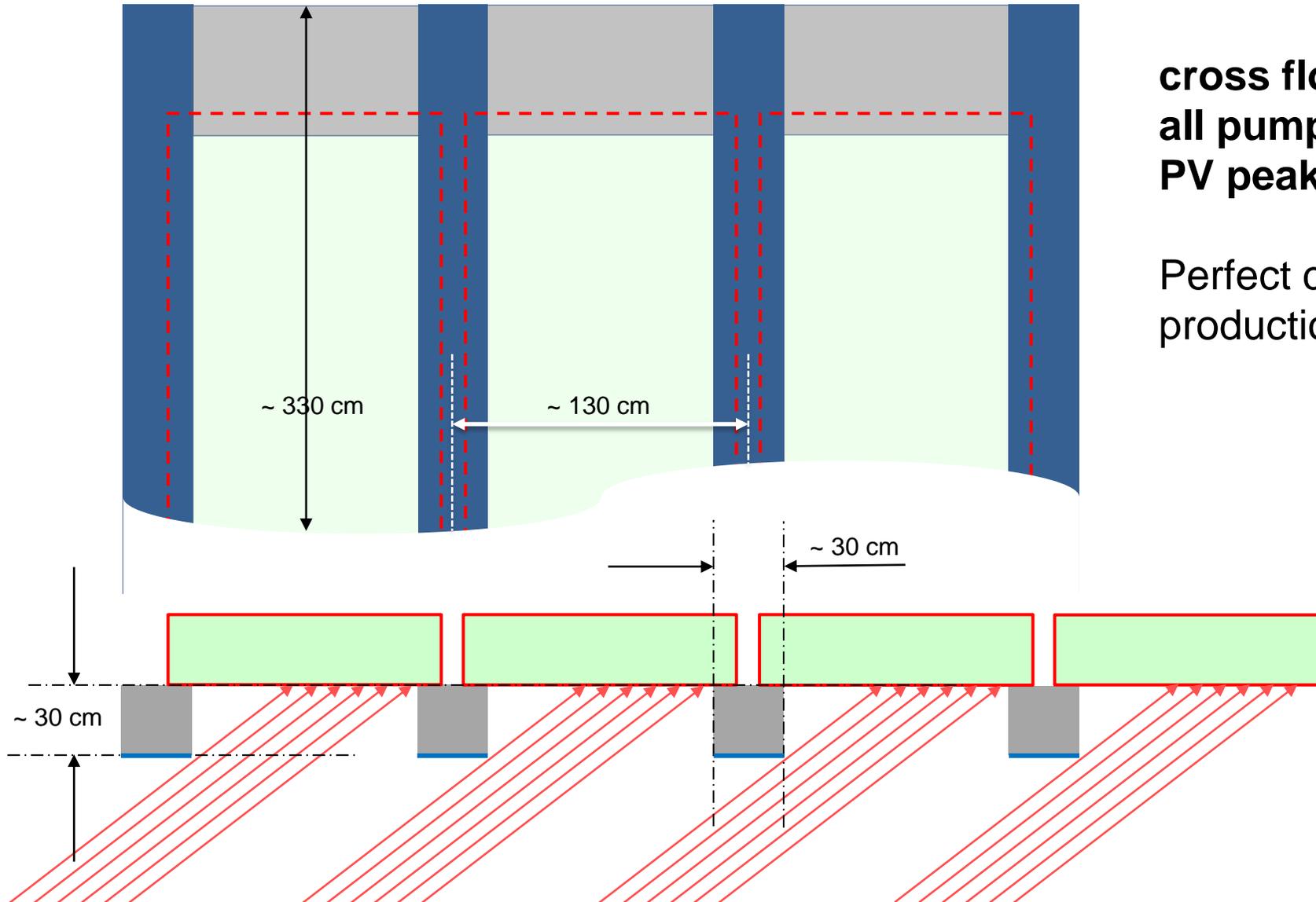
Office building:  
**50'000 m<sup>2</sup>**  
HyWin overproduction:  
**+ 5'000 MWh/a**  
mainly summertime



Residential development:  
**125'000 m<sup>2</sup>**  
with 40 kWh/m<sup>2</sup> ERA:  
**- 5'000 MWh/a**  
mainly wintertime

«**Cooling**» the office building with anergy from a «**cold**» geothermal probe field.  
**Seasonal storage** in a «**warm**» field. The HyWin **excess heat** will be compensated by the anergy requirement of a **residential area** and the anergy used to **regenerate** all geothermal probes.

# Shadowing and integration of photovoltaic



**cross flow fan: 25 W**  
**all pumps: 10 W**  
**PV peak power: 200 W**

Perfect correlation between electricity production and demand

# Summary

- > **Lower investment**
- > **Low maintenance cost**
- > **Better use of building volume**
- HyWin is the solution for
- > **Zero emission and improved comfort**

**Integral system design**

**But who takes the responsibility  
for the system?**