

# LEXU II – Low Exergy Utilisation

## Field test of an outlying wall tempering for building refurbishment Modeling and validation of the components and the system using TRNSYS

### The outlying wall tempering (aWT)

The outlying wall tempering (aWT) is a panel heating that is attached between the existing wall and the new thermal insulation. Depending on their position, very low supply temperatures can be used in the aWT. Additionally the aWT can be attached to existing buildings allowing the inhabitants of the apartment to remain inside; more or less undisturbed. Another advantage of the aWT is, that the existing wall will be thermally activated and therefore can be used as a thermal storage.

### The outlying air heating (aLH)

The outlying air heating (aLH) is a low exergy extension of the aWT. External air can be tempered and provided to the room as tempered fresh air, by creation of an air duct between the thermal active layer and the insulation.

### Photovoltaic thermal hybrid solar collector

A photovoltaic thermal hybrid solar collector (short: PVT-collector) is a combination of PV-modules and solar thermal absorbers behind them. Thus electricity and heat can be generated on one area.

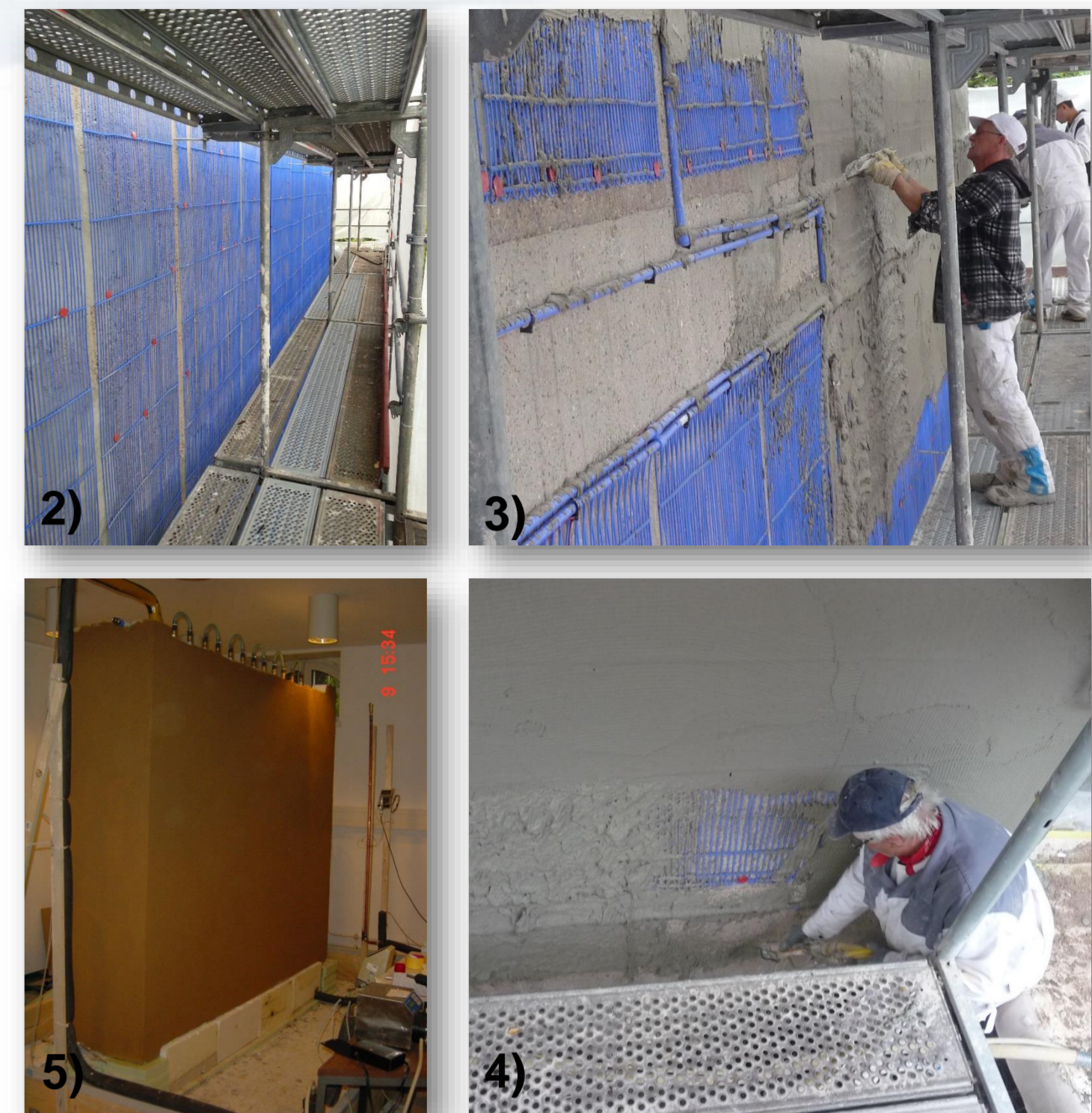
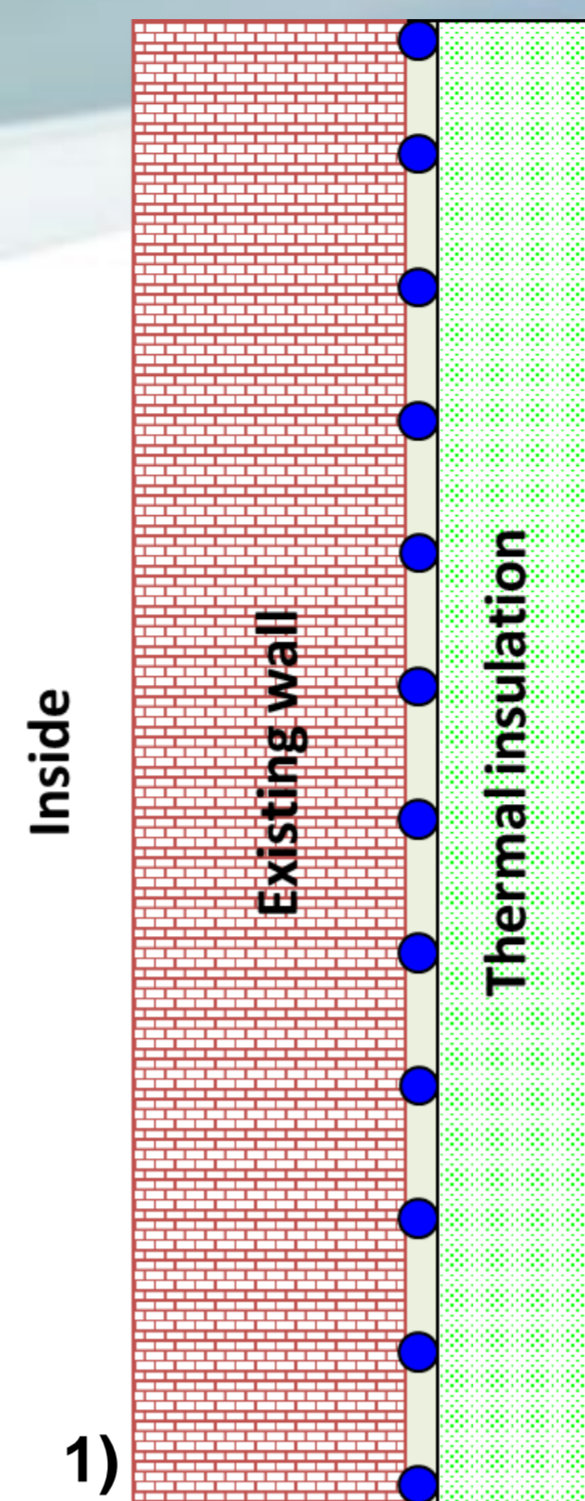
### Work packages aWT, aLH and PVT

- Modeling of the components and the system in TRNSYS
- Validation of the simulation results / types by...
  - Comparison with calculations (e.g. HEAT)
  - Comparison with measurements at a laboratory wall
  - Comparison with measurements at a test facade
- Realization of the components at a field test object

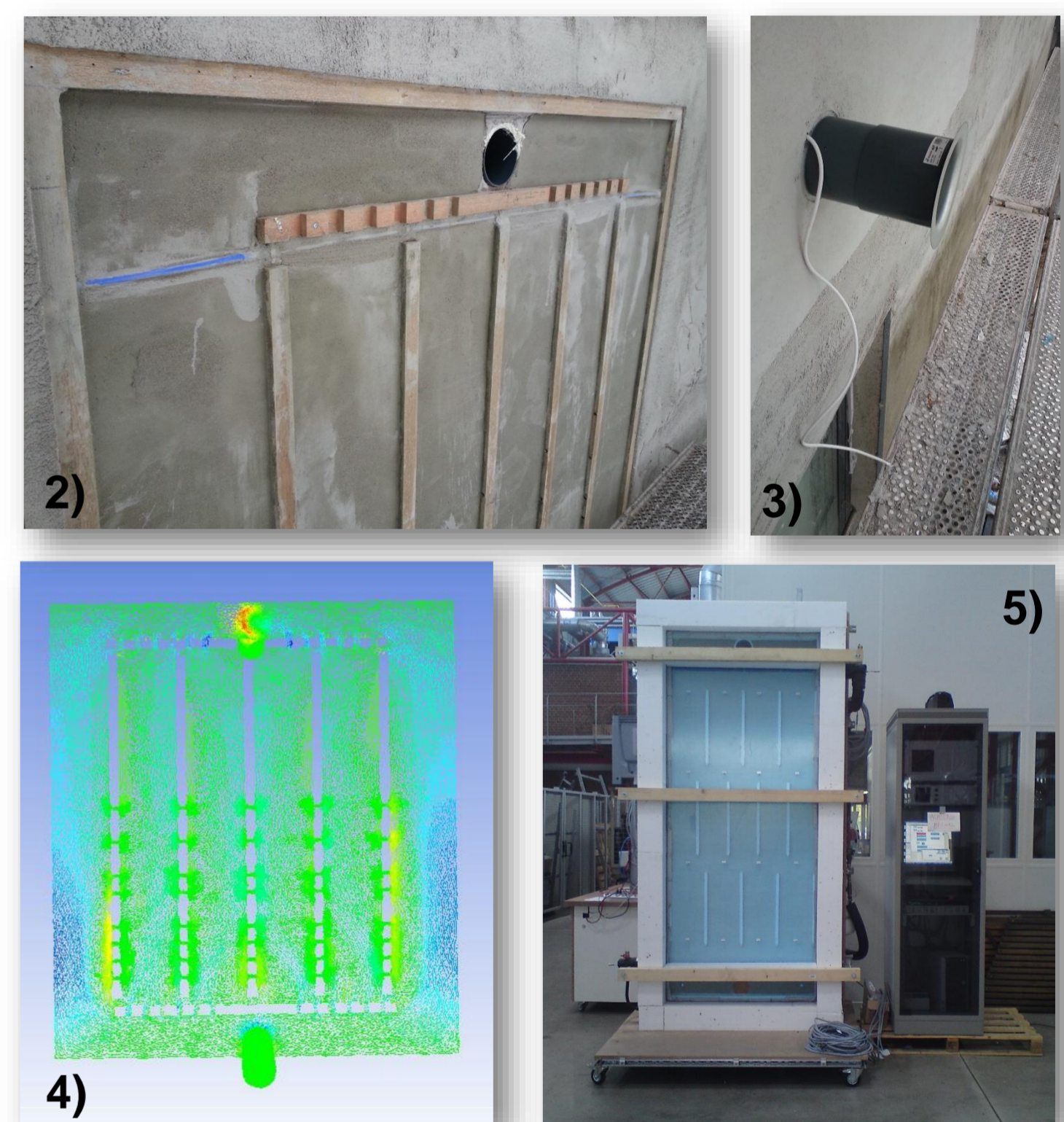
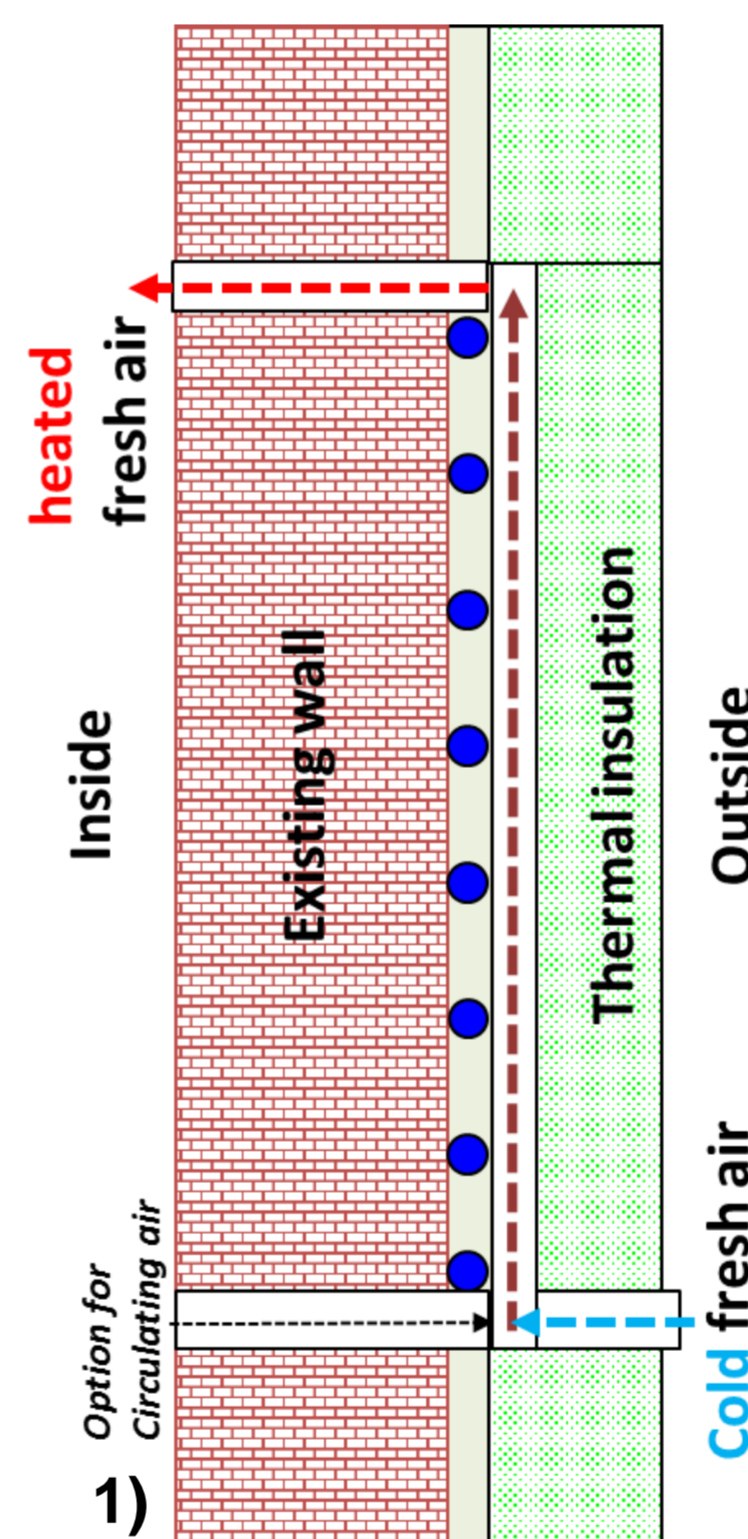
### Building and system simulation

Several buildings and systems have already been simulated with the aWT/aLH within the project LEXU II. Thereby simulations with existing buildings as well as simulations at reference buildings according to [1,2] were performed. First results of these simulations will be published in 2016.

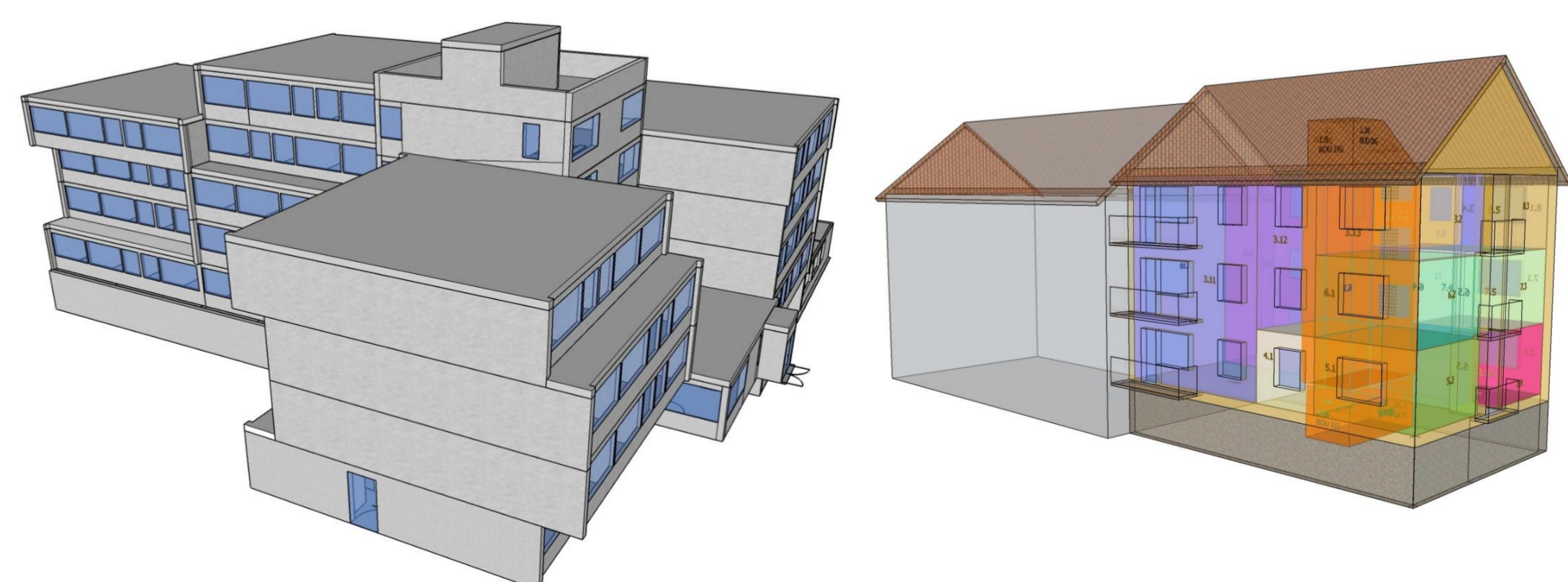
References:  
[1] Haller, Dott, Ruschenburg, Ochs, Bony (2013): The Reference Framework for System Simulations of the IEA SHC Task 44 / HPP Annex 38, Part A: General Simulation Boundary Conditions, Report C1 Part A  
[2] Haller, Dott, Ruschenburg, Ochs, Bony (2013): The Reference Framework for System Simulations of the IEA SHC Task 44 / HPP Annex 38, Part B: Buildings and Space Heat Load Report C1 Part B



1) Layer construction of the aWT (Existing wall, capillary tubes and insulation)  
2), 3) & 4) Realization of the aWT at a field test object (mid-2015)  
5) Laboratory wall of the aWT (at the technical department of the IZES gGmbH)



1) Layer construction of the aLH (Existing wall, capillary tubes, air duct and insulation)  
2) Realization of the aLH at a field test object (mid-2015)  
3) Detail of the aLH at the field test object: Air inlet (without insulation)  
4) CFD-simulation of the air flow in the aLH (part of a student research project)  
5) Laboratory wall of the aLH (at the technical department of the IZES gGmbH)



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