

EEHB 2024

Austria | Singapore

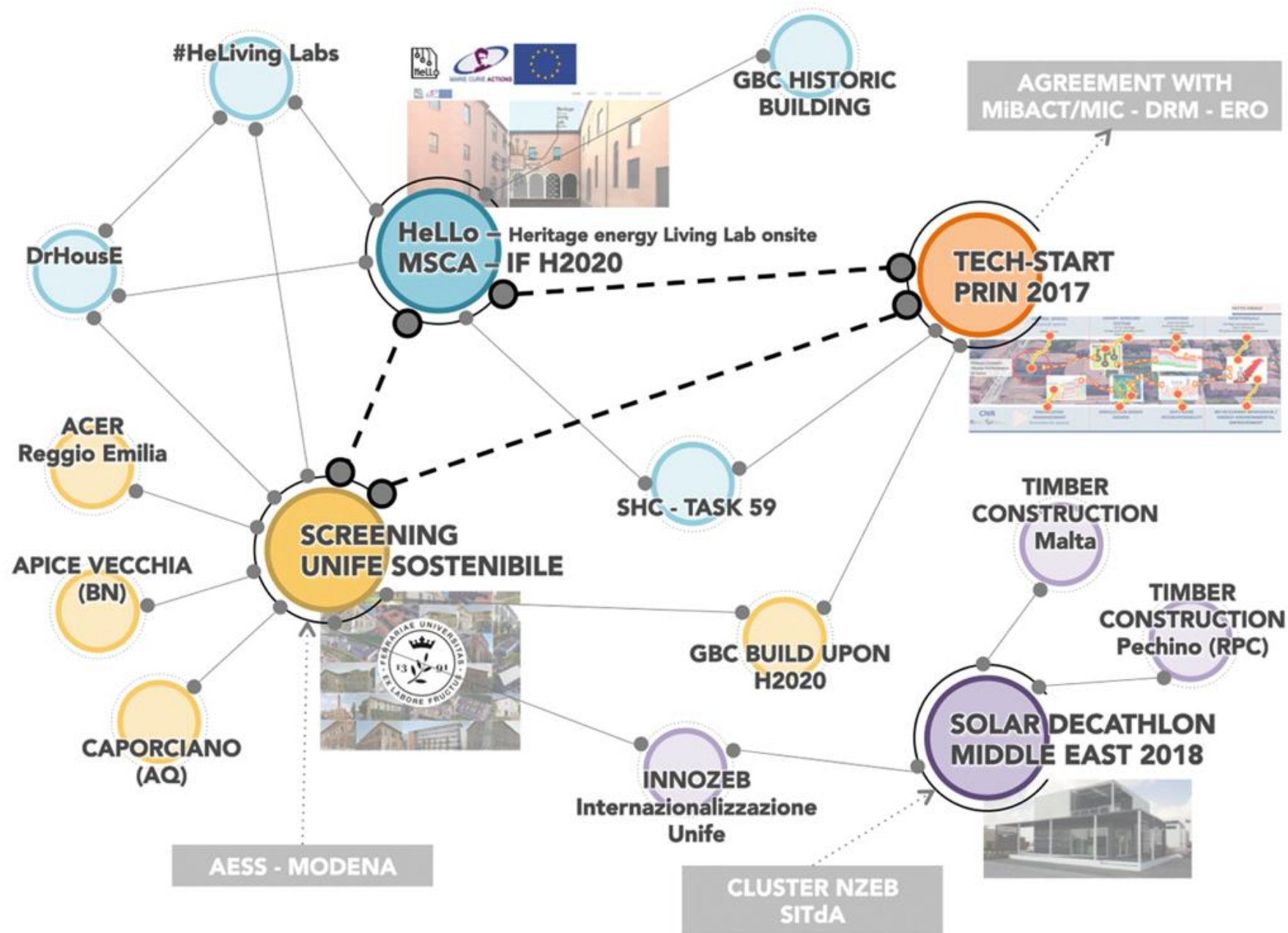
The 5th International Conference  
on Energy Efficiency in Historic Buildings

# **A path of experimental research from the building to the city: assessment of energy and environmental performance tools and methods for historic heritage**

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## AFTER INTERVENTION ENERGY PERFORMANCE



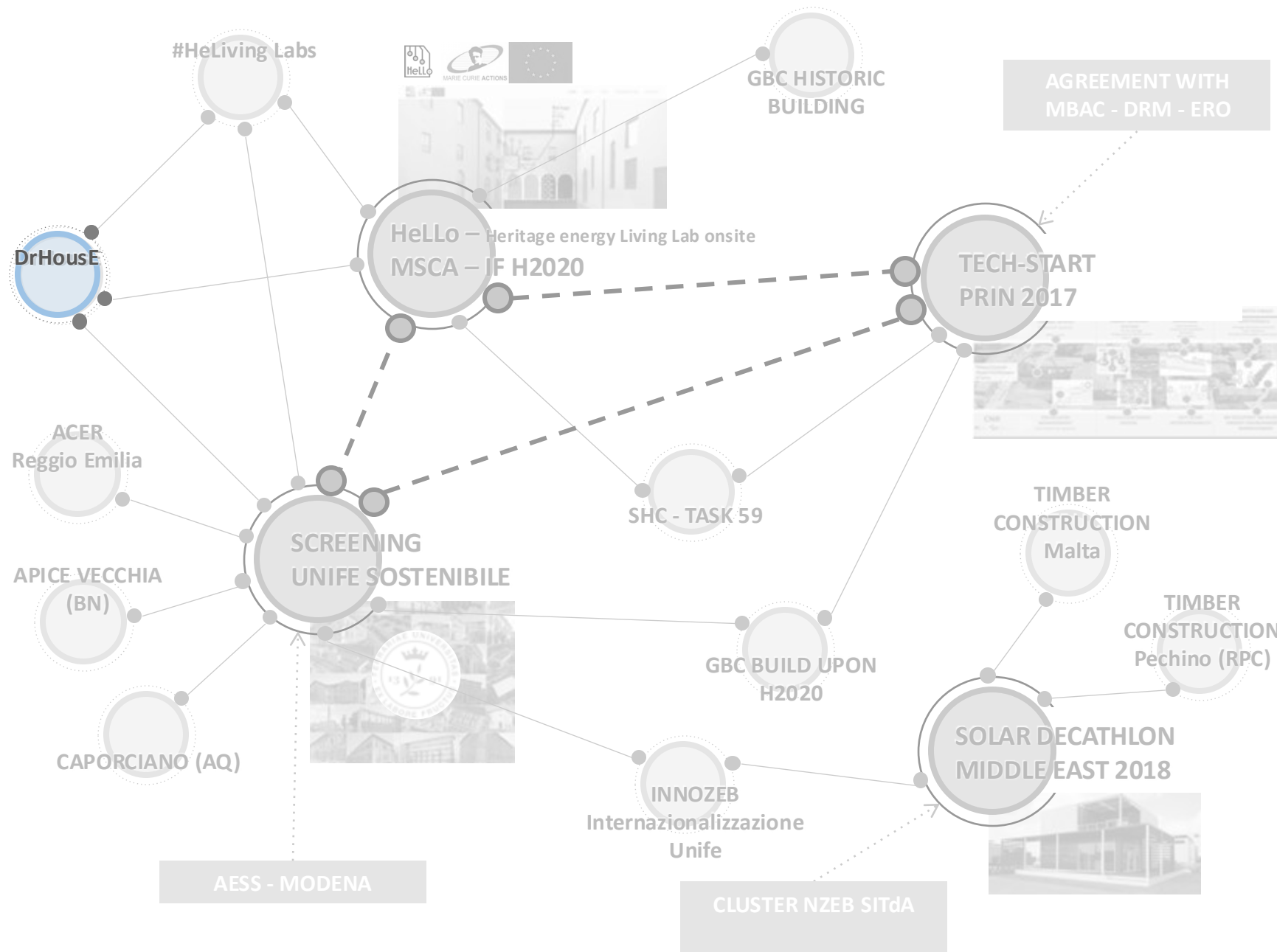
**To identify the buildings with greater retrofit potential**

**To define  
diversified and  
calibrated  
intervention  
levels**

# PARAMETRIC ENERGY ASSESSMENT TOOL TO EASE THE PLANNING OF RETROFIT ACTIONS

**To conduct economic analysis and cost/benefit evaluation**





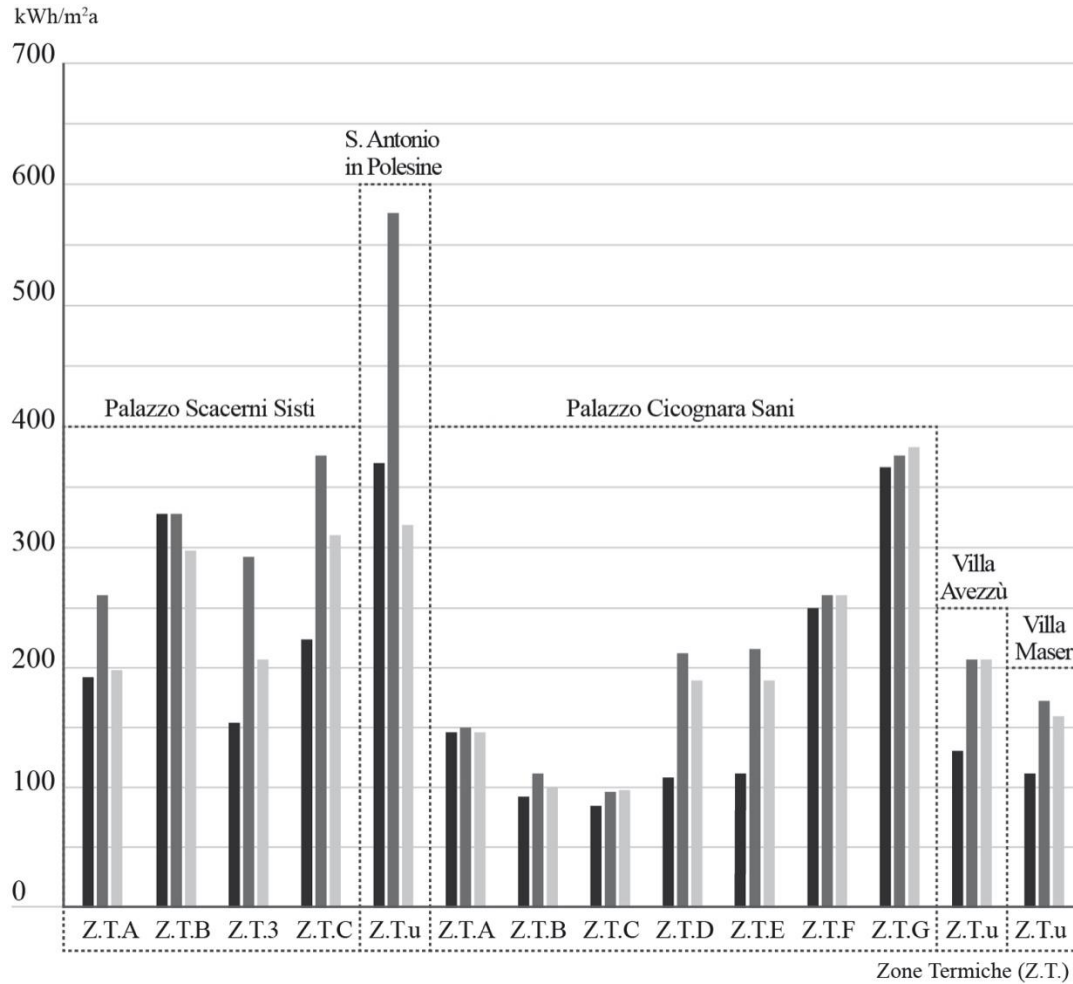


# FOR HISTORIC BUILDINGS THERE IS A SIGNIFICANT DIFFERENCE BETWEEN

THE RESULT OBTAINED BY THE  
**ANALYTICAL METHOD**  
USING THE RULES FOR NOT HISTORIC  
BUILDING

THE RESULT OBTAINED BY THE  
**SIMPLIFIED METHODS**  
RECOGNIZED BY THE ITALIAN  
THERMO-TECHNICAL COMMITTEE





## SIMPLIFIED METHOD **DOCET**

**+ 40%**

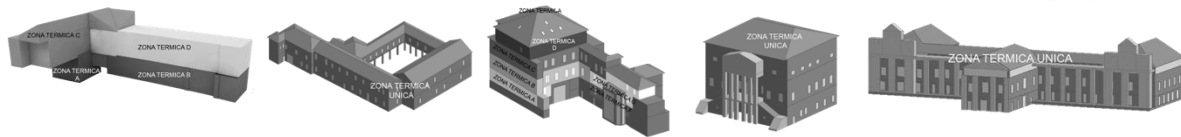
Compared to standardized analytical method

## SIMPLIFIED METHOD **UNITS11300**

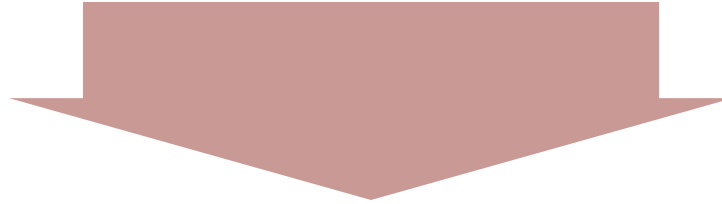
**+ 20%**

Compared to standardized analytical method

■ METODO STANDARDIZZATO  
 ■ METODO SEMPLIFICATO DOCET  
 ■ METODO SEMPLIFICATO UNITS11300



THEORETICAL METHOD LIMITS HAS ENCOURAGED

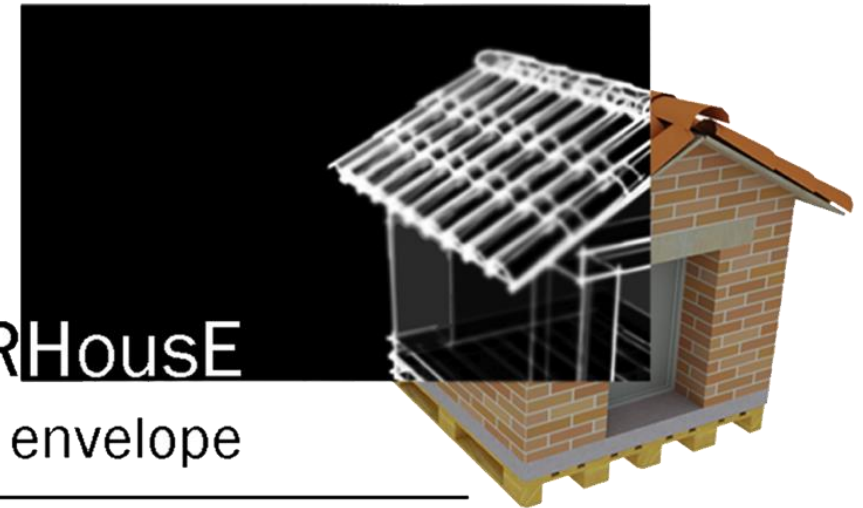


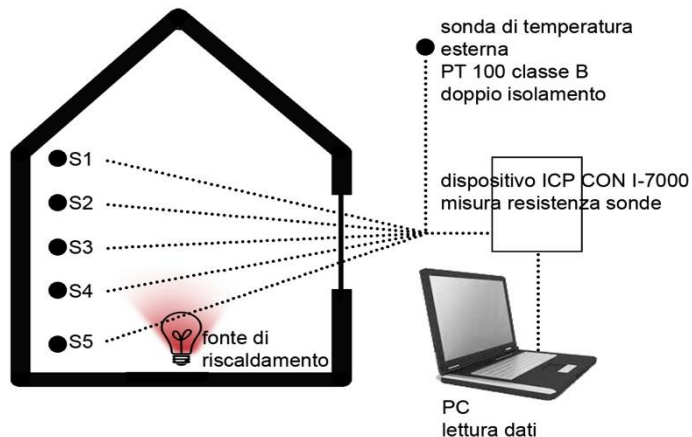
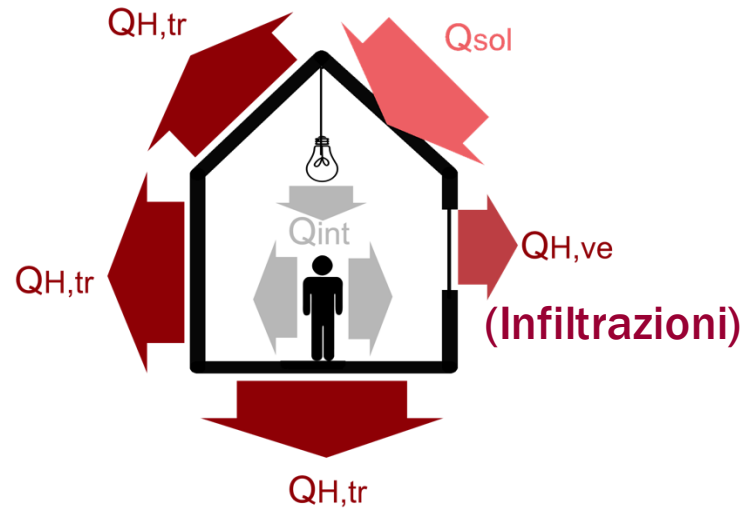
**to develop a data acquisition and processing system designed specifically for the historic buildings, which allows a building's energy field survey**

DRHouseE

diagnosis of a real house envelope

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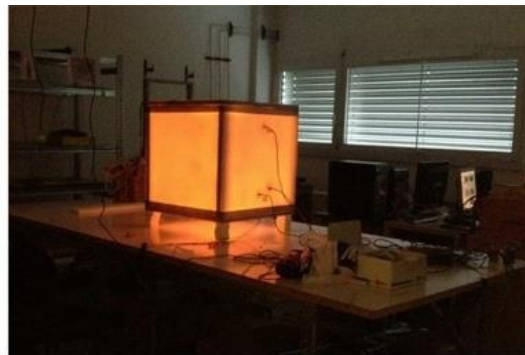
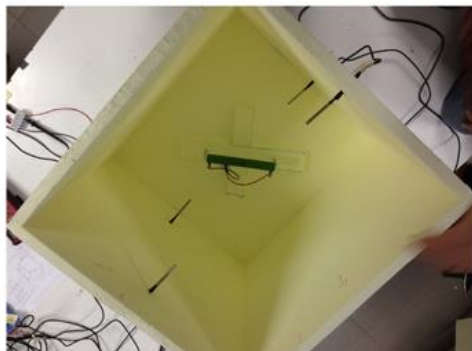
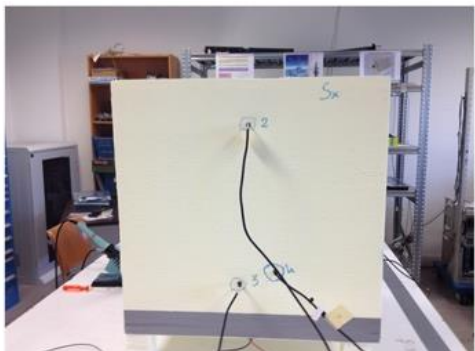
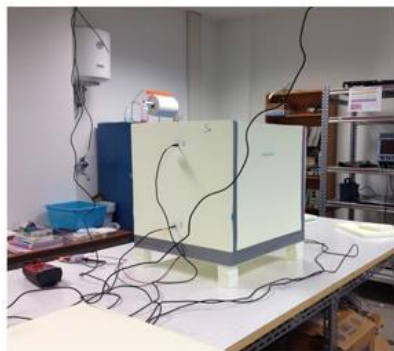
## TECHNIQUES OF INSTRUMENTAL MEASUREMENT OF THE OVERALL HEAT TRANSFER COEFFICIENT

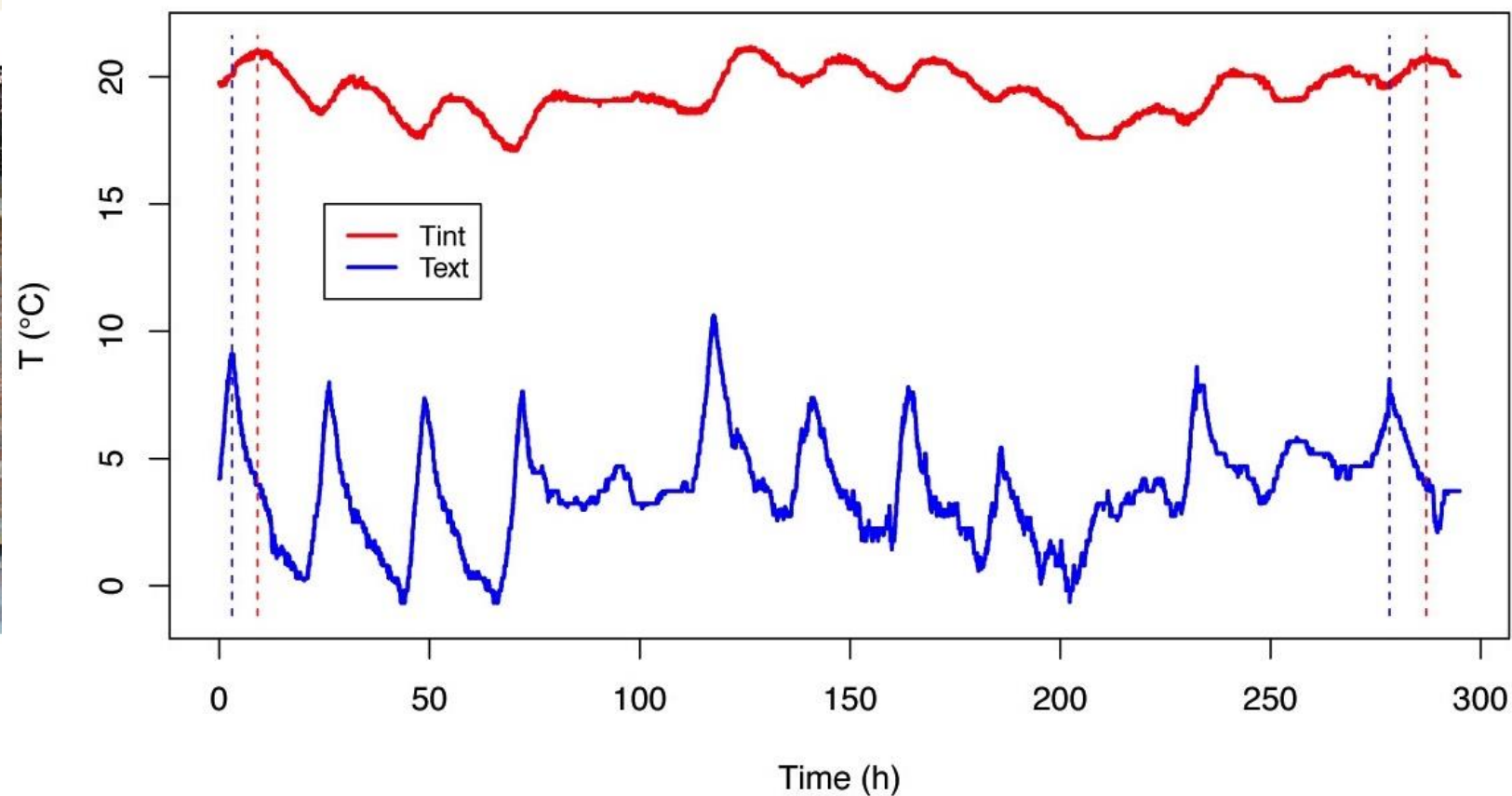
⋮

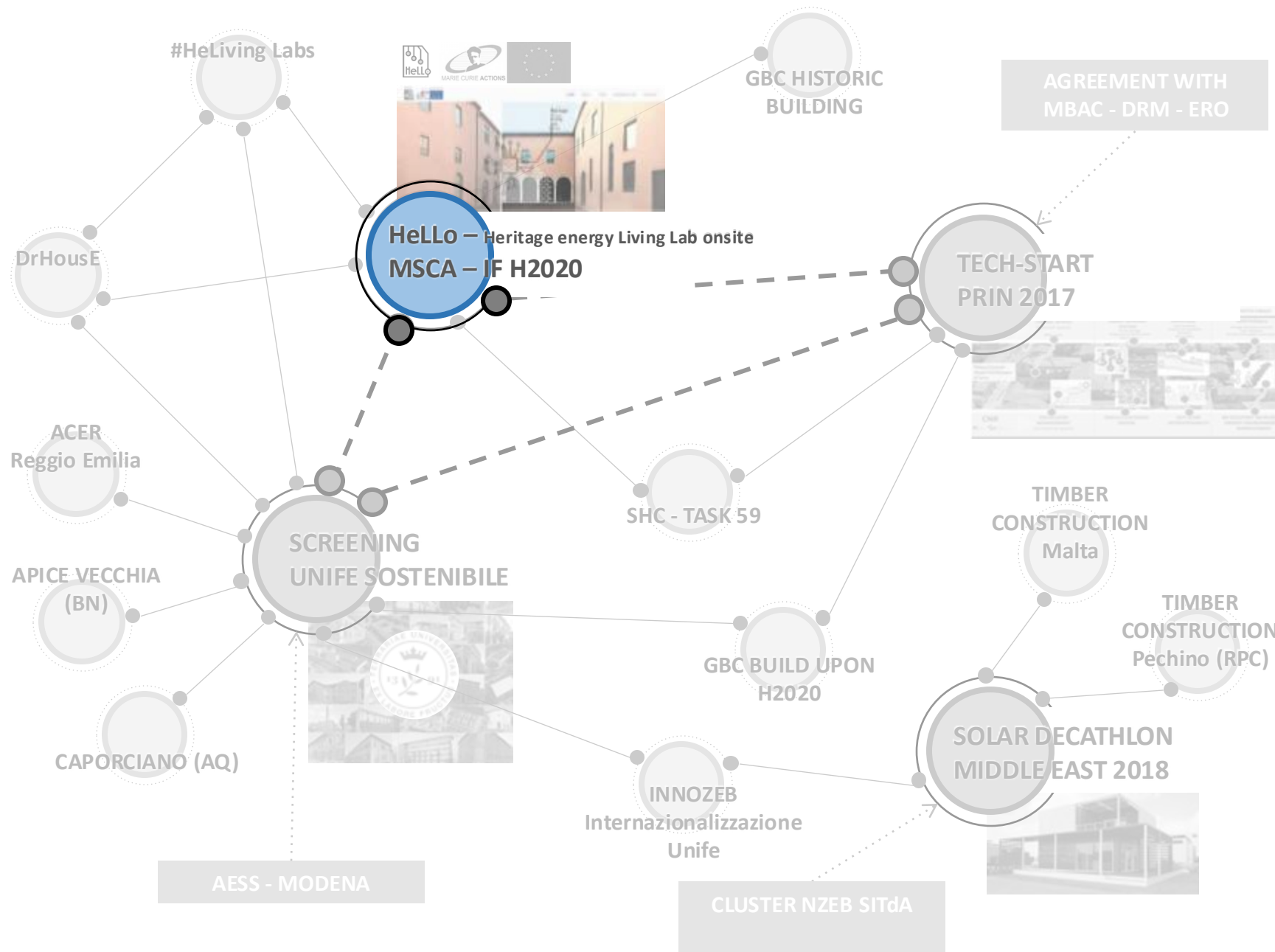
$$H_{gl} = \sum U_i A_i$$

1. HEATING CURVE
2.  $\Delta T$  CONSTANT
3. CURVE TRACKING





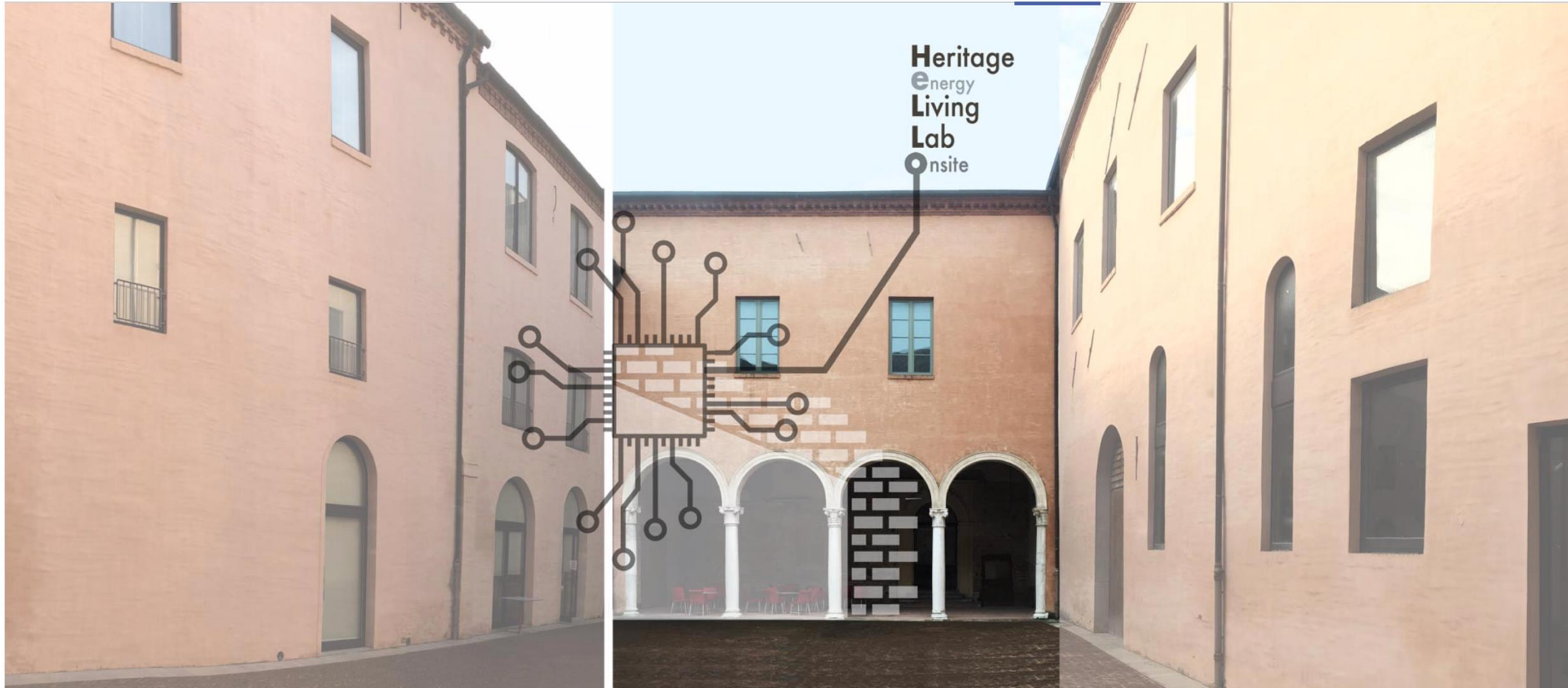






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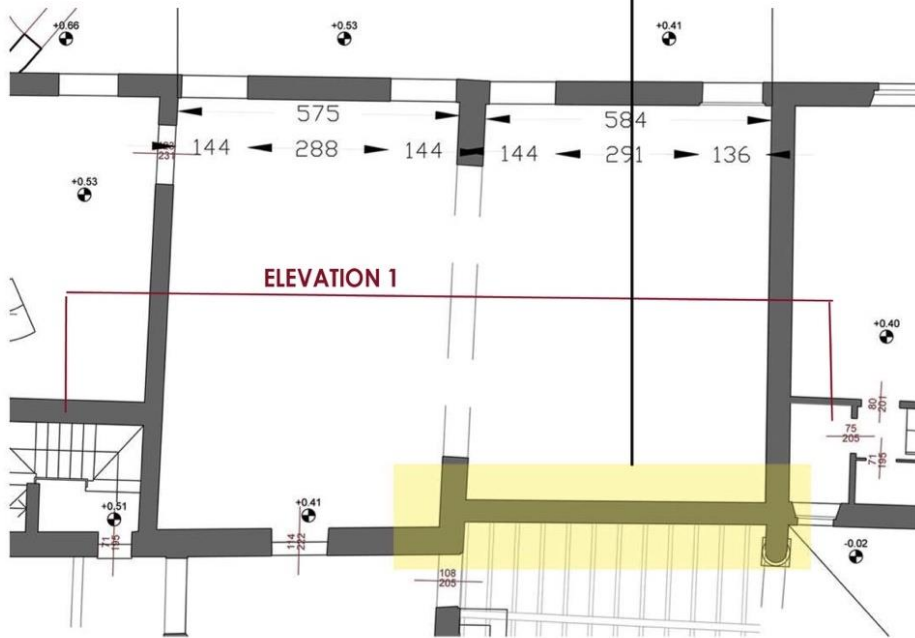
<https://hellomscaproject.eu>



SELECTED ROOM FOR TESTS



SELECTED WALL FOR TESTS





Insulation system technology #1 (CaSi)

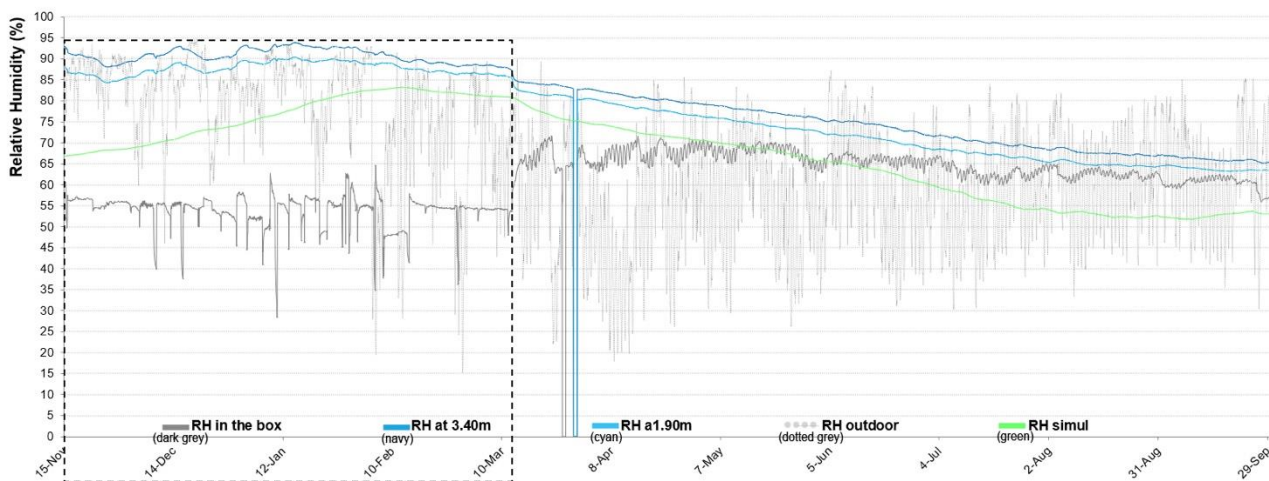


Insulation system technology #2 (Co)

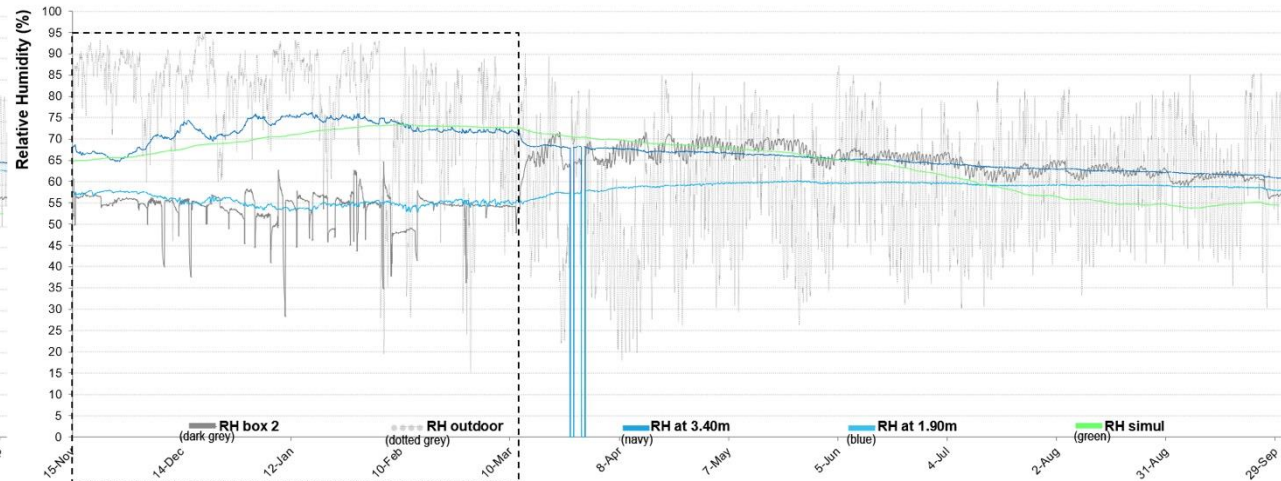


Insulation system technology #3 (S)

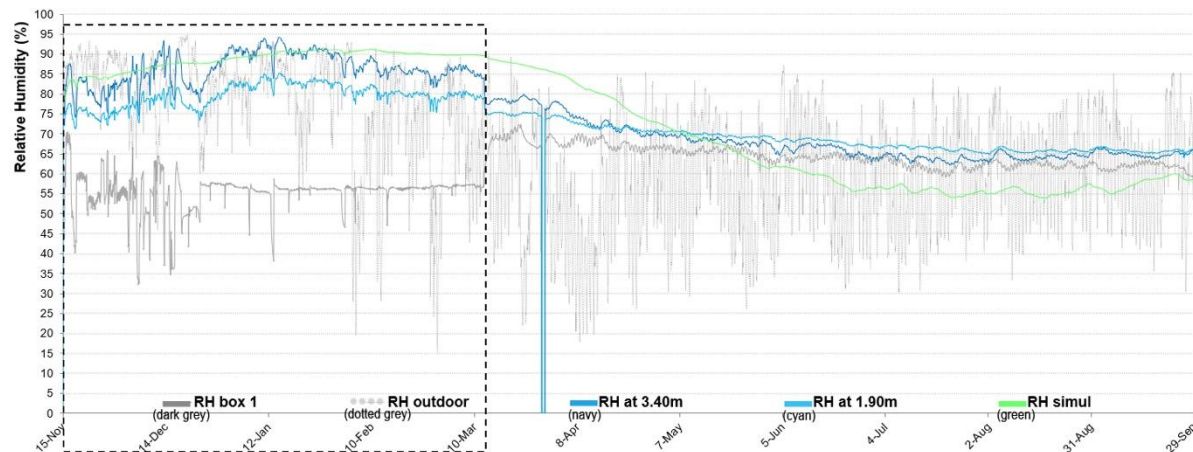




**Calcium Silicate**

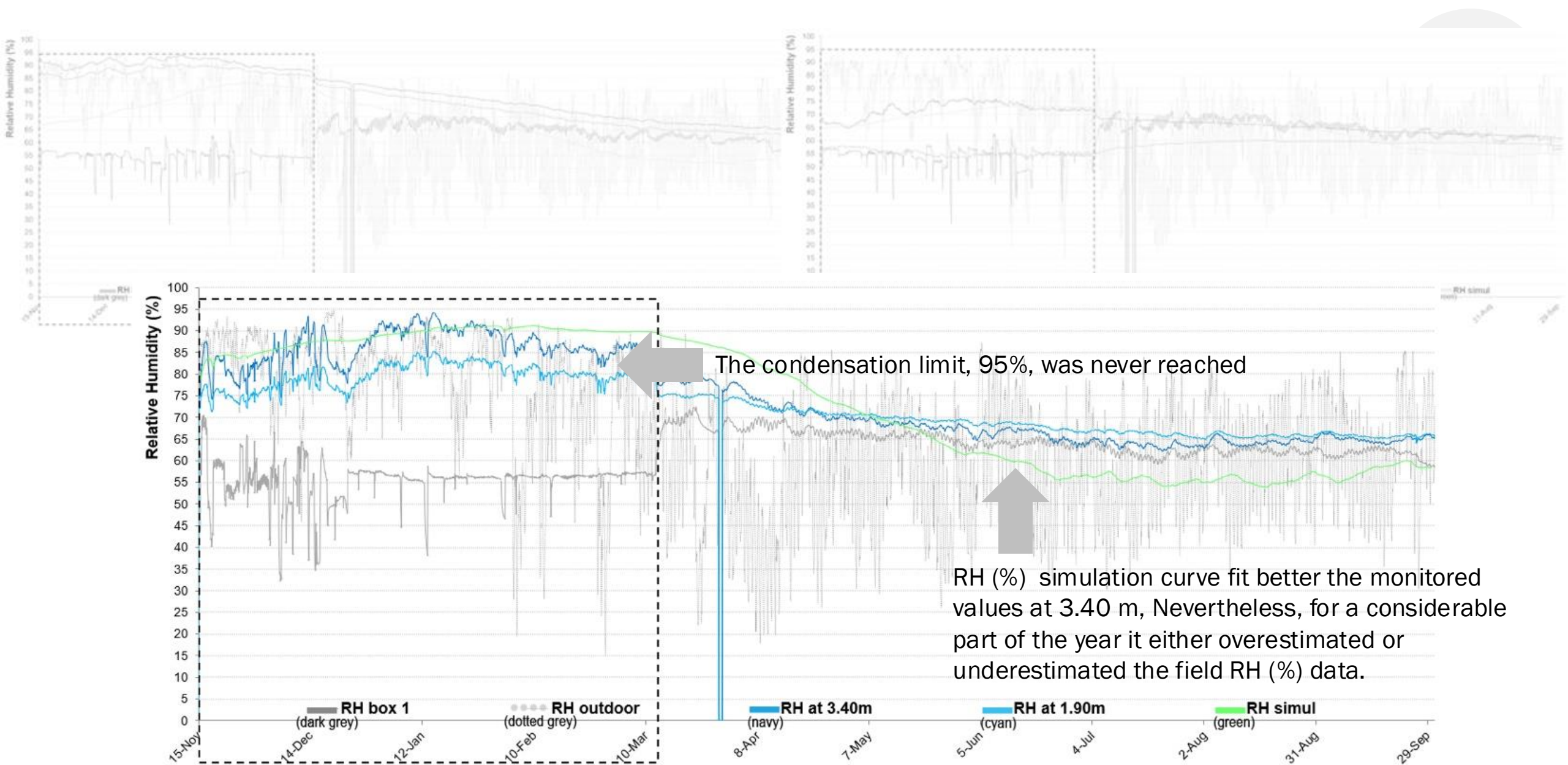


**Cork**



**Stone Wool**



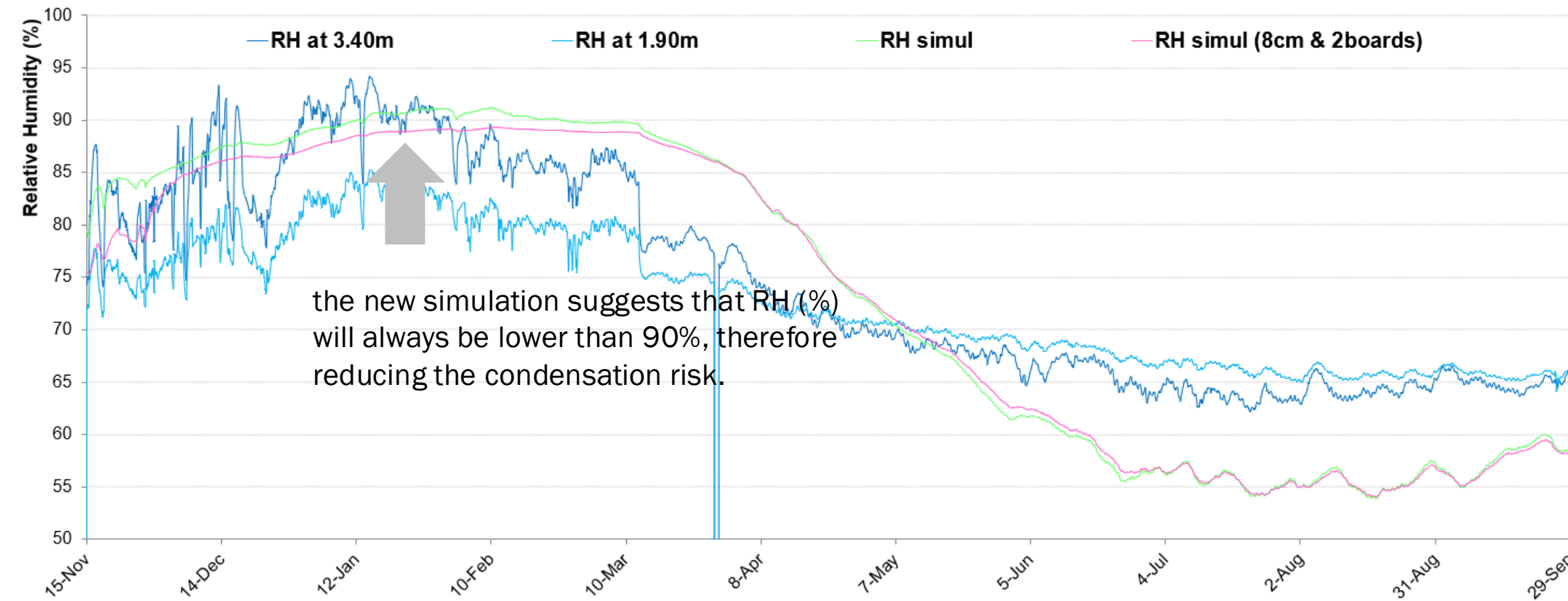


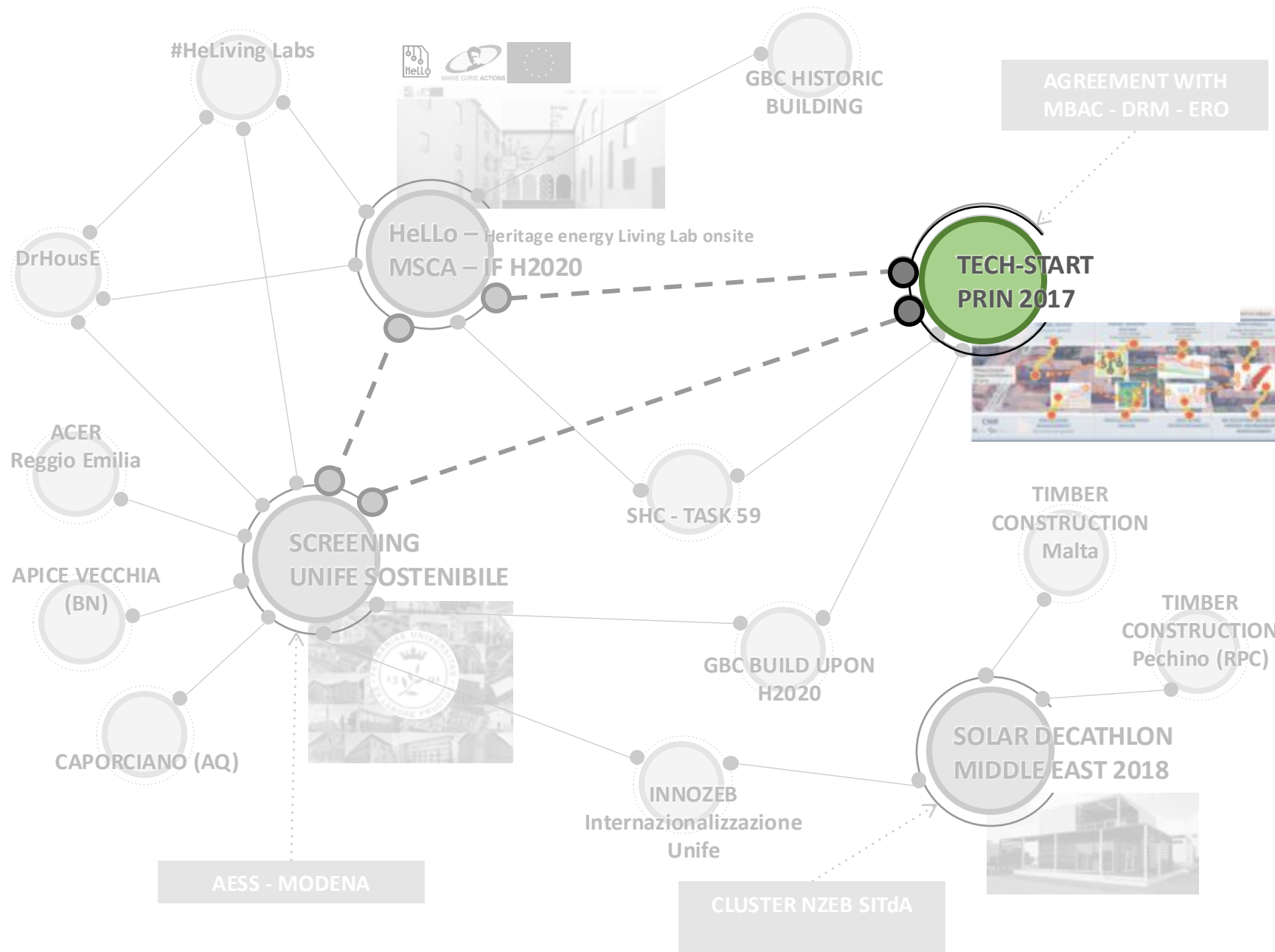
## Stone Wool

# Variations

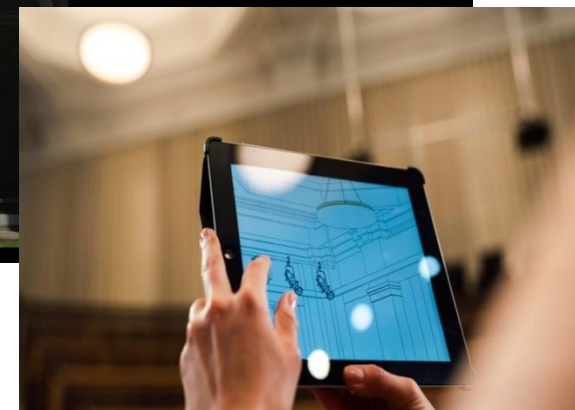
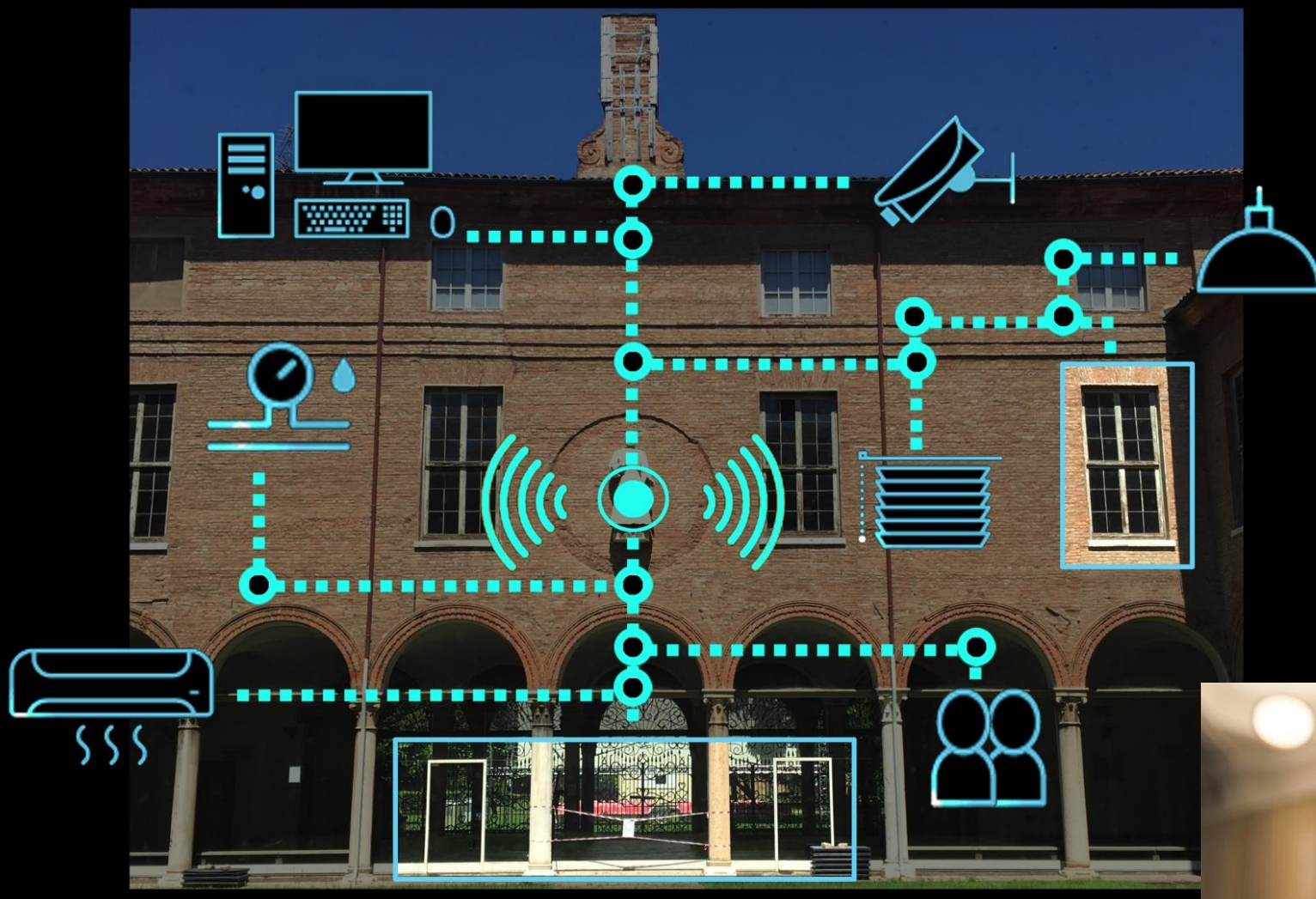
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new scenario is made of 8 cm stone wool and two gypsum boards of internal finishing









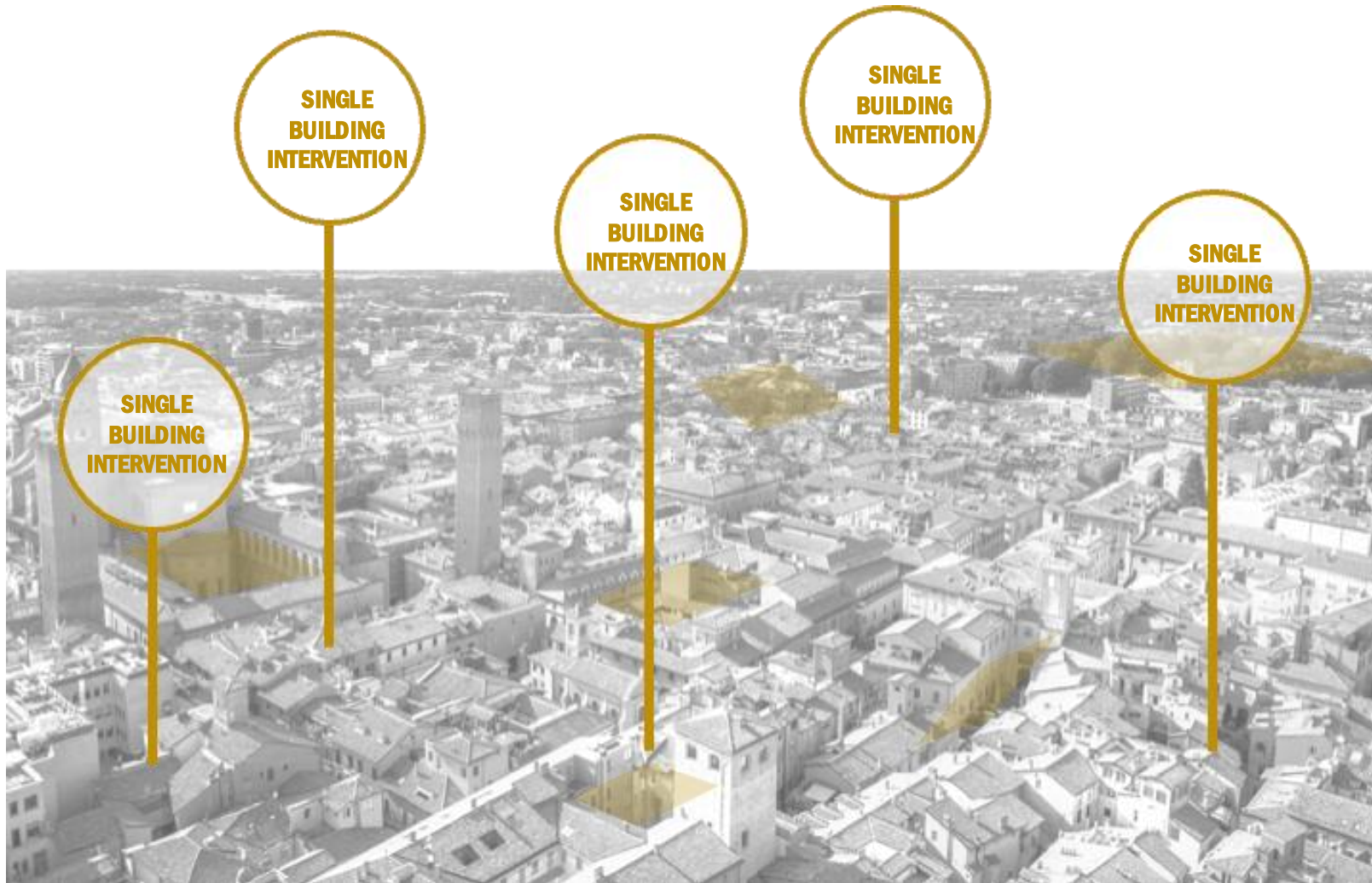
**TECH-START - key enabling TECHNOLOGIES and Smart environment in the Age of gReen economy. Convergent innovations in the open space/building system for climaTe mitigation**

**SINGLE  
BUILDING  
INTERVENTION**





# LARGE SCALE INTERVENTION + OUTDOOR SPACES



**PILOT CASE:  
PALAZZO COSTABILI, CALLED  
«LUDOVICO IL MORO»**

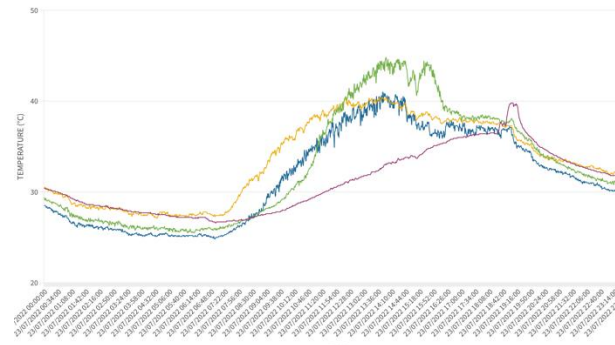


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**THANK YOU!**

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