



Med-EcoSuRe



Convegno

UNIVERSOstenibilitA'

la transizione digital-green
dei luoghi del sapere

Napoli, Mostra d'Oltremare
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beXlab: Digital Twin and User Experience

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@MedEcoSure



enicbcmed.eu/projects/med-ecosure



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The Mediterranean cross-border Living Lab (LL)

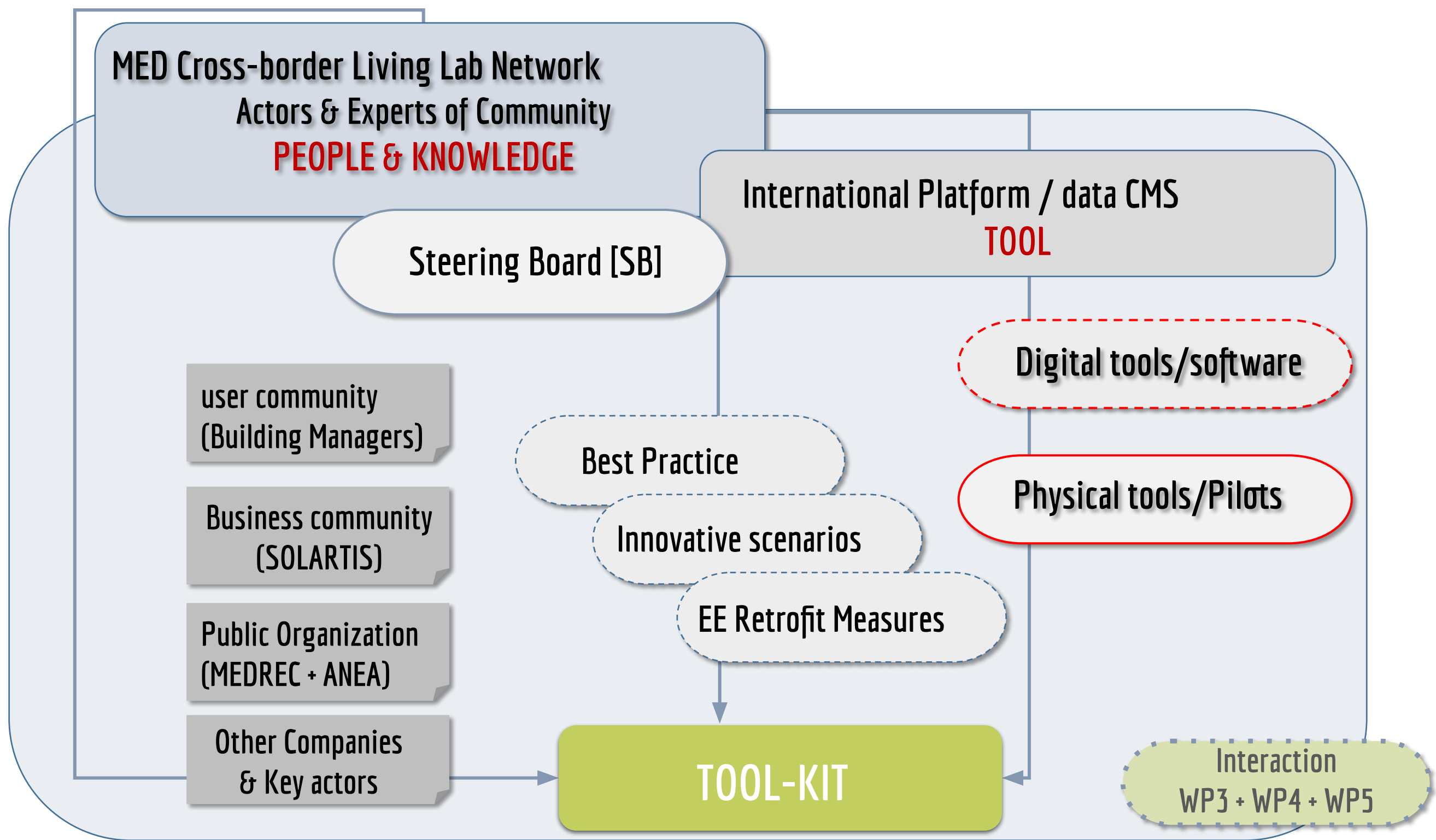
is coming up with the notion of working with stakeholders to produce research towards innovative solutions

Traditionally...
considered as merely “*passive technical or administrative*” subjects to whom new approaches and solutions are simply proposed

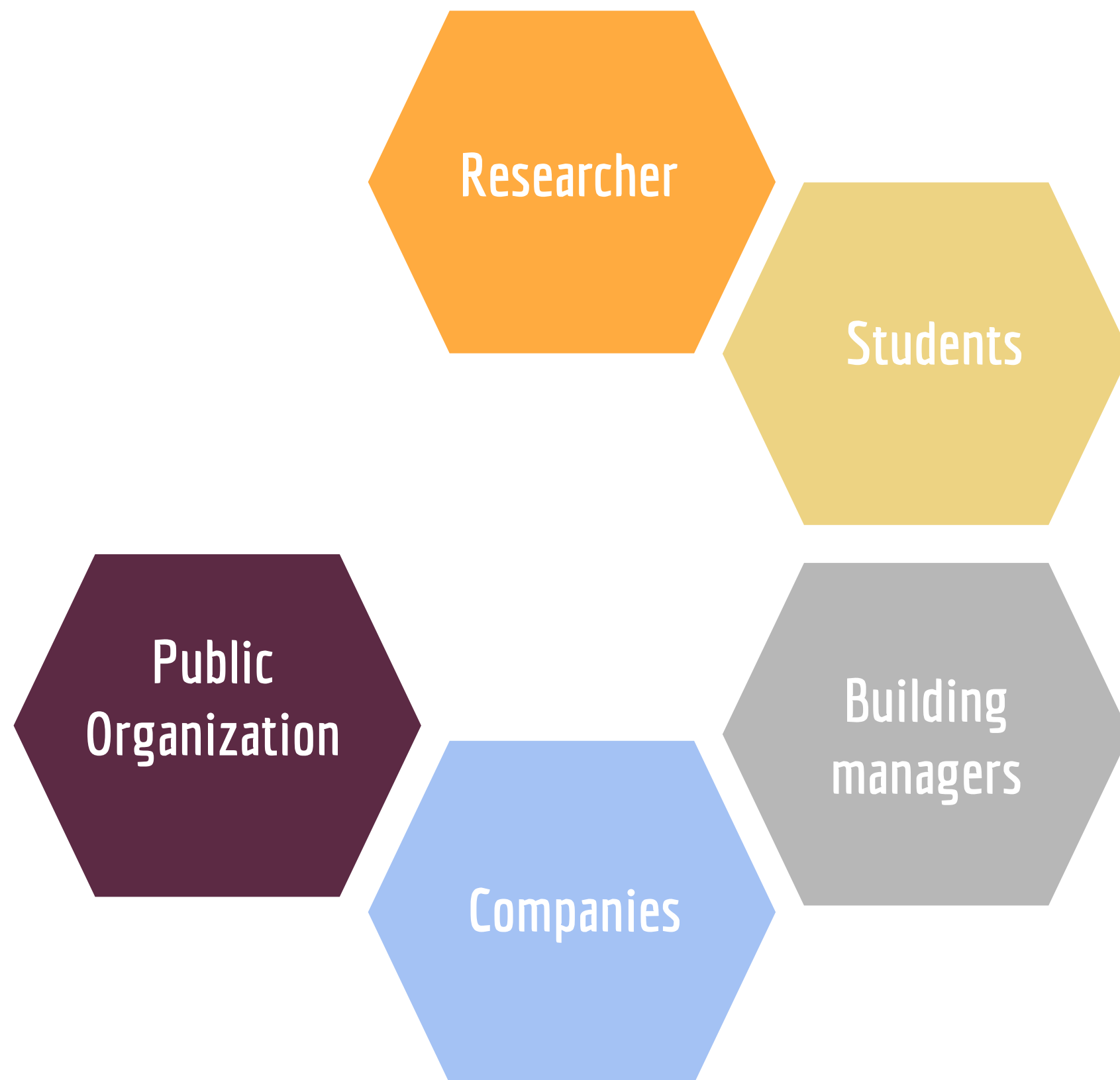


New collaborative...
active players contributing to the co-creation and experimentation of emerging ideas, breakthrough scenarios and innovative concepts.

The Mediterranean cross-border Living Lab (LL)



5 Stakeholders



Benefits for Stakeholders

Researcher

Researchers can deepen their theoretical investigation and get study cases

Students

Students will implement their awareness in the field of EE and the role of smart human behaviour

Public Organization

Public organizations can get increased concern of issues co-identified with researchers

Building managers

Building managers can get the solutions that fits to their specific needs

Companies

Companies can get and experiment new and innovative ideas

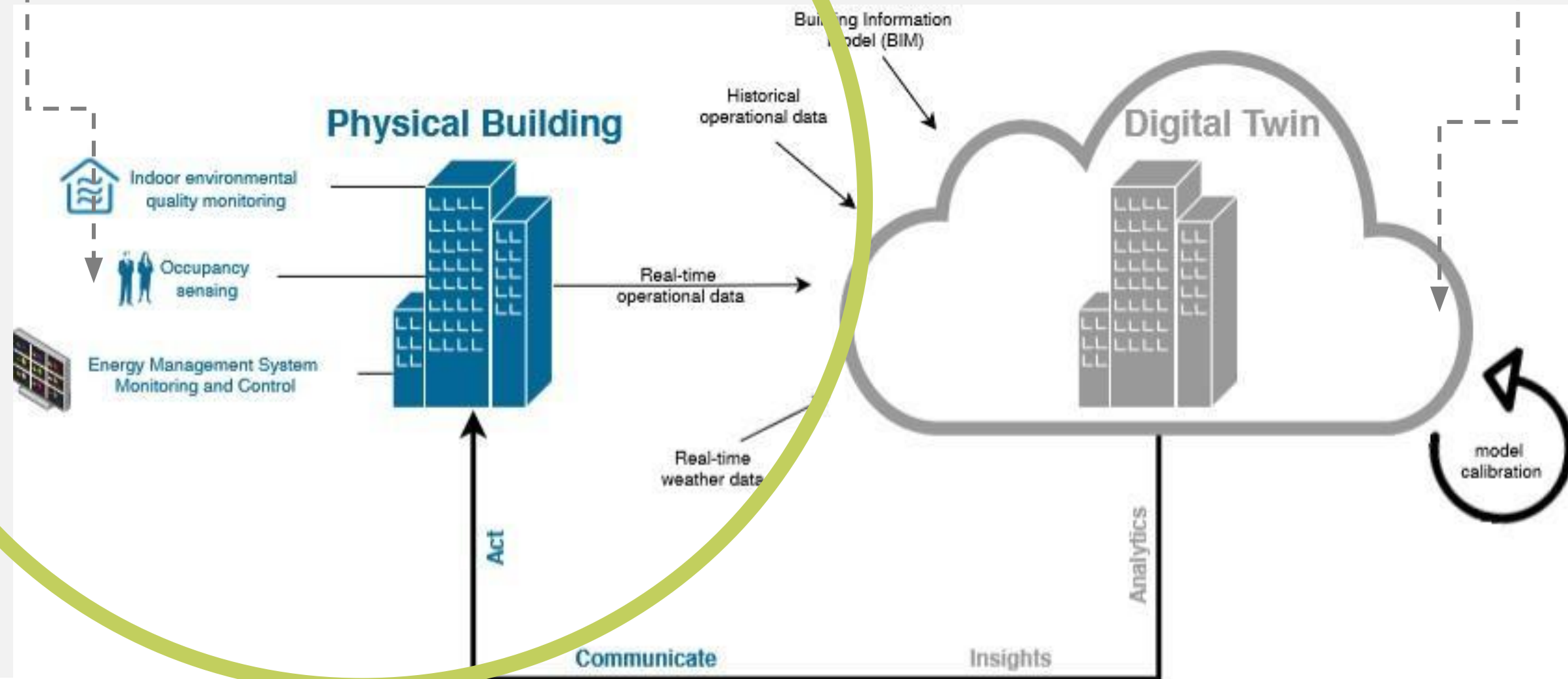
ACTIVITIES Implementation

LOCAL LIVING LAB

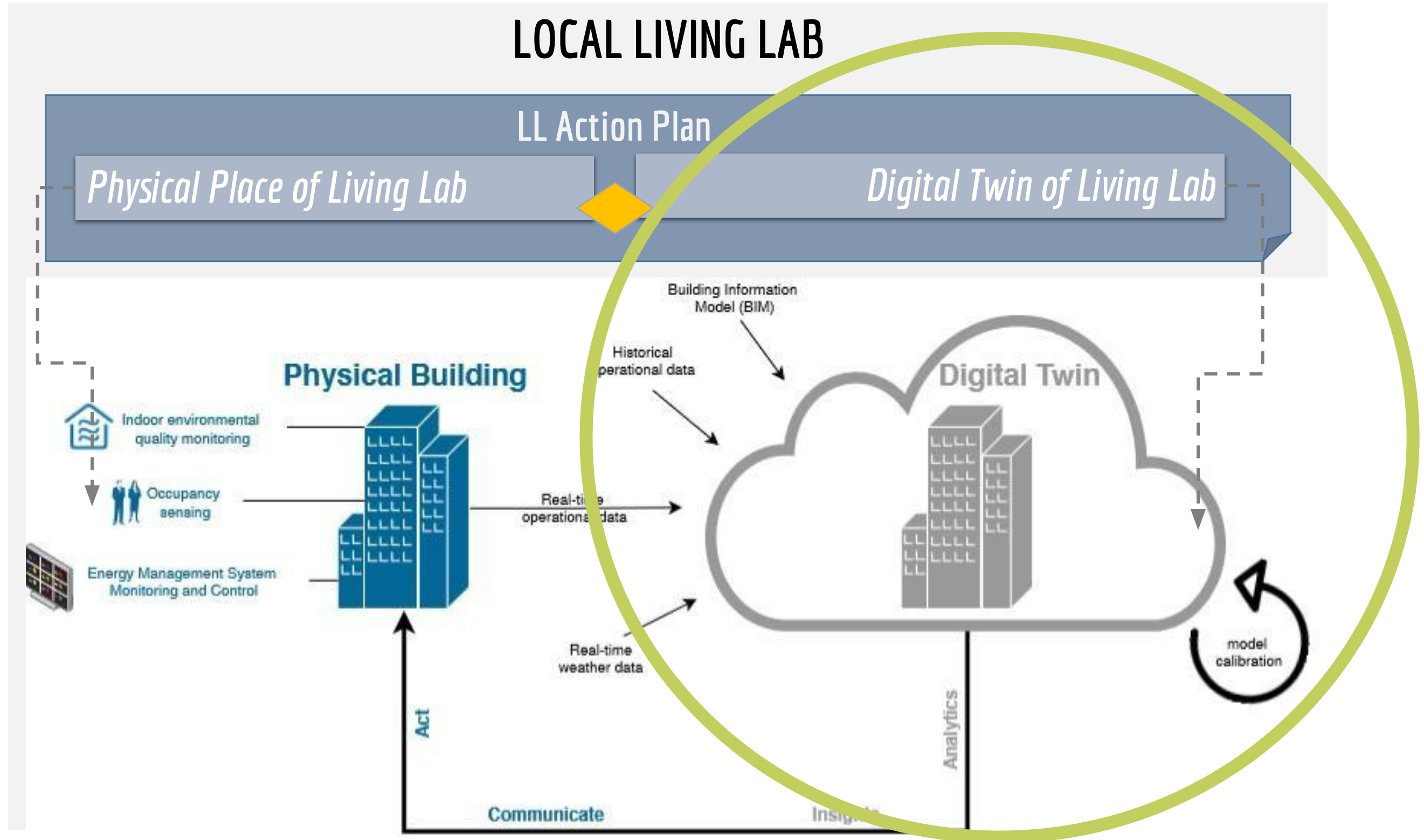
LL Action Plan

Physical Place of Living Lab

Digital Twin of Living Lab



Development of the LIVING LAB



AUGMENTED Digital Twin of Living Lab



concept

University as living lab



RETROFIT as INNOVATION PROCESS



UNIVERSITY BUILDING RETROFIT as INNOVATION PROCESS



5 phases

1

KNOWLEDGE
FRAMEWORK

2

ANALYSIS OF
CRITICALITIES

3

PLANNING AND
DESIGN

4

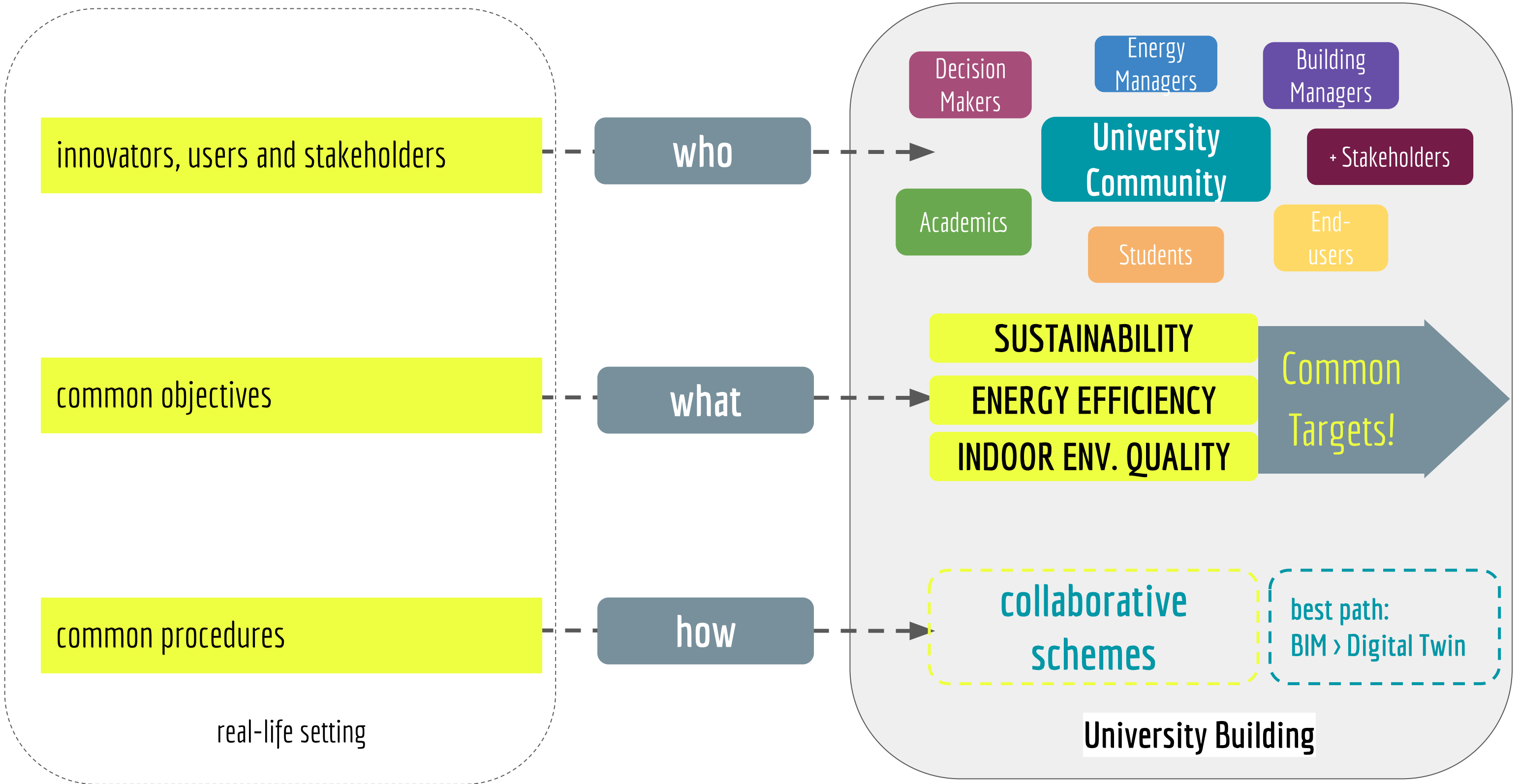
INTERVENTION

5

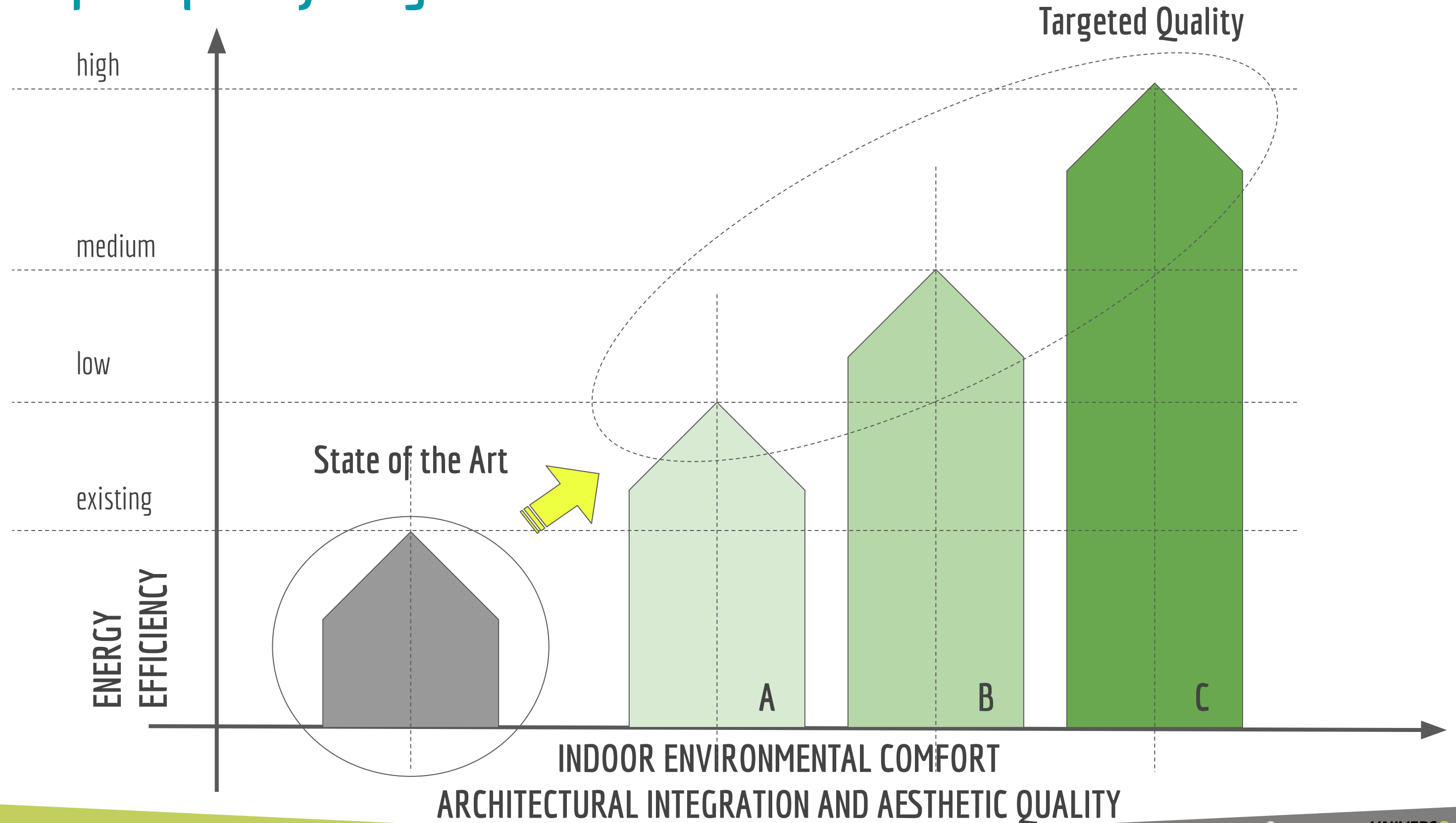
POST-
MANAGEMENT

living lab approach

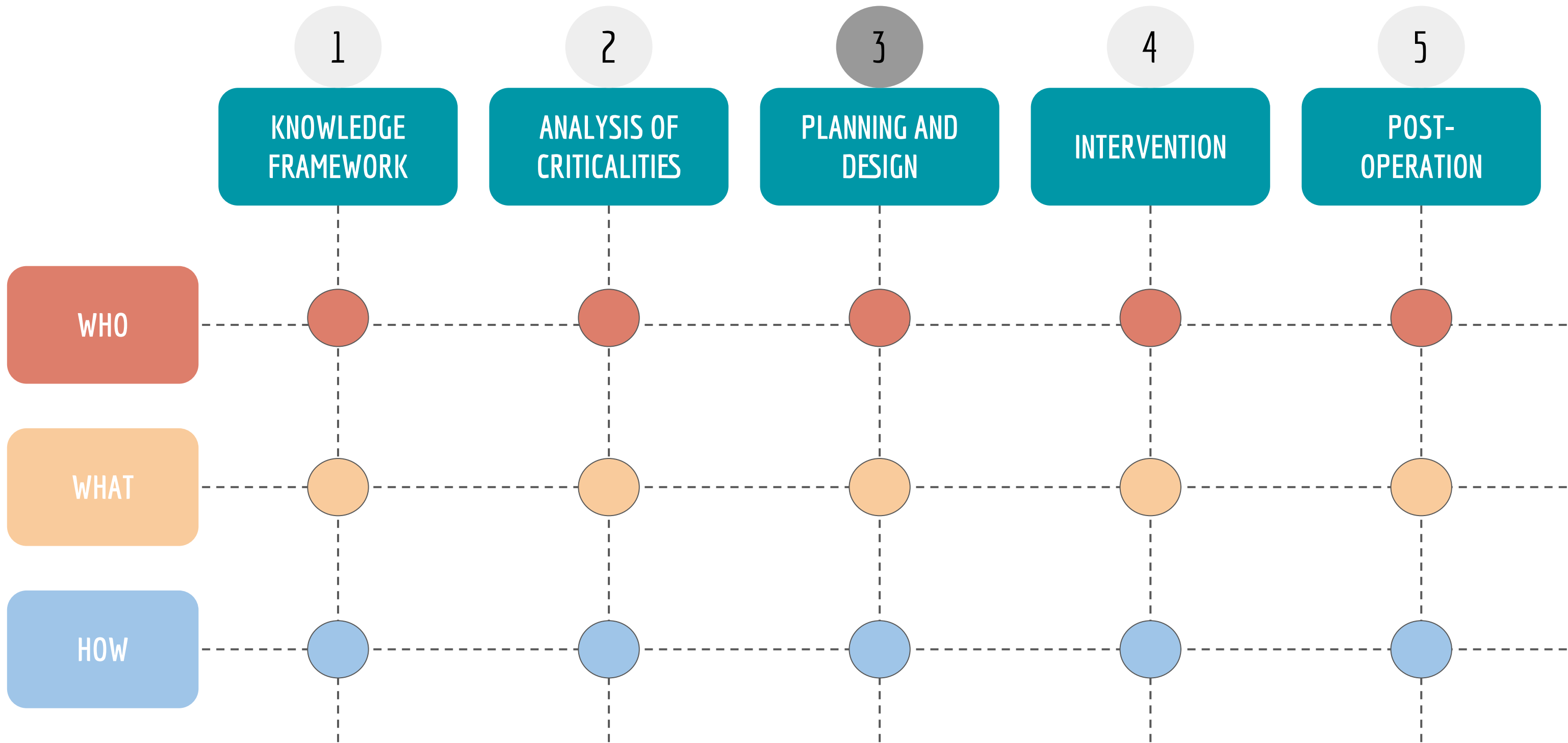
to university retrofit



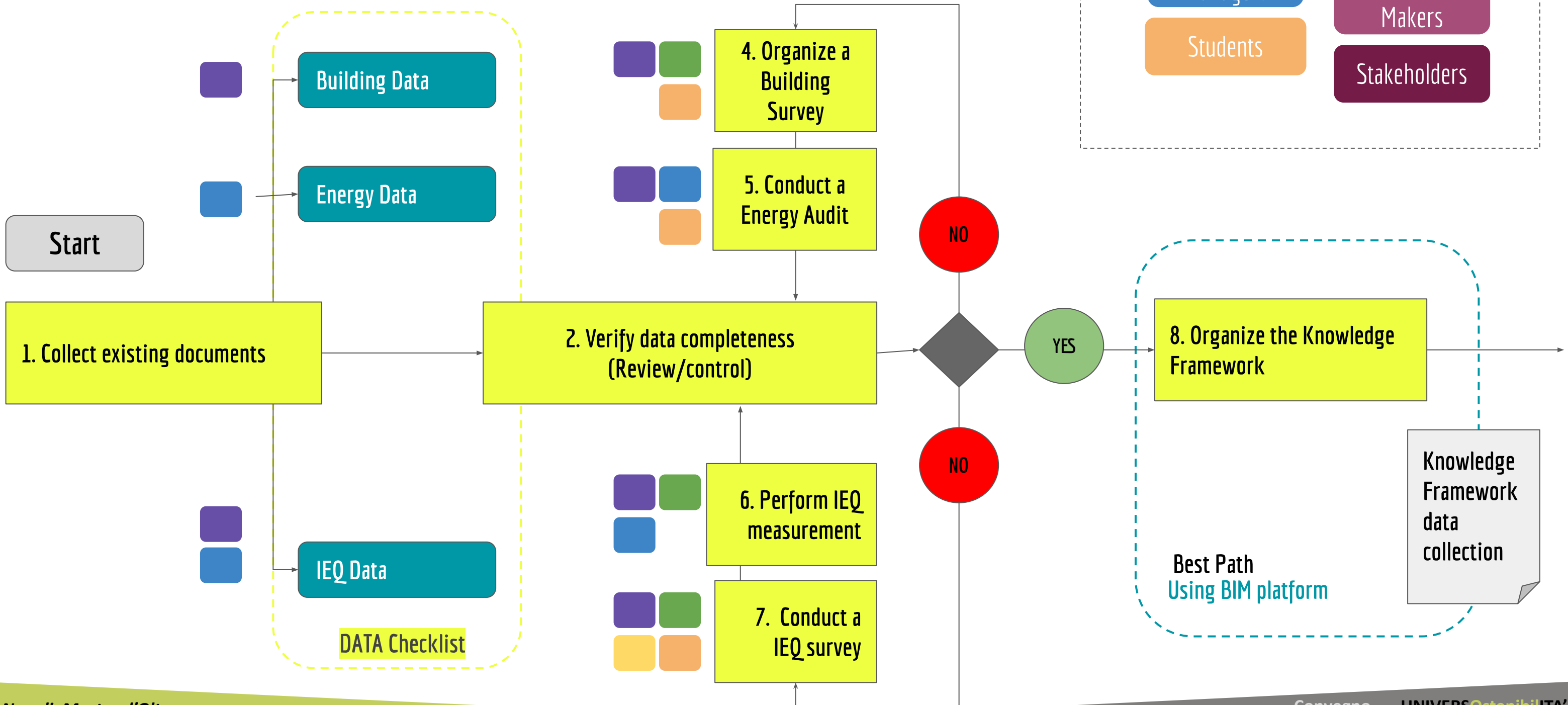
Define quality targets!



LOGICAL MATRIX



KNOWLEDGE FRAMEWORK Workflow



Who is involved?

- Academics
- Energy Managers
- Students
- Building Managers
- Officers workers
- Decision Makers
- Stakeholders

ANALYSIS OF CRITICALITIES

Workflow

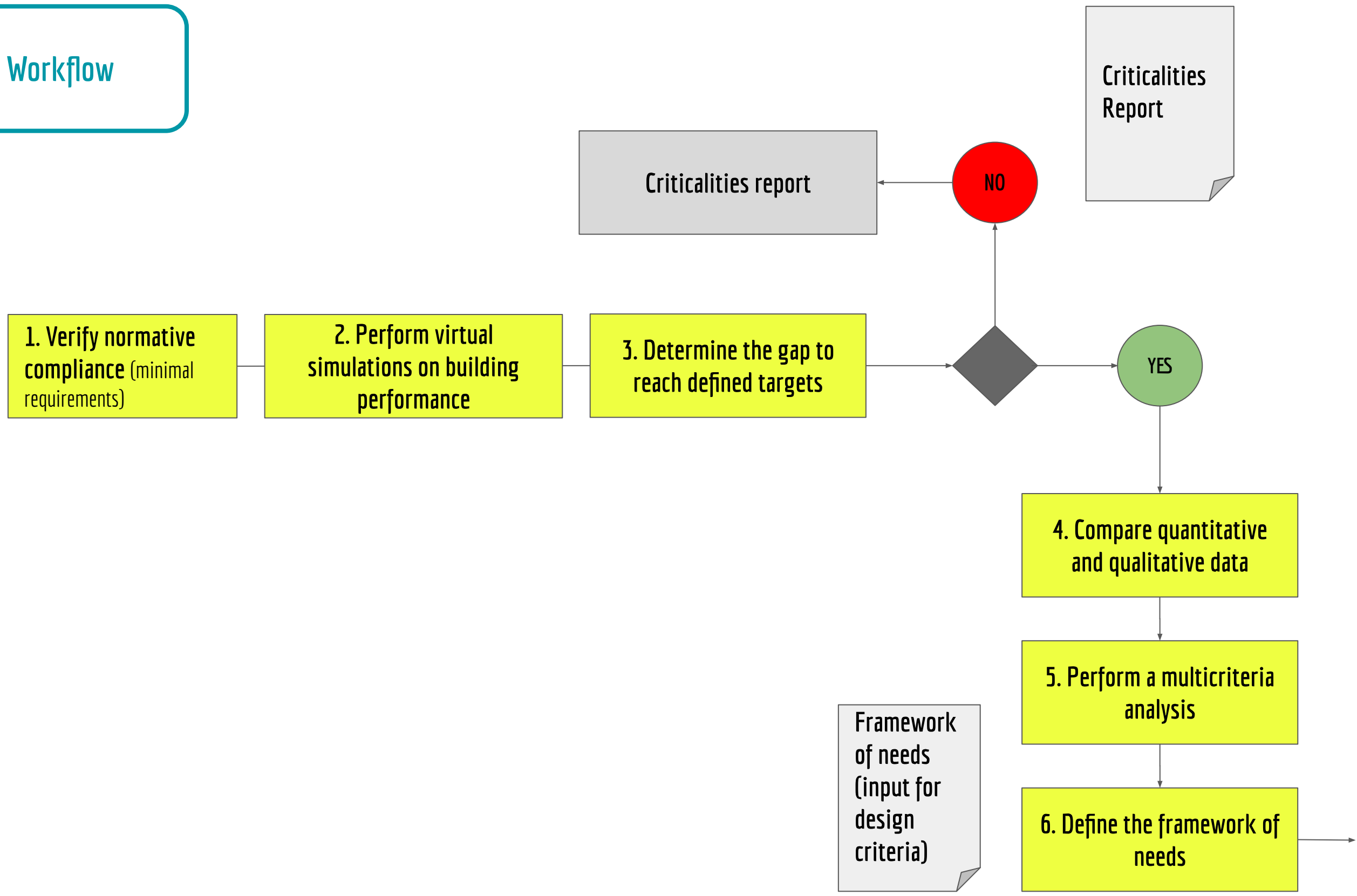
Start

Knowledge Framework data collection

Building Data

Energy Data

IEQ Data



PLANNING AND DESIGN

Workflow

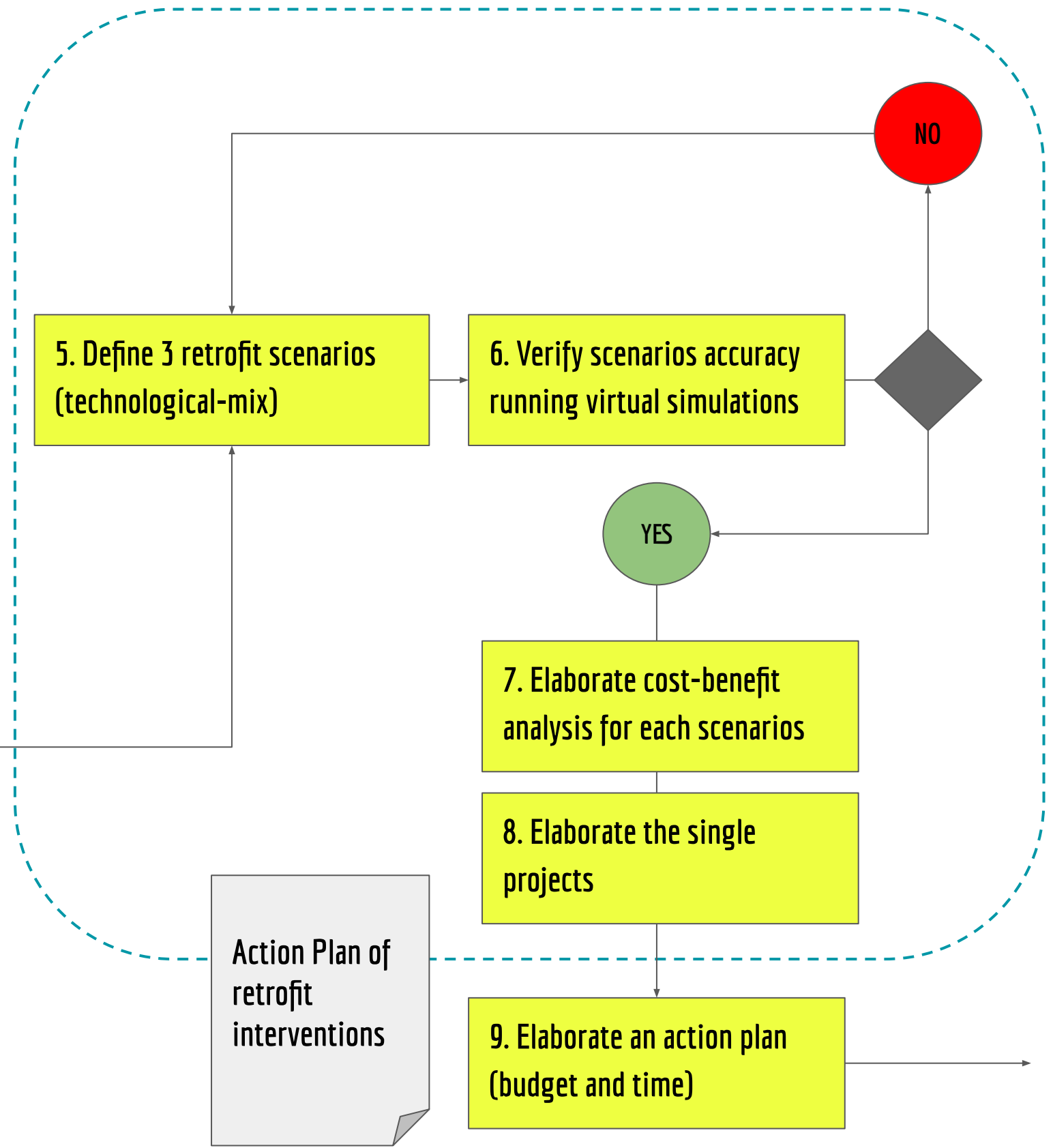
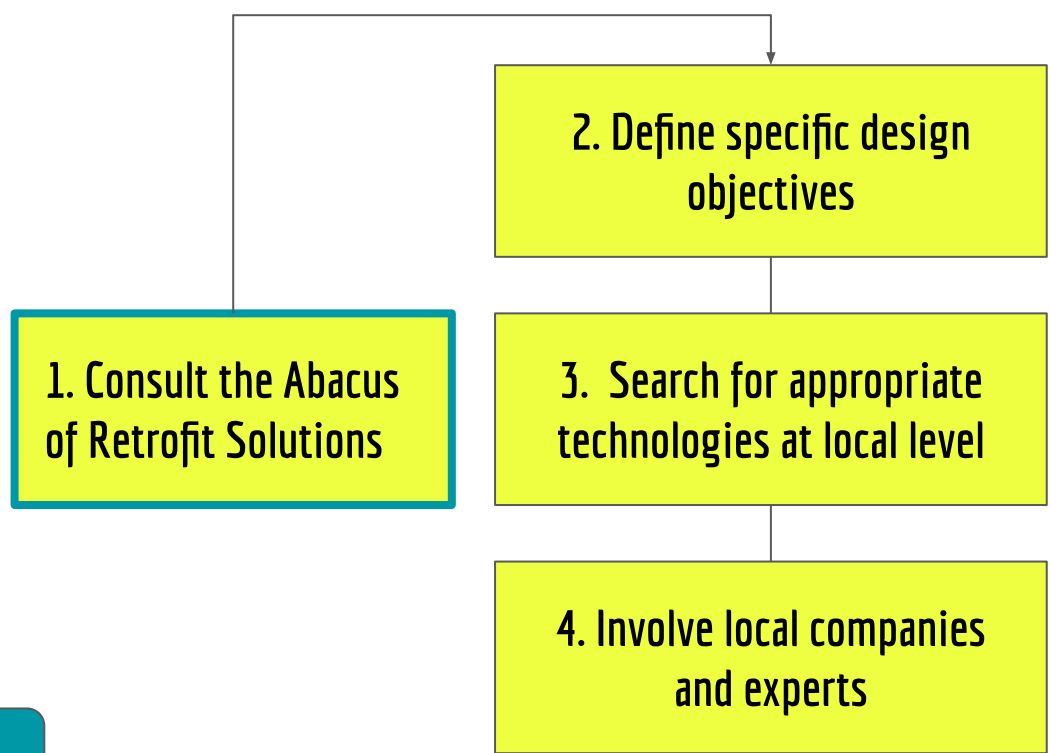
Start

Framework of needs (input for design criteria)

Building Criticalities

Energy Criticalities

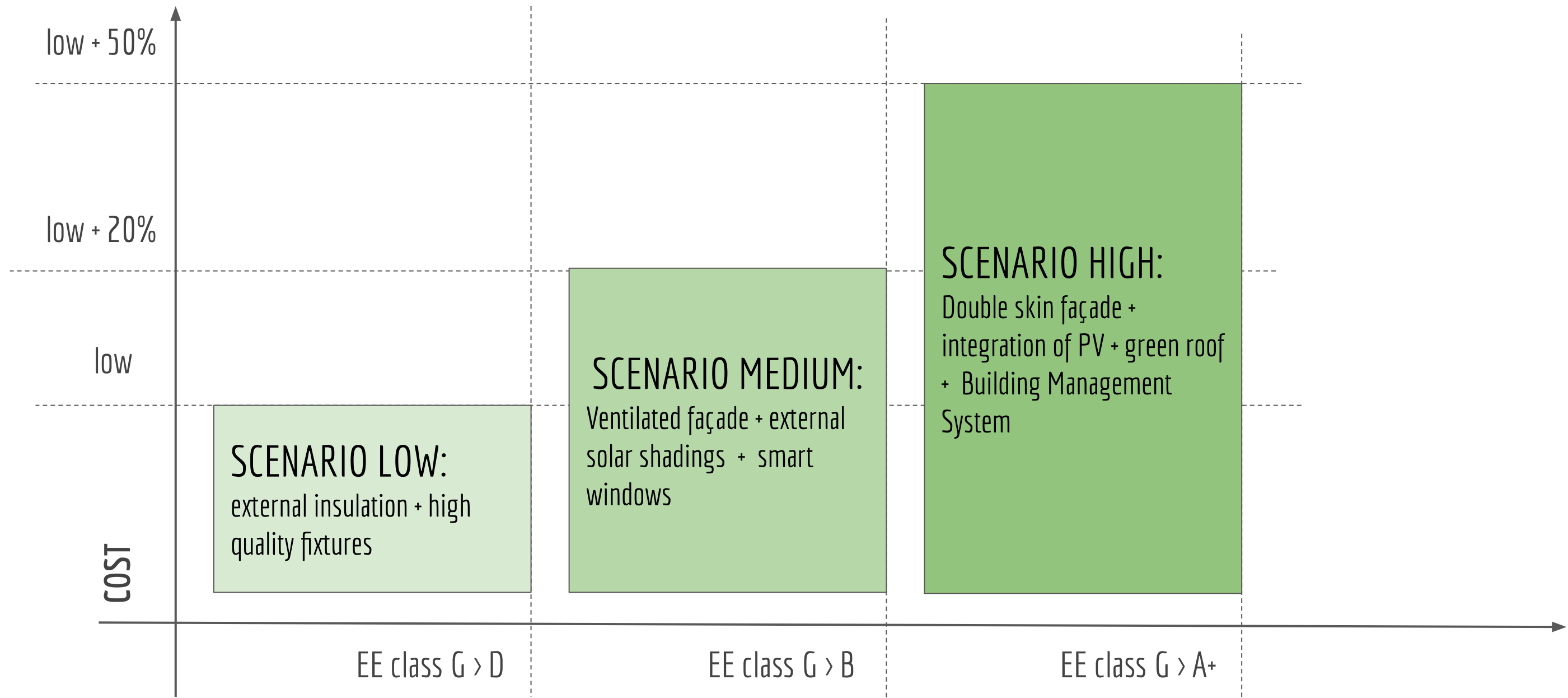
IEQ Criticalities



Action Plan of retrofit interventions

PLANNING AND DESIGN

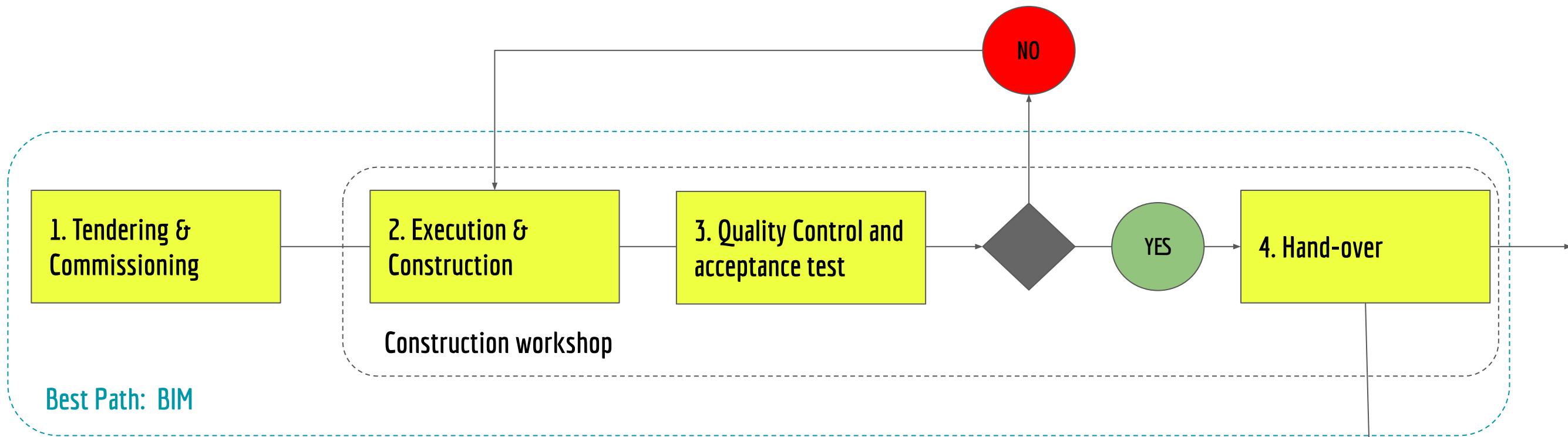
Example of content



INTERVENTION Workflow

Start

Action Plan of retrofit interventions



Type of interventions:

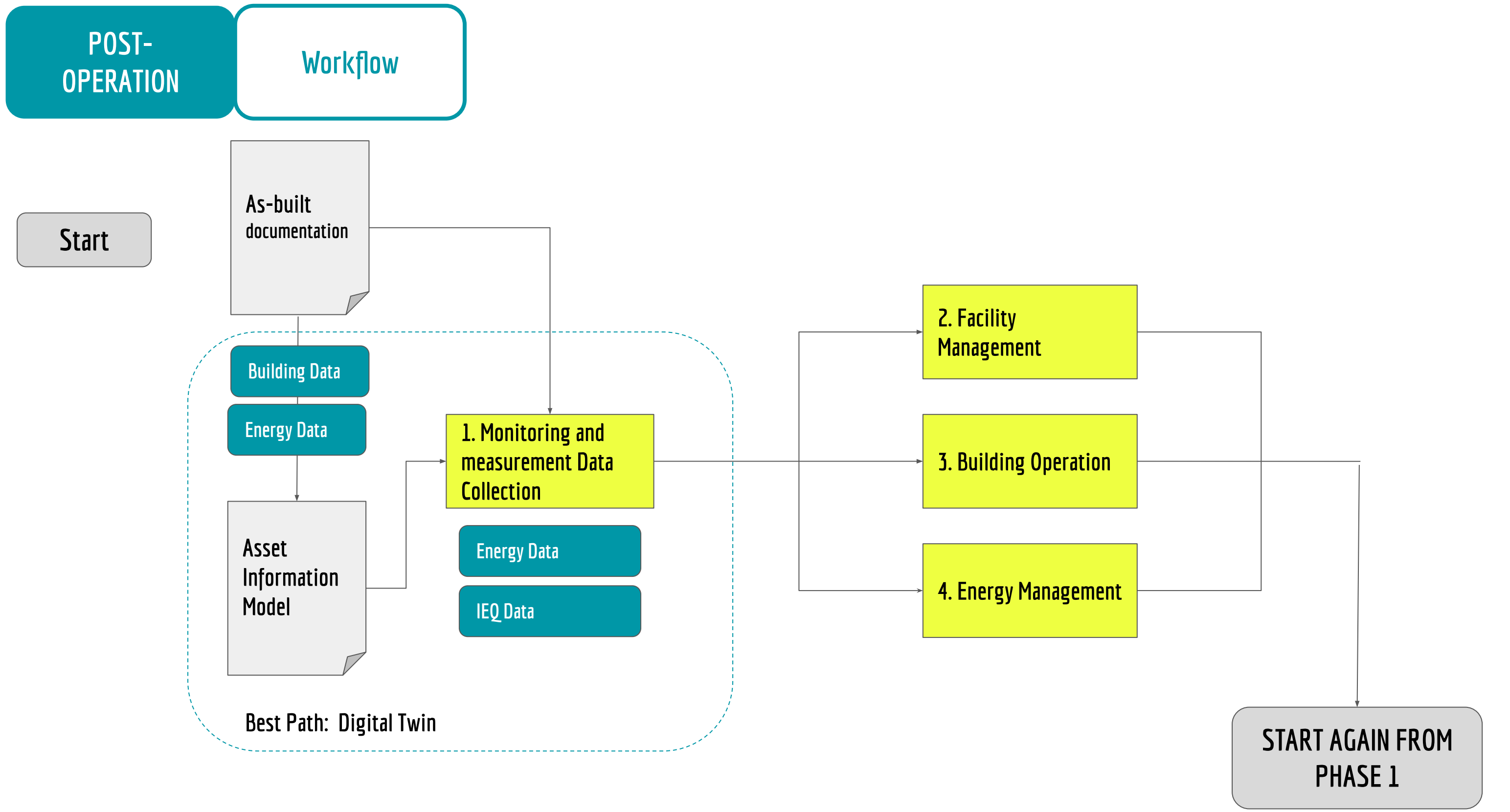
Emergency Intervention

Extraordinary Maintenance (retrofit)

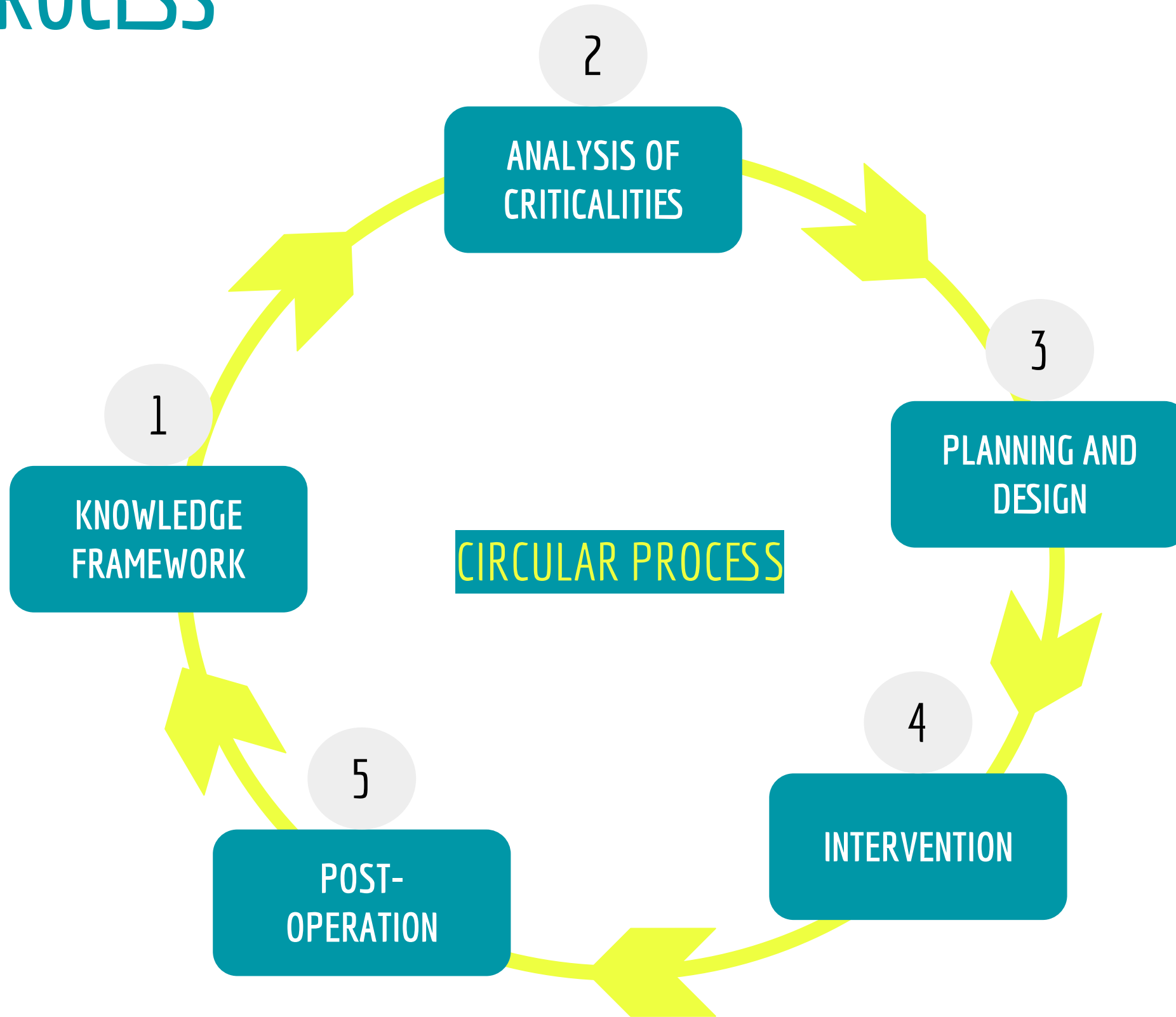
Ordinary Maintenance

Deep renovation

As-built docs and certificates



QUALITY PROCESS





Med-EcoSuRe

What is the TOOLKIT?

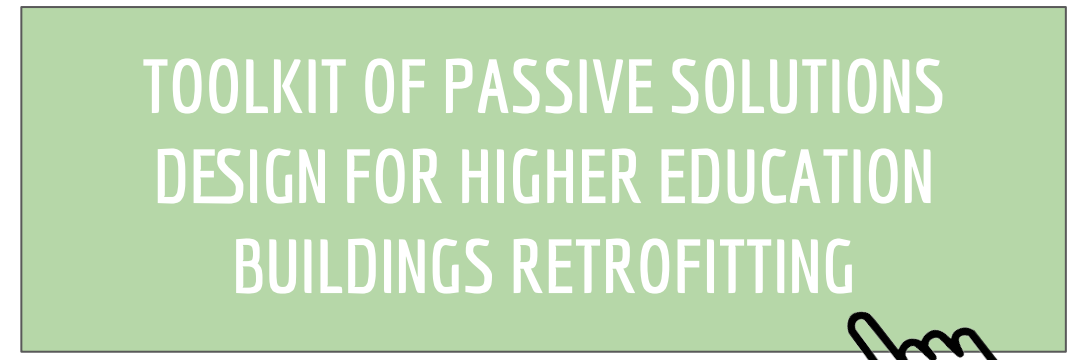
Innovative, interactive, bottom up and partecipative (Living Lab) programme of training and education for technicians and students on the energy retrofiting of the university building, with a list of suggestions for the management and sharing experience”

Why the TOOLKIT?

For their innate research & innovation nature, universities can act as real-life laboratories (LL) where to collectively experiment and share innovative retrofiting processes and solutions, as catalyst for Eco-Sustainable Renovations in the Med- Area.

TOOLKIT target?

University managers and communities committed in sustainability goals, and intended to approach an innovative retrofiting process...



THE PILOT BUILDING OF SANTA VERDIANA

1395

Convent of Santa Verdiana

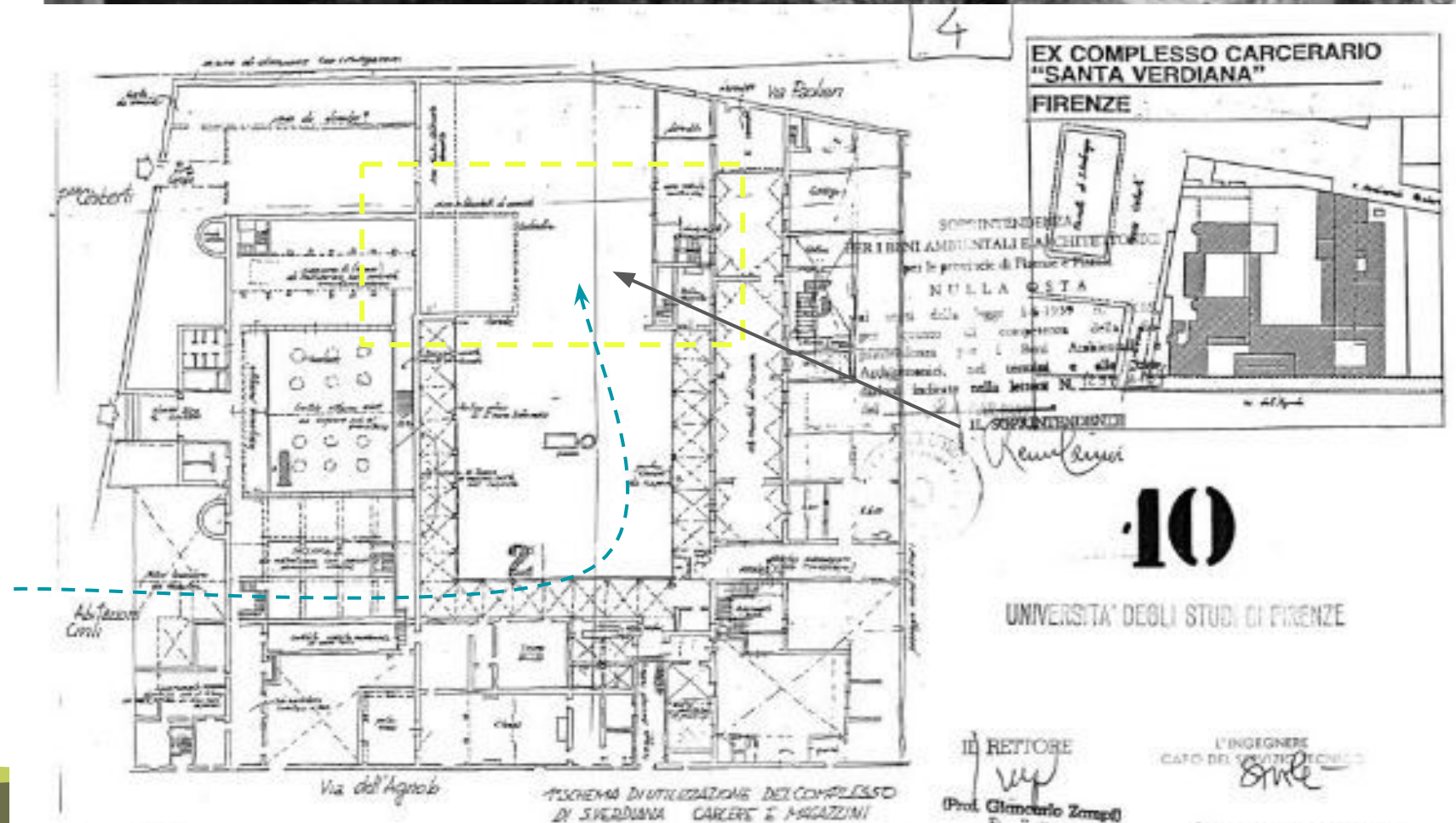
1865

Female Prison

1980 - 1990

New project for the School of Architecture of the University of Florence (Prof. Arch. Roberto Maestro)

PILOT BUILDING ADDITION
(first floor on pilotis)

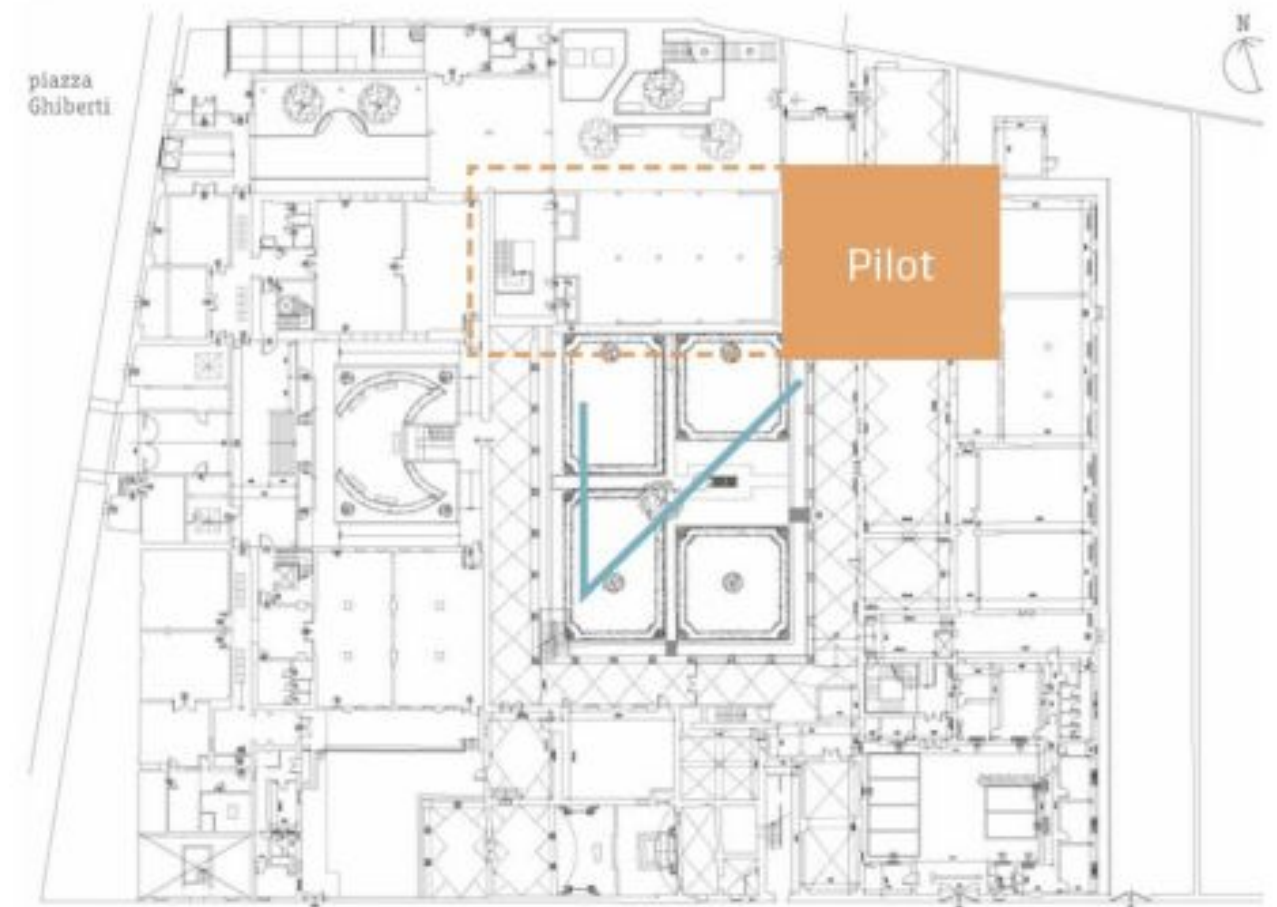
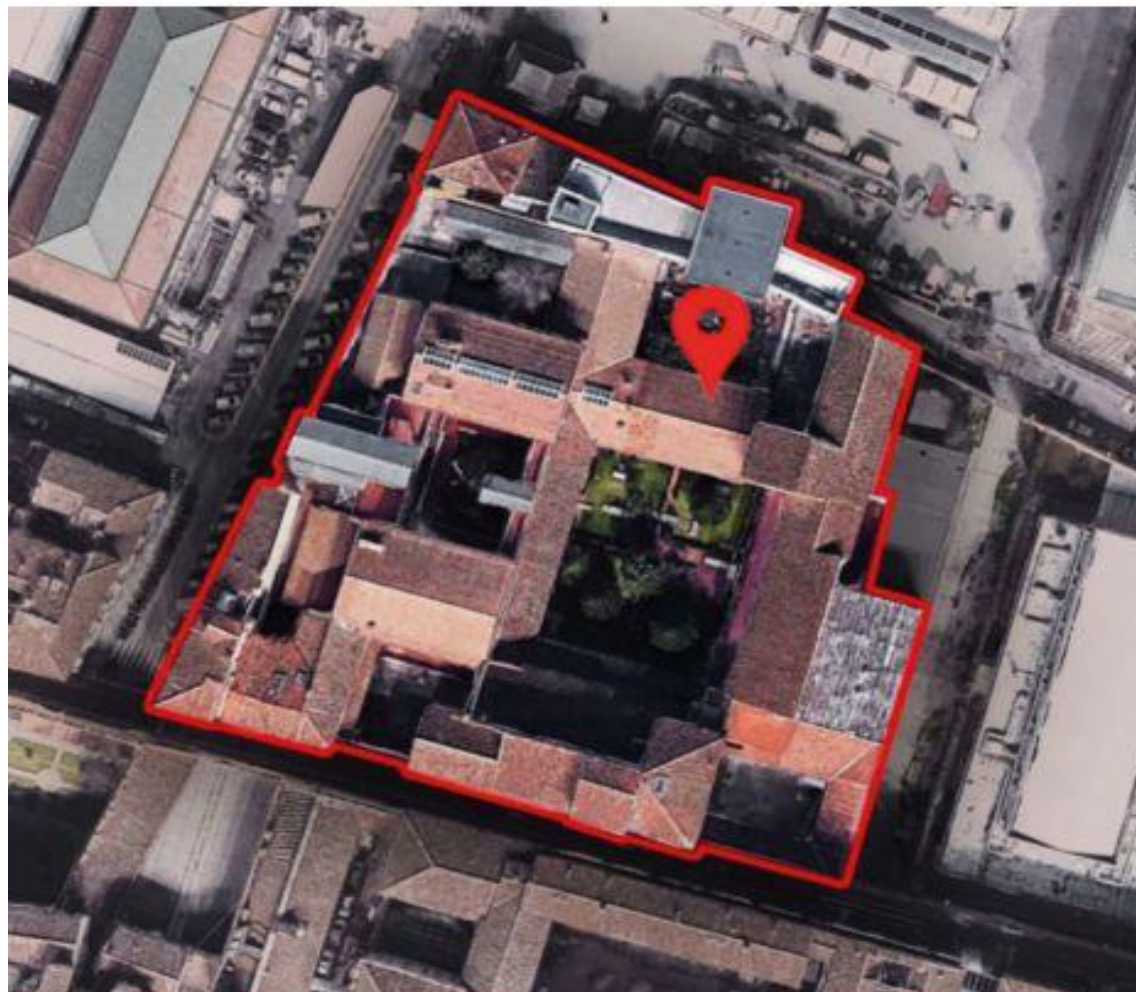


2000

The ground floor of the pilot building is closed to host two new student rooms

2017

New project for a multifunctional building in the north of the pilot building

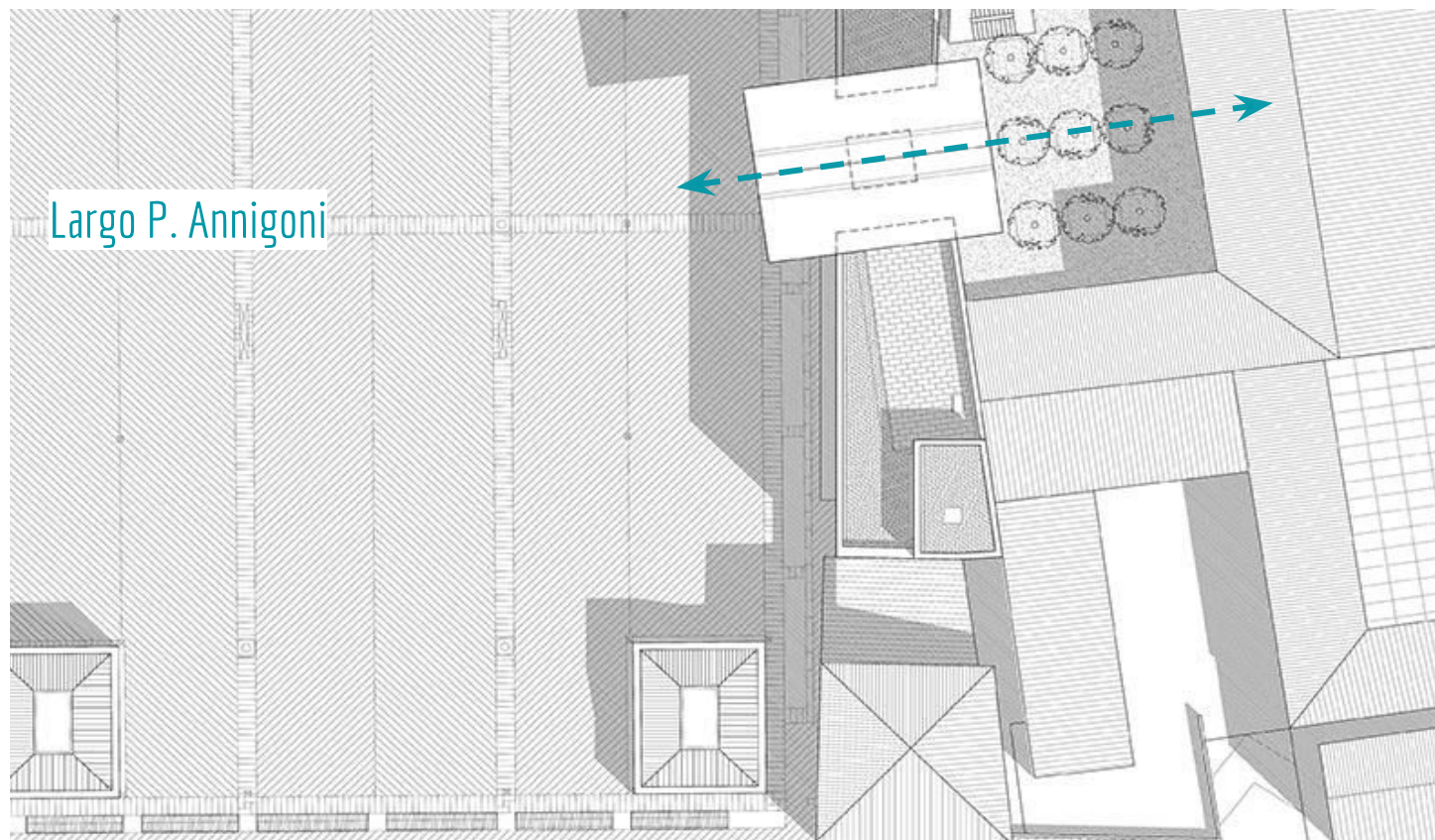


TODAY

New Main Entrance of the School of Architecture

New multifunctional building

The pilot building with its corridor is the natural entry point to all the university spaces of Santa verdiana



THE PILOT BUILDING OF SANTA VERDIANA

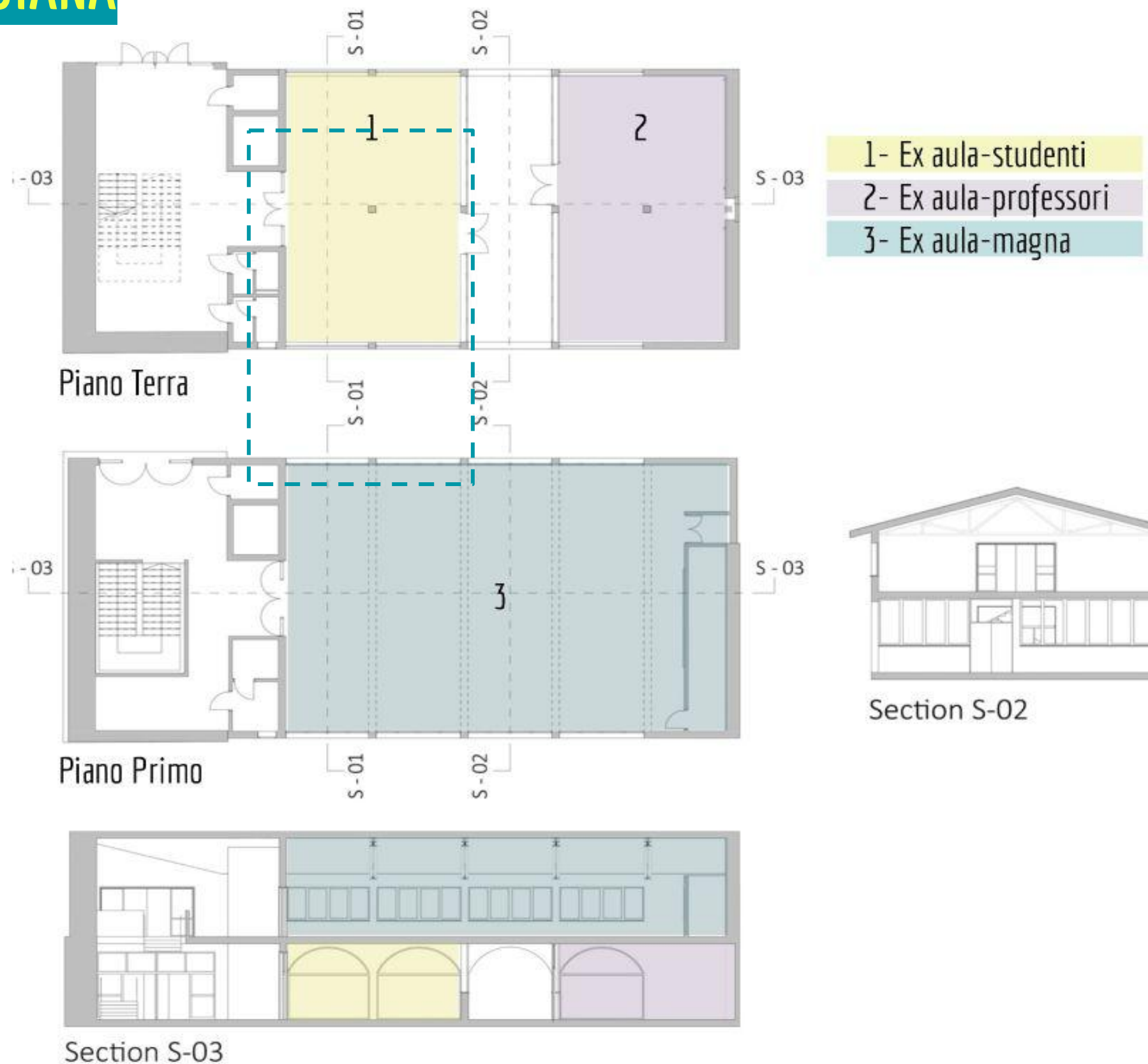
GROUND FLOOR

G16 - **BeXLab**, 94 mq

G17 - ex professors' room, 90 mq

FIRST FLOOR

AULA 19 - ex aula magna, 213 mq





background
Med-EcoSuRe project (ENICBC Med)
 Mediterranean University as Catalyst of Eco-Sustainable Renovation

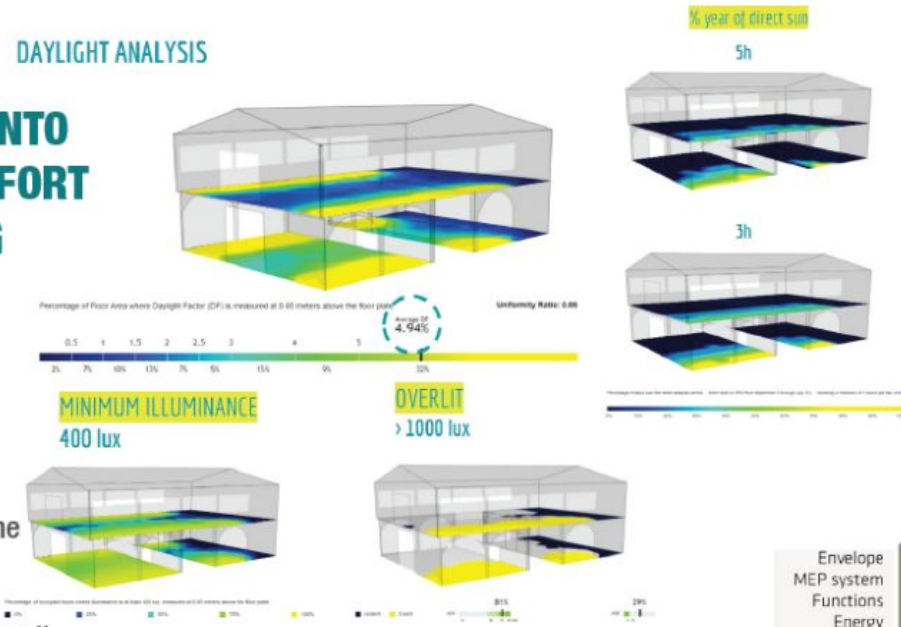
**PROGETTO PILOTA DI RETROFIT
 A SANTA VERDIANA
 3 MACRO-OBIETTIVI**



**MIGLIORAMENTO
 INDOOR COMFORT
 e WELLBEING**

DAYLIGHT ANALYSIS

Benessere ambientale:
 qualità dell'aria
 comfort termo-
 igrometrico
 corretta illuminazione
 comfort acustico
 + fruizione elementi naturali



3 MACRO-SCENARI



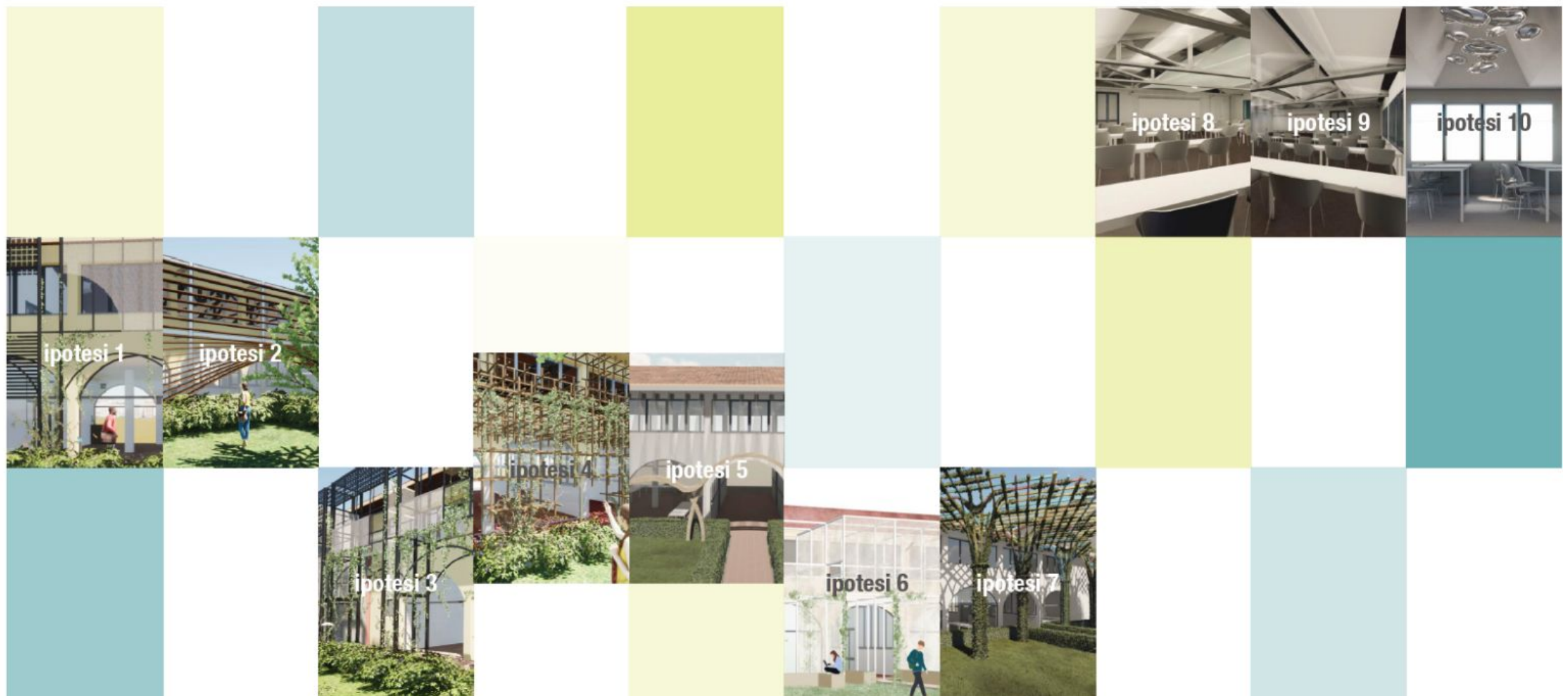
Intervento diretto sull'involucro attraverso la sostituzione e/o integrazione di elementi tecnologici



Addizione di elementi tecnologici distaccati dall'involucro (appoggio strutturale)



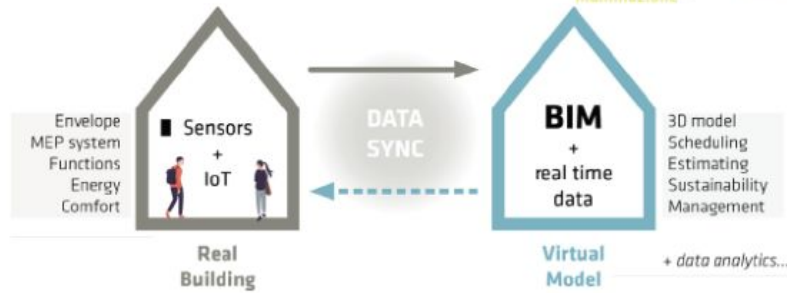
Struttura tridimensionale esterna, distaccata dall'edificio, da cui rimane indipendente



SPERIMENTAZIONE



Sistema di misurazione in continuo dei parametri ambientali (DIEP) implementazione Digital Twin



* la simulazione è in linea con il dato fornito da UNR, di 23,63 kWh/m² (Relazione Tecnica Legge 10/1991)

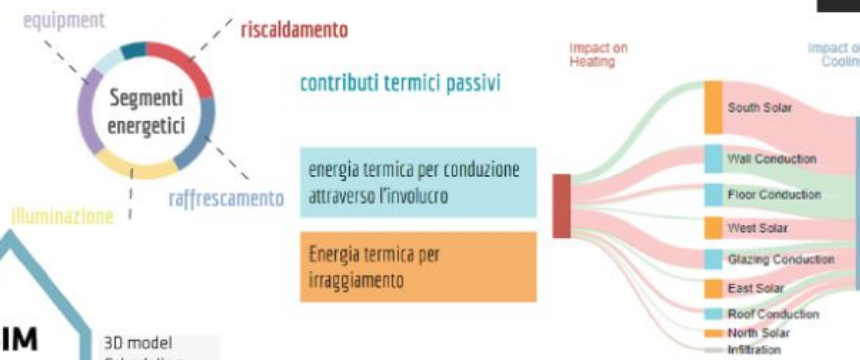
+ ENERGY AUDIT

Energy Segments kWh/yr	
Heating	9652
Cooling	8974
Lighting	9514
Equipment	9927
Fans	3386
Pumps	2804

EFFICIENZA ENERGETICA

Riduzione dei consumi energetici dell'edificio per riscaldamento, raffrescamento e illuminazione attraverso sistemi passivi

+ integrazione di sistemi per la produzione di energia da fonti rinnovabili



Impatto dei contributi termici passivi sul consumo per riscaldamento PERIODO INVERNALE
 Impatto dei contributi termici passivi sul consumo per raffrescamento PERIODO ESTIVO



VISTA ESTERNA



VISTA ESTERNA

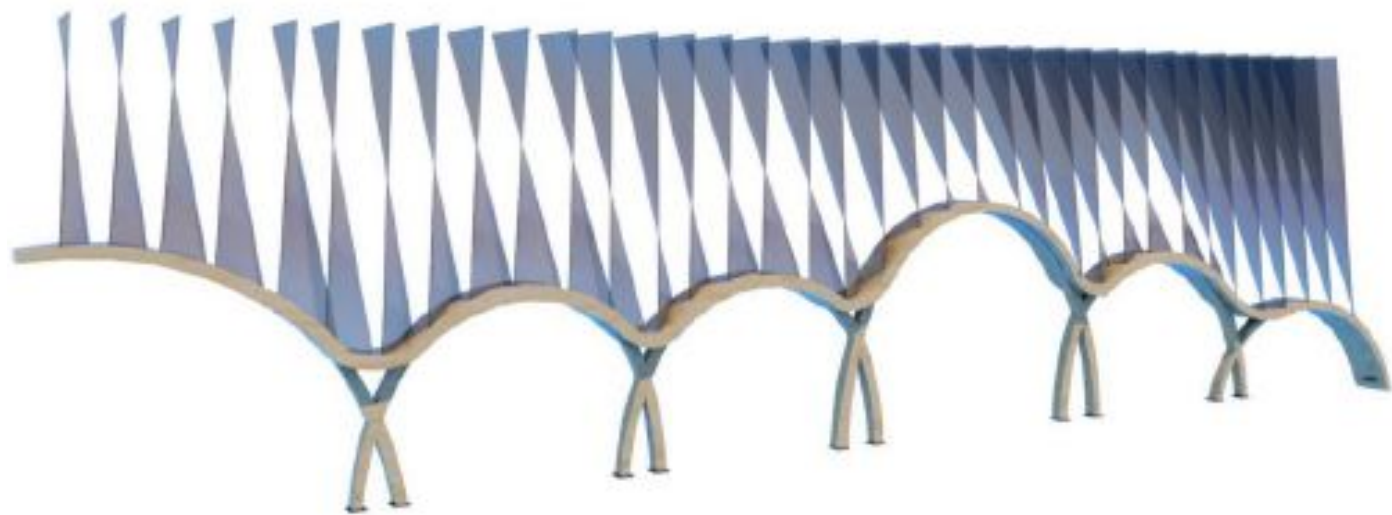


VISTA INTERNA PIANO PRIMO



VISTA INTERNA PIANO TERRA

Rete metallica forata in alluminio ad alta resistenza e struttura portante in legno

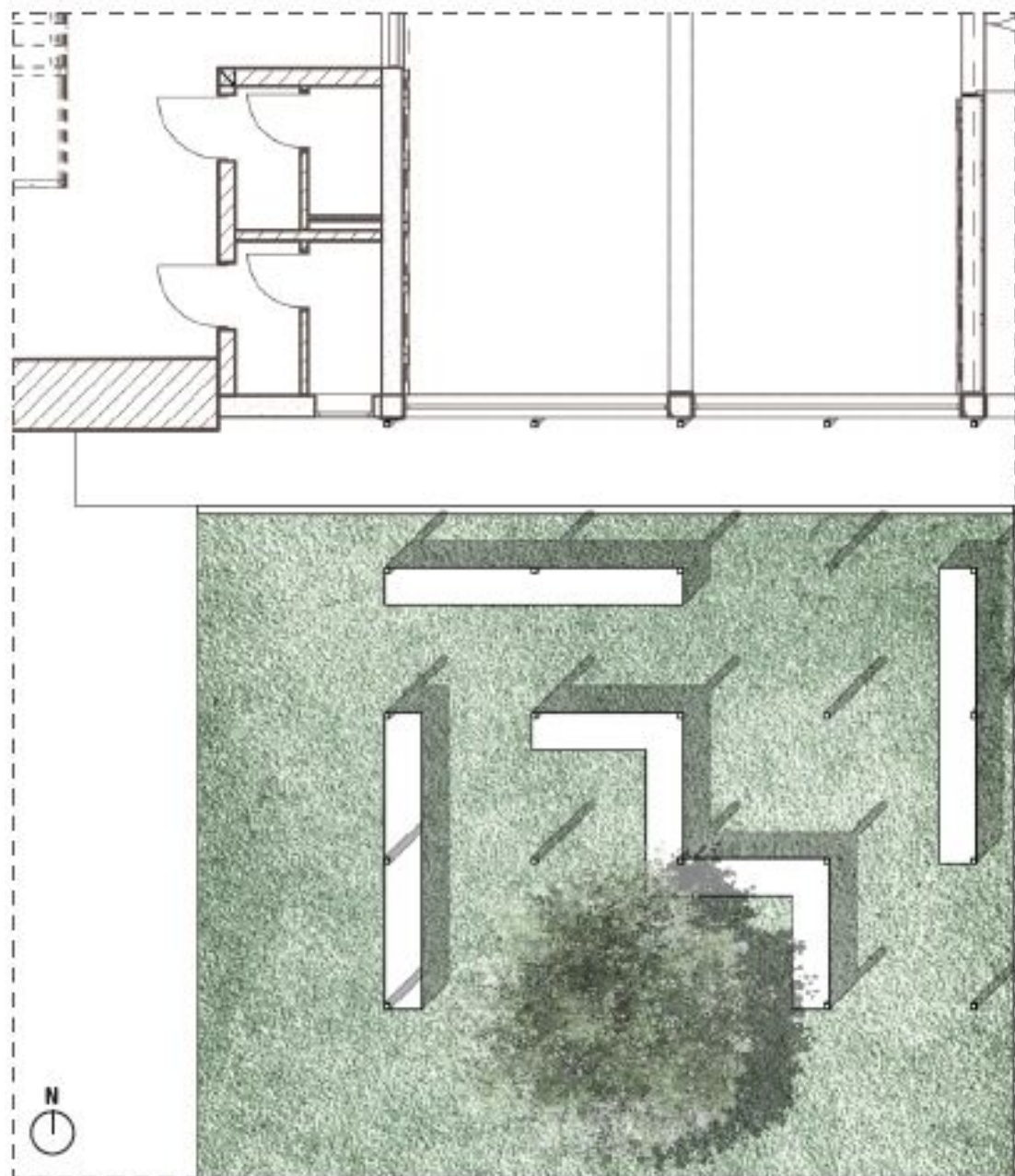


Controllo della radiazione solare
con le reti metalliche forate

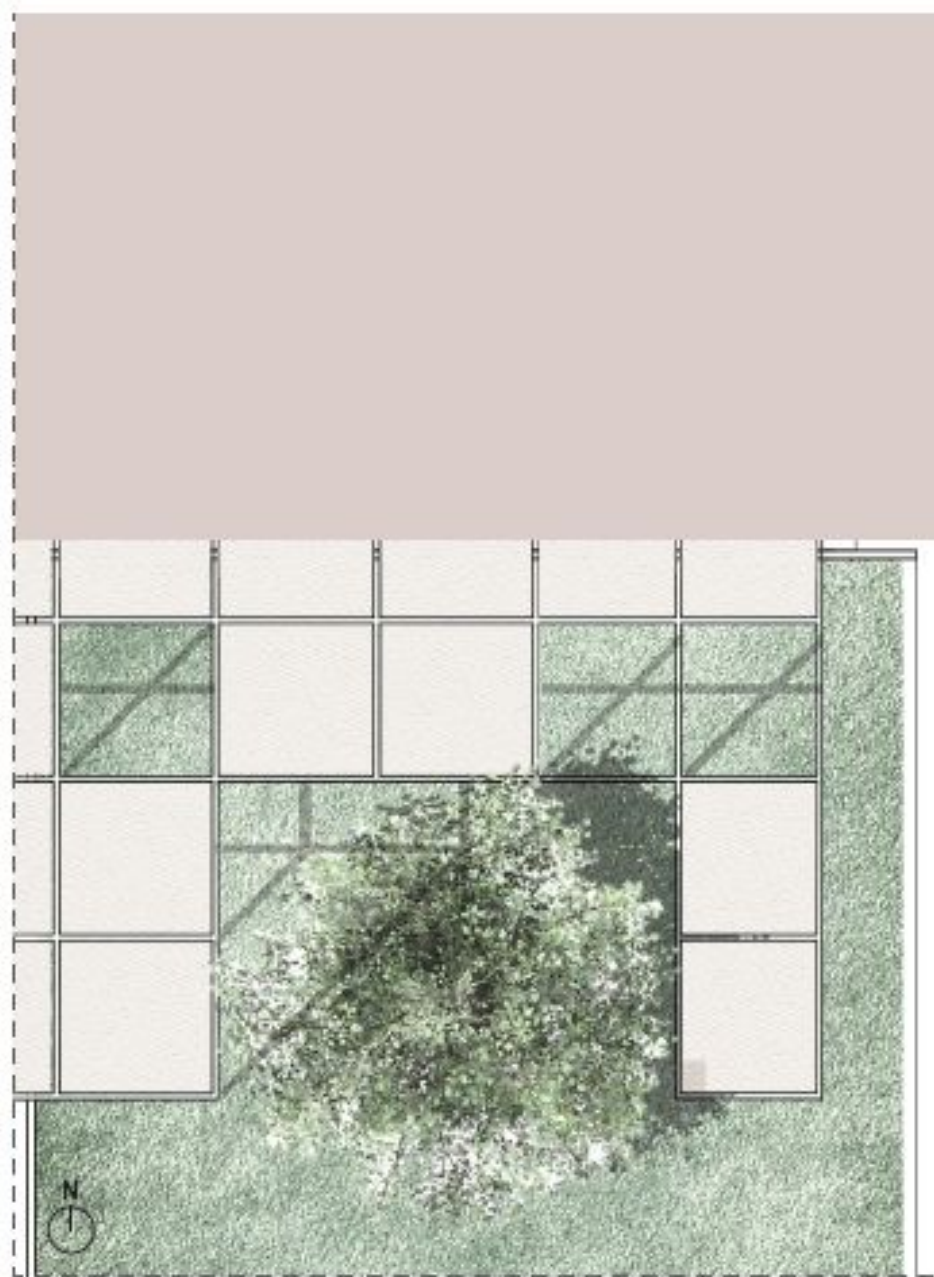
VISTA ESTERNA



VISTA ESTERNA



PIANTA | 1:100

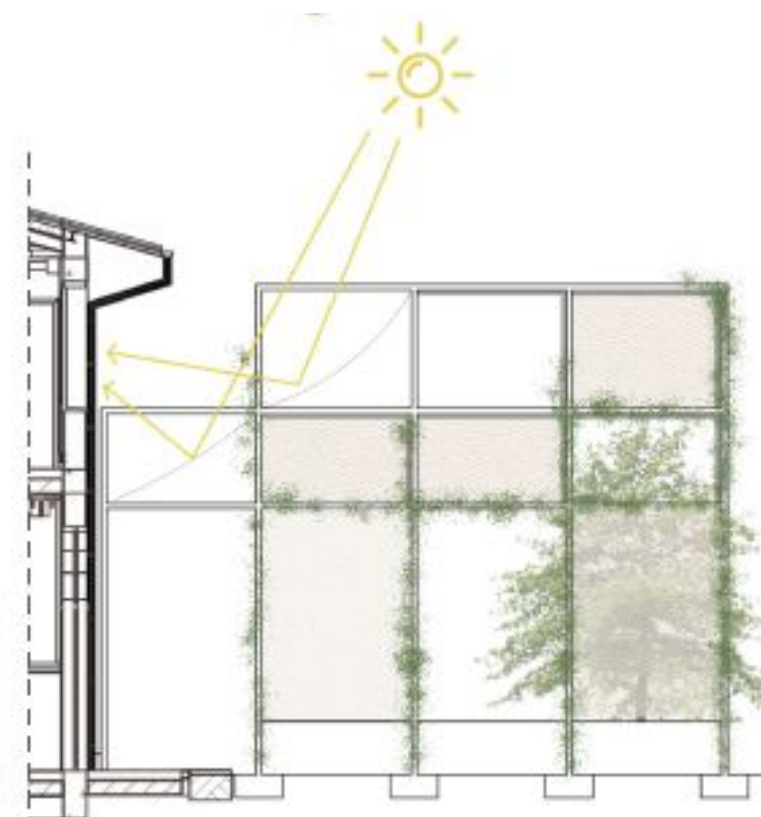


COPERTURA | 1:100

- **Possibilità di produrre energia rinnovabile** > inserimento di pannelli fotovoltaici nella struttura modulare
- **Miglioramento comfort termoigrometrico estivo e dell'illuminazione naturale interna** > Teli oscuranti / riflettenti
- **Integrazione del verde 'sospeso' e/o rampicante**
- **Modularità degli elementi per consentire l'inserimento 'temporaneo' e test di diversi materiali / tecnologie nelle superfici verticali, orizzontali e inclinati della facciata** > Struttura in acciaio
- **Possibilità di inserire banner, segnaletica e avvisi** > Teli stampati, pannelli informativi, schermi inseriti nella struttura o proiezioni
- **Materiali sostenibili** > Teli in viscosa riciclata
- **Disegno di nuovi spazi sociali, implementabile nel tempo** > Inserimento di elementi di arredo esterno all'interno della struttura modulare flessibile



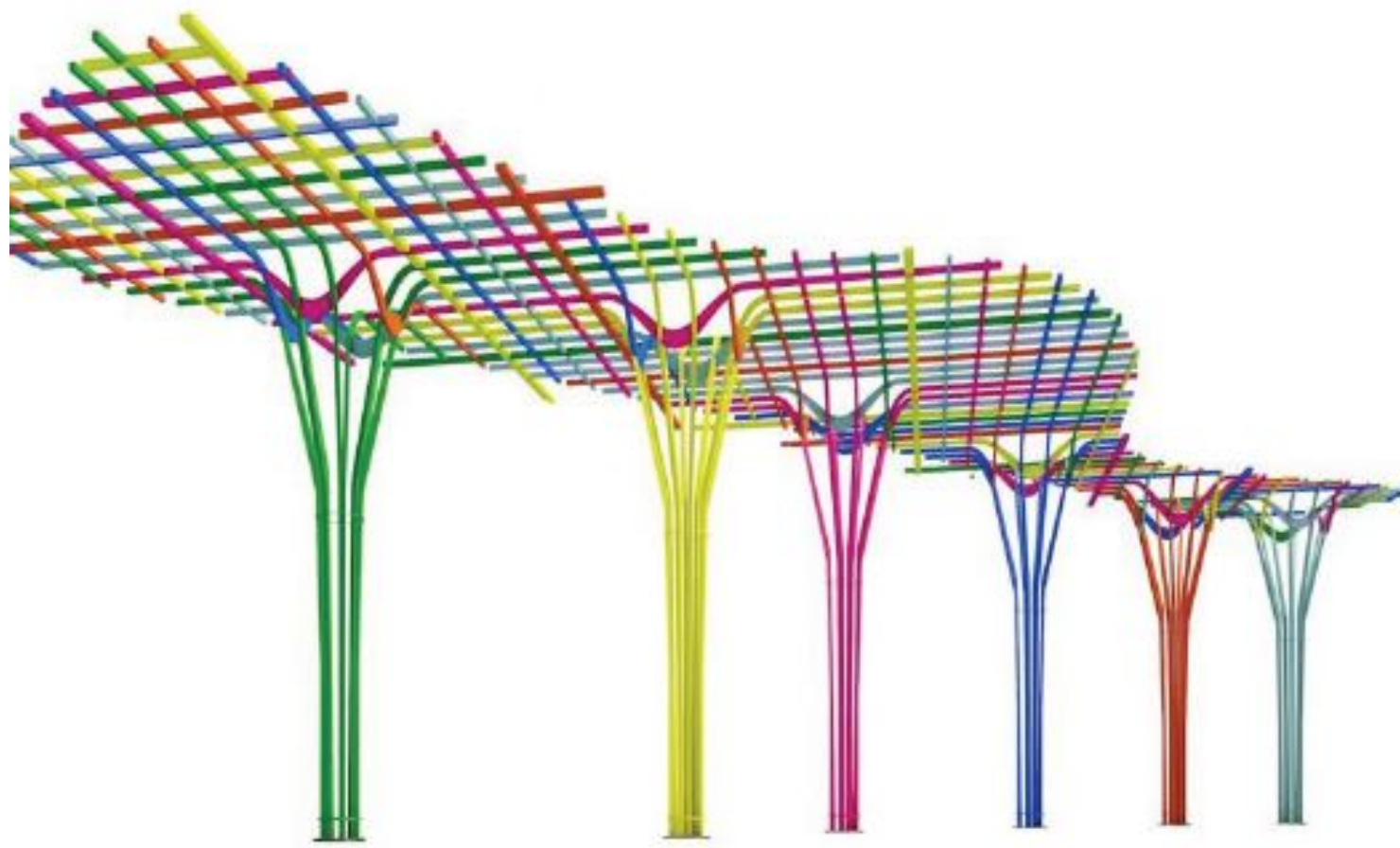
PROSPETTO | 1:100



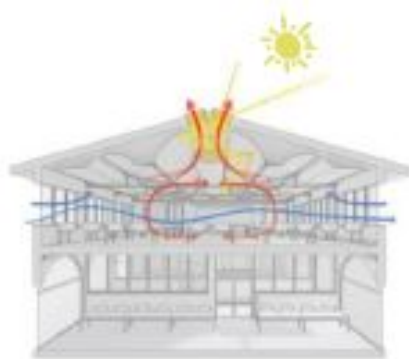
SEZIONE | 1:100



3D RAMIFICAZIONE PILASTRI



8

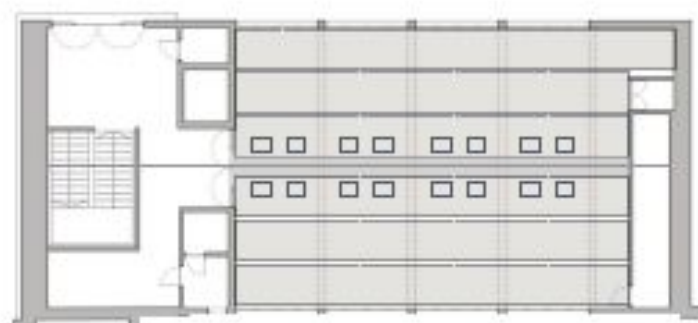


APERTURA DI LUCERNARI di piccole dimensioni sulla copertura esistente

+ **SISTEMA DI CONTROSOFFITTATURA** > sistemi, teli e/o pannelli schermanti e riflettenti per la modulazione della luce naturale

=

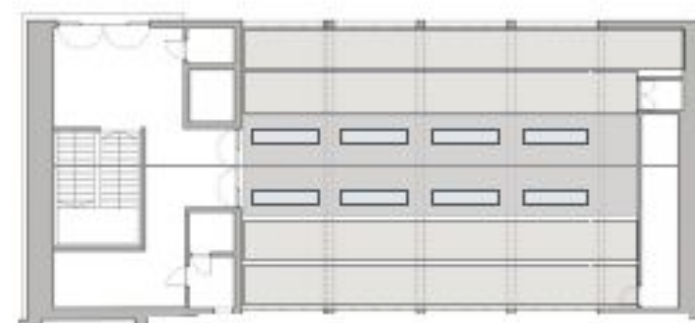
- **Miglioramento della illuminazione naturale**
ingresso luce naturale nella parte centrale della grande aula (sottoilluminazione)
- **Miglioramento della ventilazione naturale**
ventilazione incrociata + effetto camino (ricambi di aria)
- **Miglioramento del comfort acustico**
possibilità di migliorare il riverbero nell'aula
- **Miglioramento estetico/visivo**
integrazione del sistema di climatizzazione al centro dell'aula all'interno del controsoffitto



SCHEMA ILLUMINAZIONE / VENTILAZIONE

SCHEMA DELLA COPERTURA

- Teli/pannelli
- Schermo riflettente
- Lucernari



SEZIONI



VISTE INTERNE



1

2



VISTA ESTERNA CORRIDOIO



VISTA INTERNA PIANO TERRA



VISTA ESTERNA



VISTA INTERNA PIANO PRIMO



grazie per l'attenzione



UNIVERSITÀ
DEGLI STUDI
FIRENZE

DIDA
DIPARTIMENTO
DI ARCHITETTURA



building
environmental
eXperience

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