

# Circular Retrofit Lab: A Brussels' renovation experiment on how to re-design existing buildings into circular buildings



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[vub.be/arch/transform](http://vub.be/arch/transform)

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# OVERVIEW

## Context

A Circular Built Environment  
Buildings As Material Banks

## Circular Retrofit Lab

Design Boundaries  
Re-design for Change  
Reversible (wall) solutions  
Collaboration with industry

## Conclusions





The total cost and environmental impact of products depends on many factors: expected service life, quality, maintenance, standardisation, etc.





Architects and engineers can choose between a wide range of materials, structural systems, assembly techniques, connections methods, etc.





As for other products, the initial price and environmental impact of buildings has little to do with its total life cycle costs / impacts



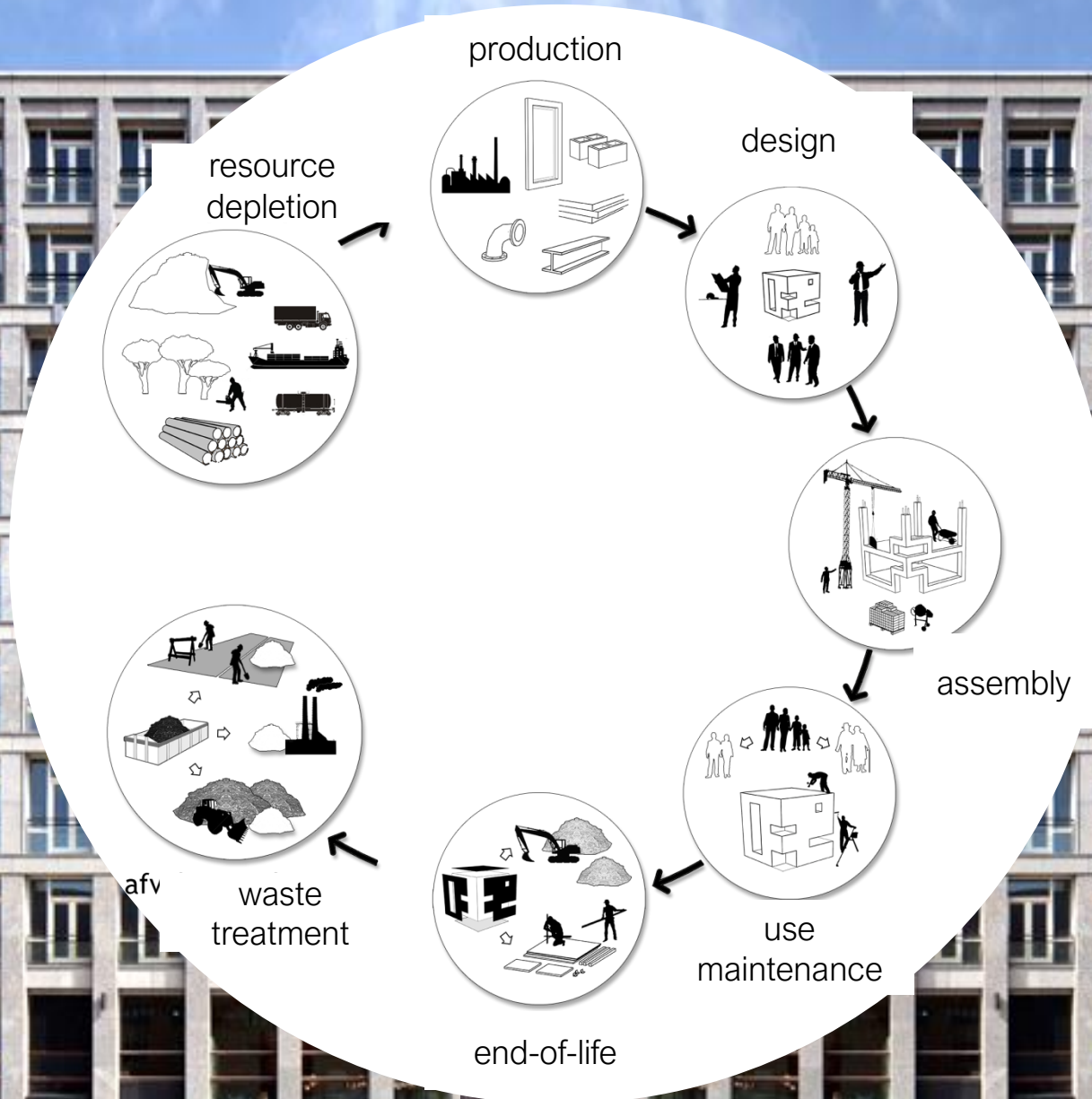


Life cycle costs of buildings can mount up 3-5 of initial construction costs

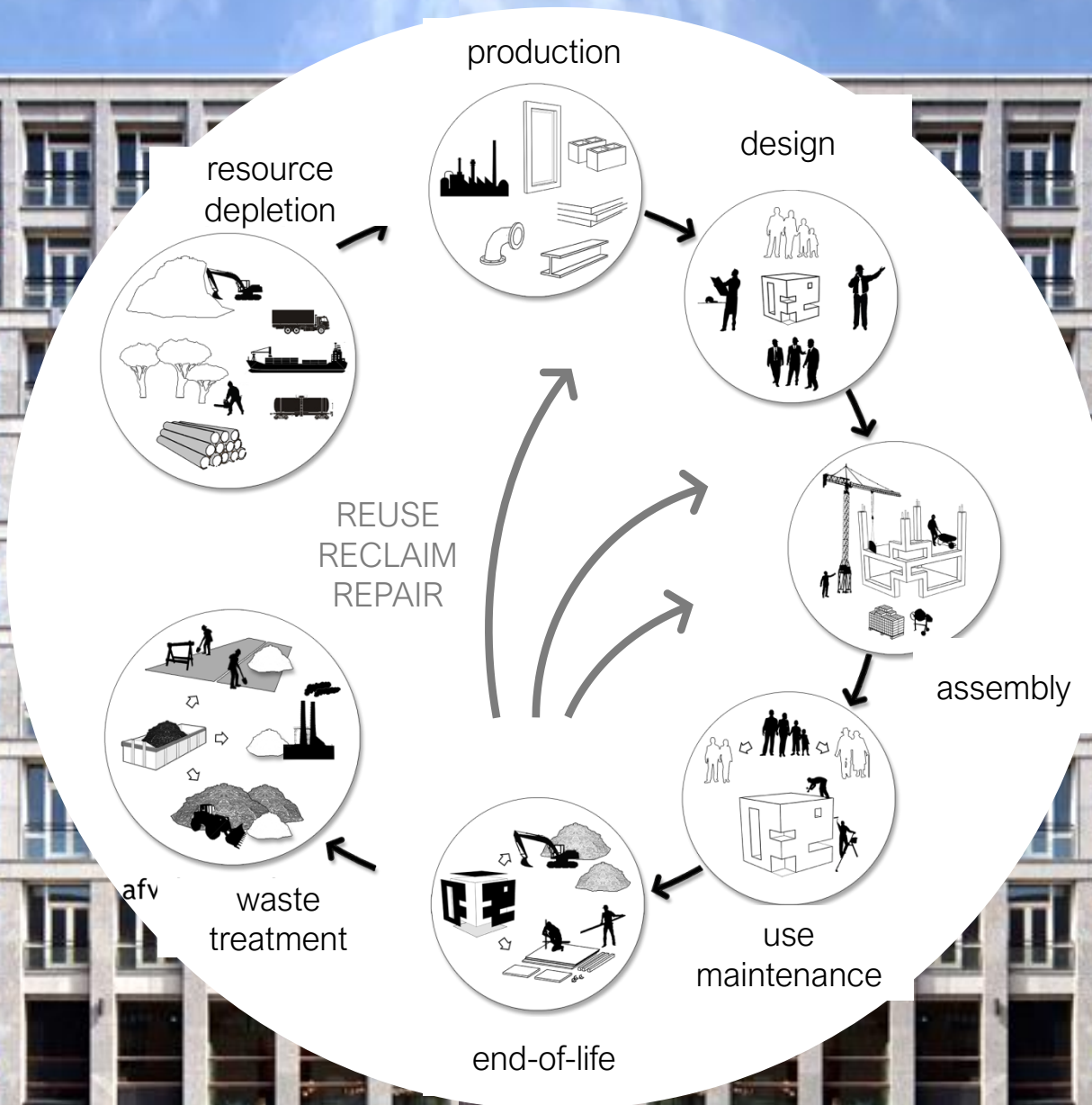
Buildings are responsible for 40% of material and waste streams,  
and 35% of CO2 emissions



# life cycle thinking



# life cycle thinking





# life cycle design



# BUILDINGS AS MATERIAL BANKS







CIRCULAR  
RETROFIT  
LAB



context

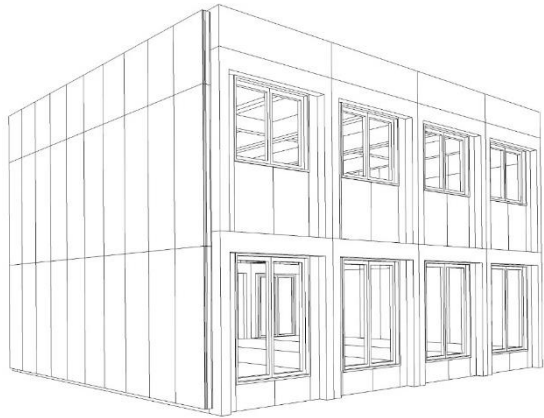
**BAMB**  
BUILDINGS AS MATERIAL BANKS



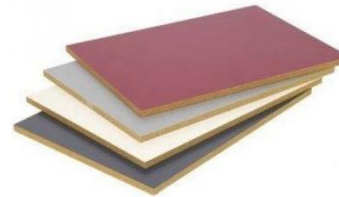
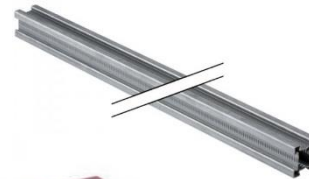








circular product  
(service) systems



## General aims

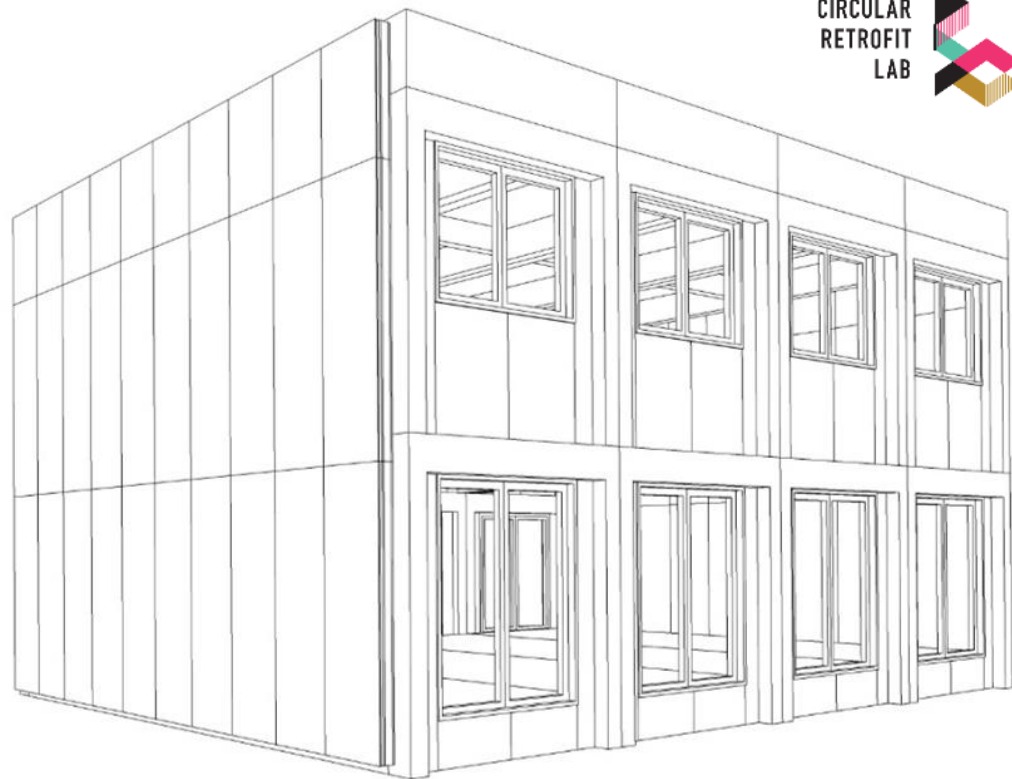
A catalyst for circular renovation

Demonstrator for reversible building principles

Collaborate with industry and test case for circular business models

Exemplary for other circular renovation experiments



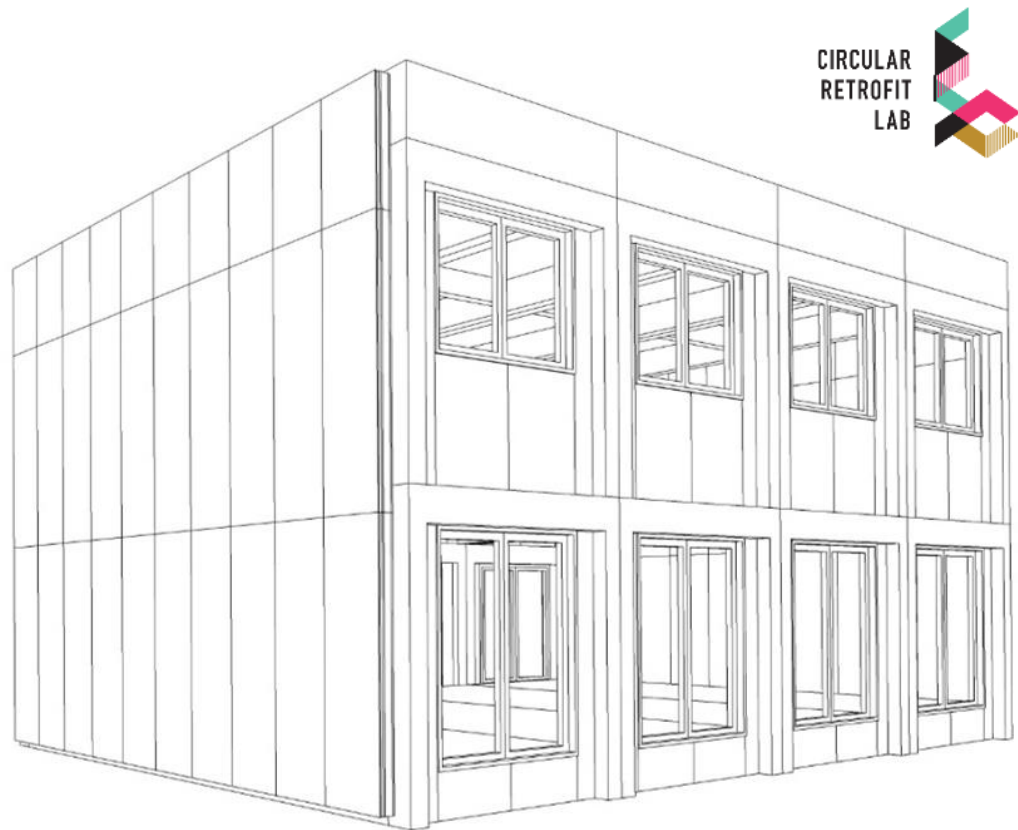


building  
boundaries



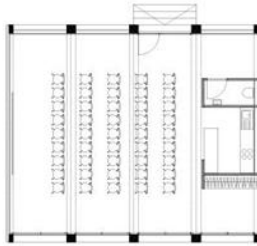




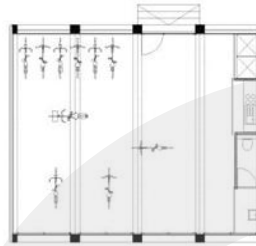


circular  
re-design

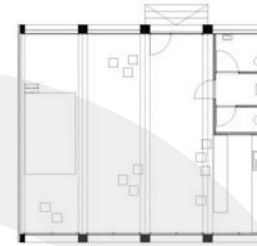




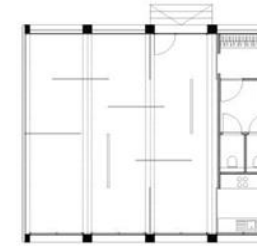
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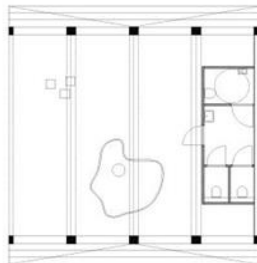
**Bicycle Repair Shop**



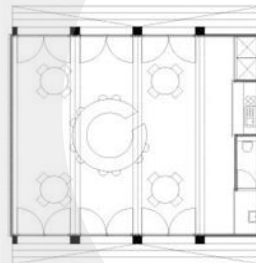
**Concert Space**



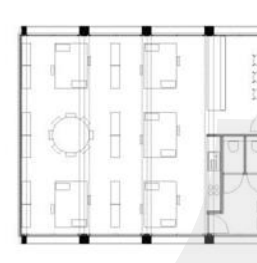
**Exhibition Space**



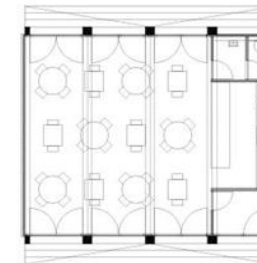
**Multifunctional Open Air Space**



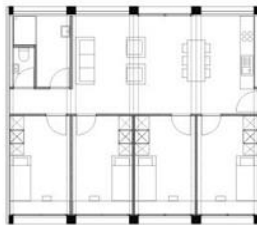
**Information Office**



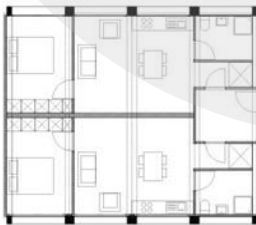
**Plug-In Offices**



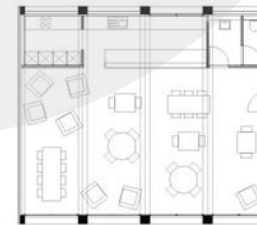
**Bistro / Resto**



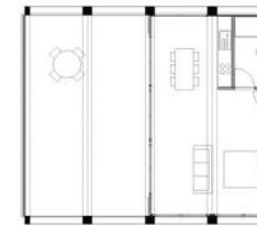
**Updated Student Housing**



**Eco Guesthouse**

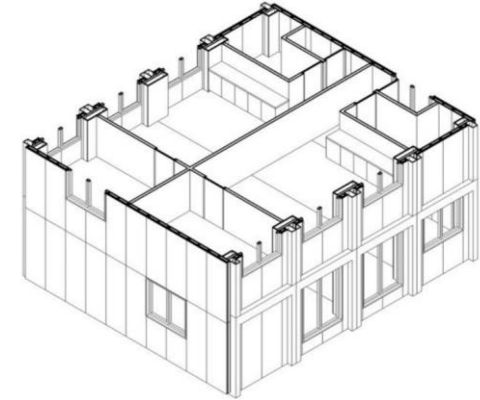
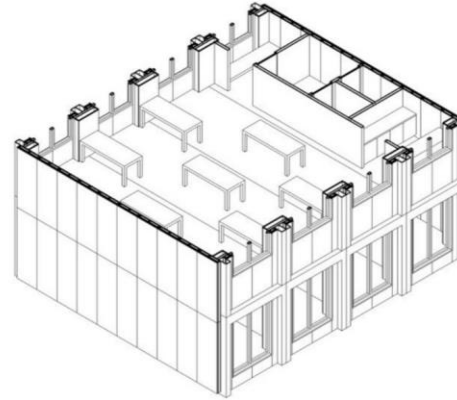
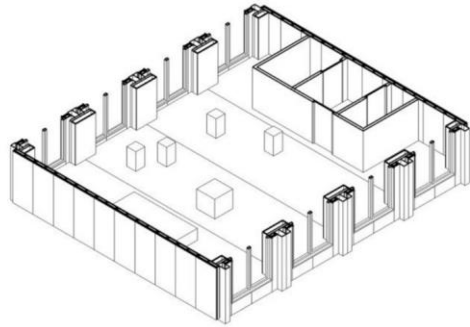


**Sandwich Bar / Coffee shop**



**'Kavelkamer'**





**dissemination space**  
public



**temporary plugin offices**  
non-residential



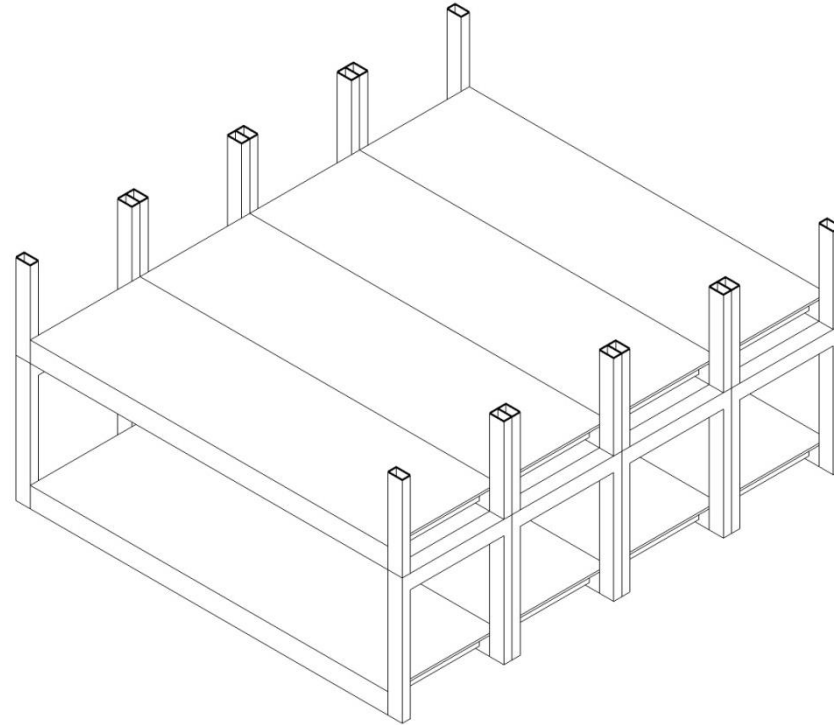
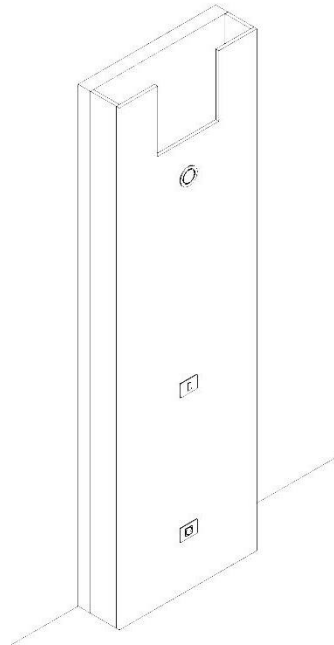
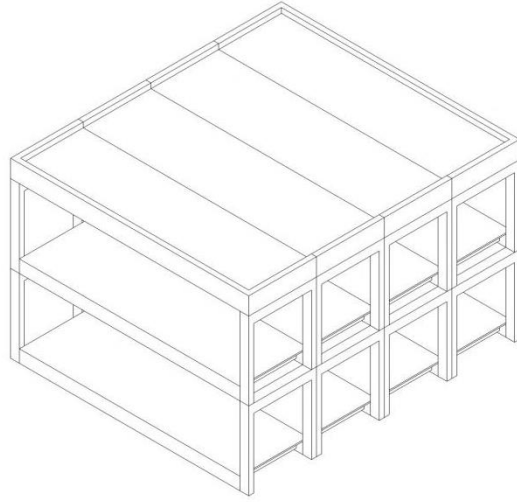
**eco guestrooms**  
residential

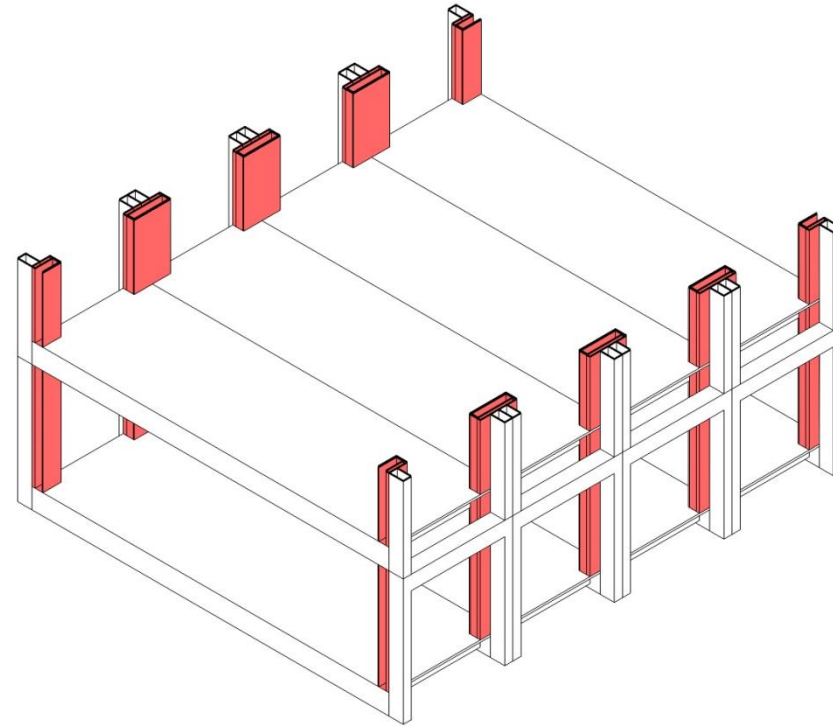
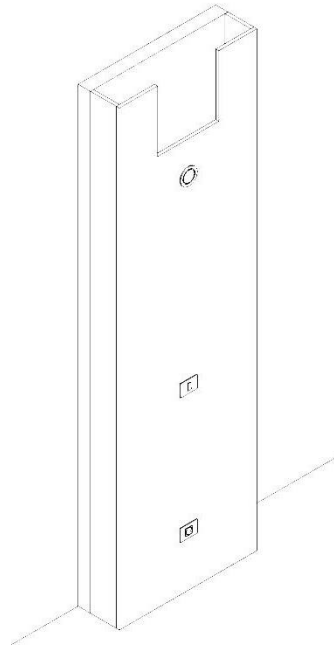
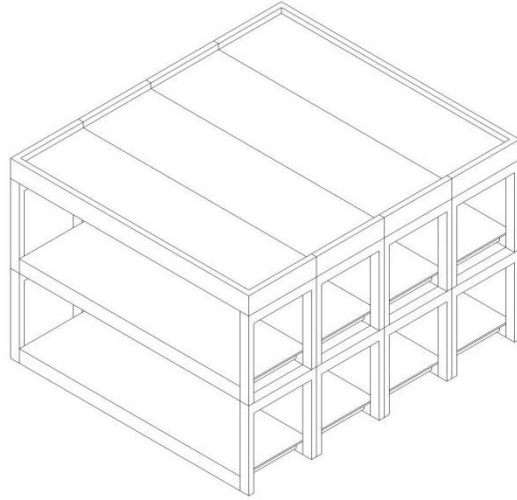




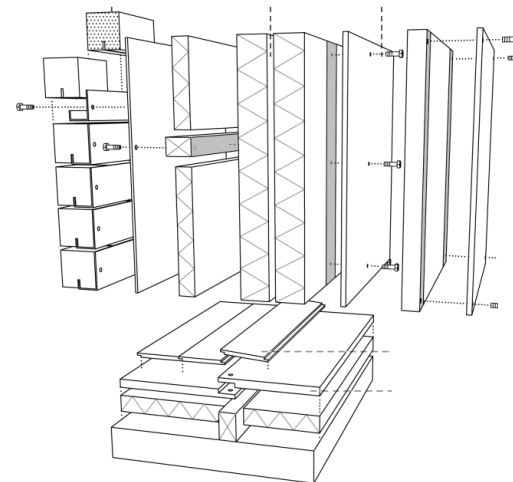
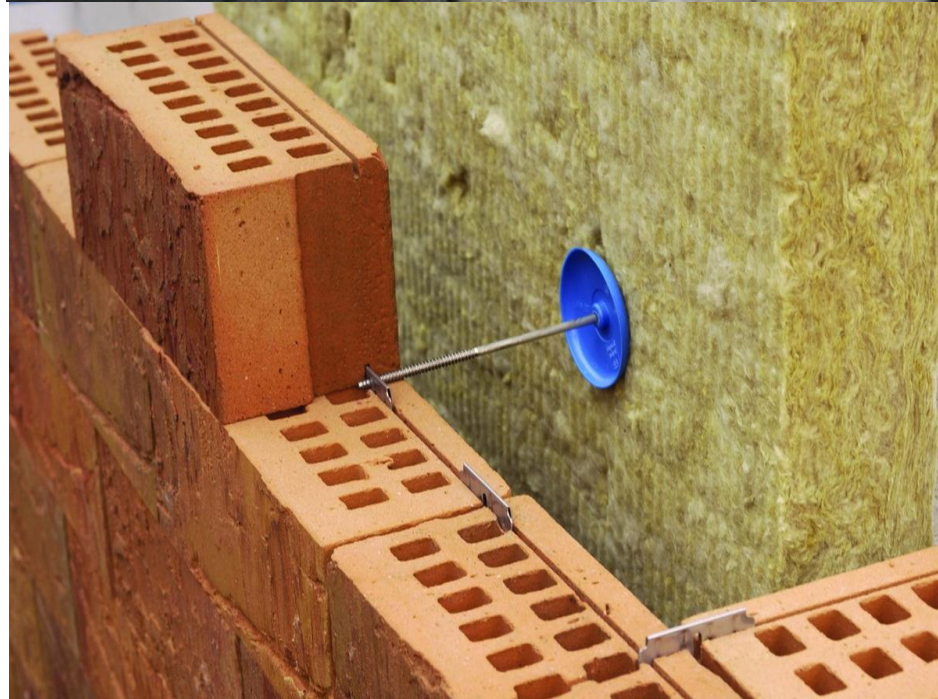
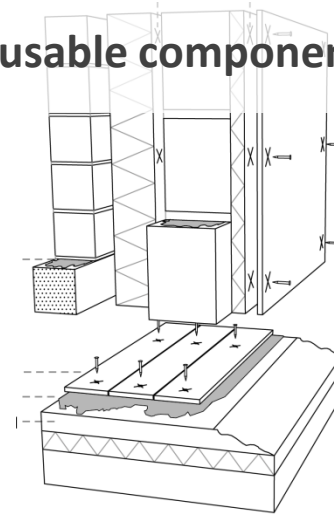
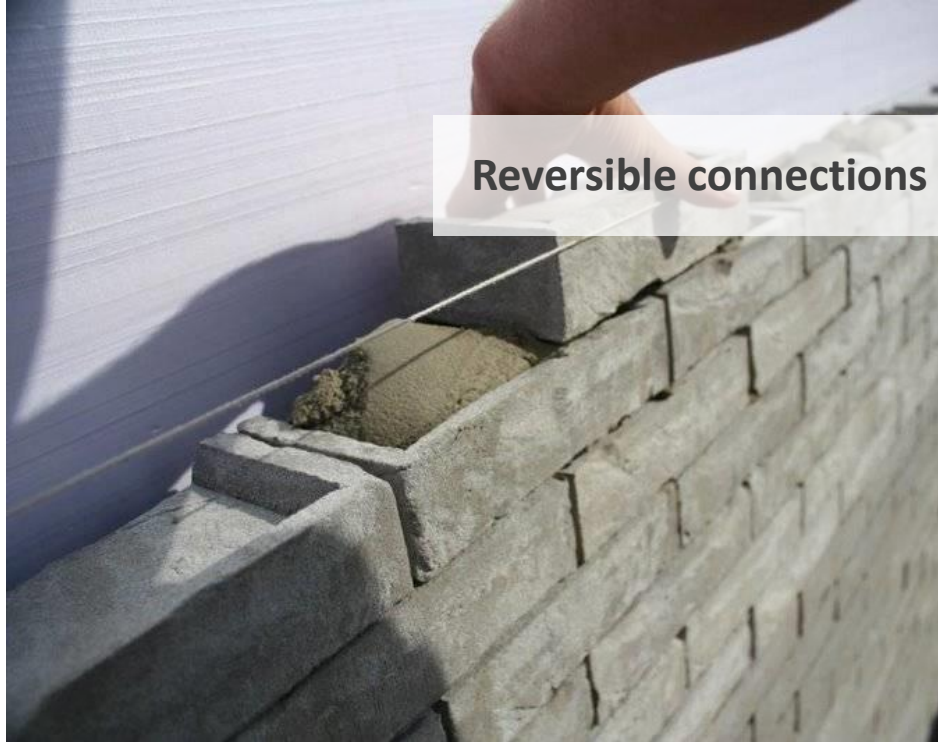










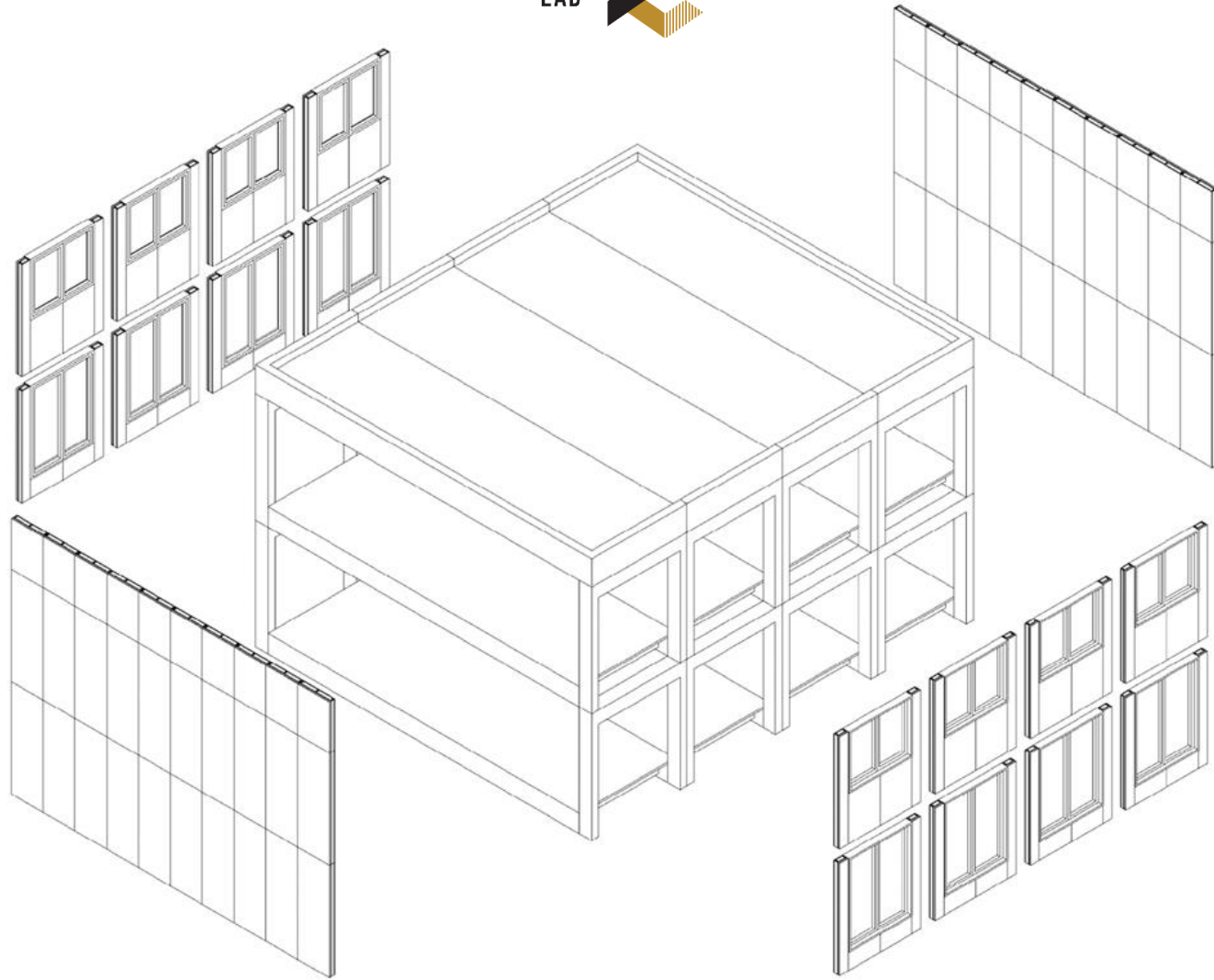


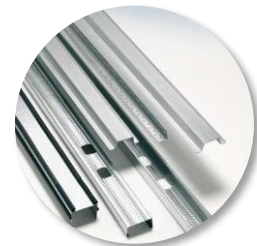
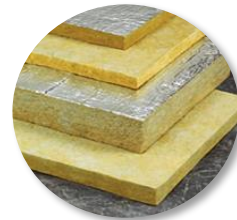
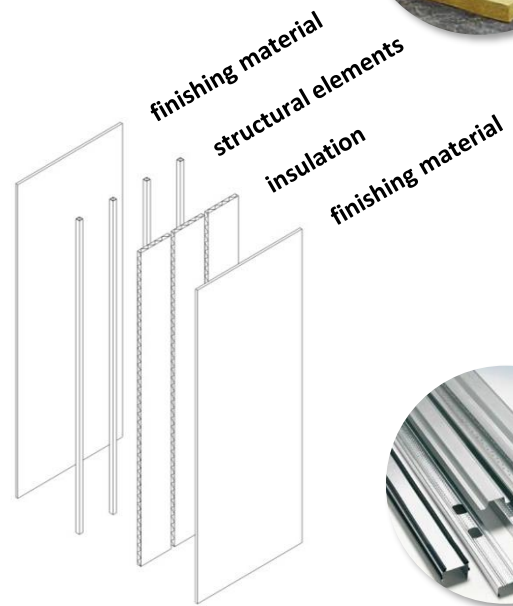
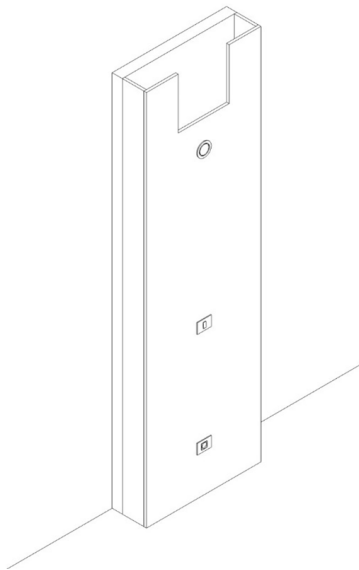
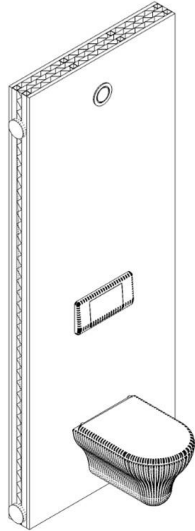
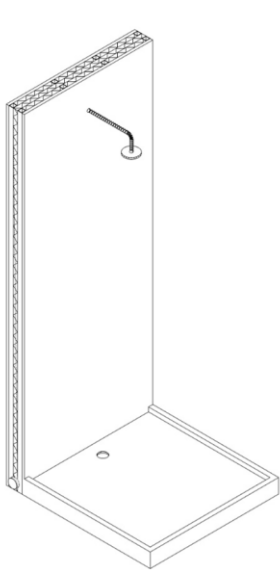
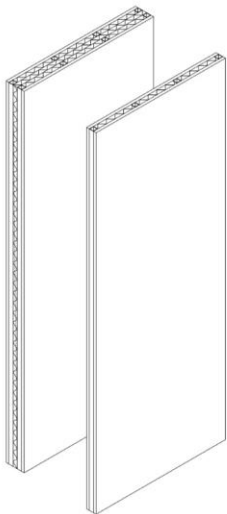


**Demountable systems that enable future upgrade,  
adaptation and non-destructive dismantling**



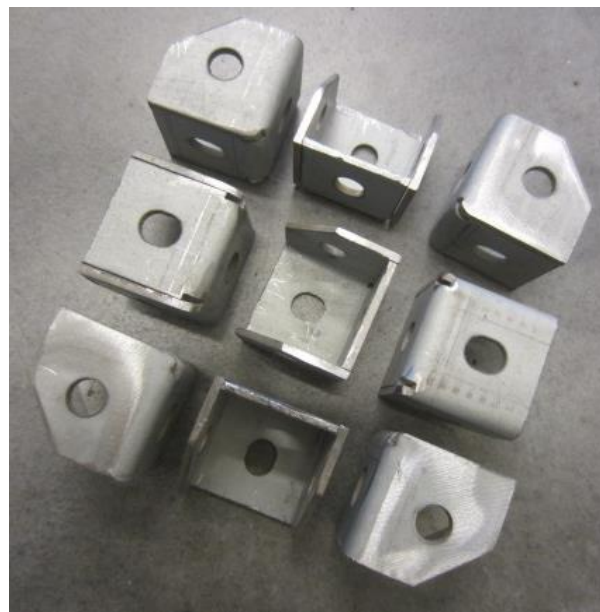








# DynamicWall





steel frame



variable finishing

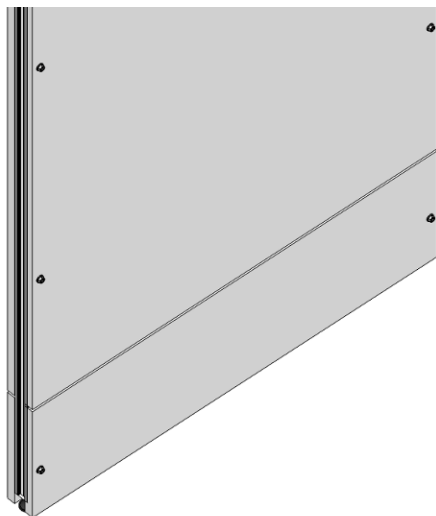
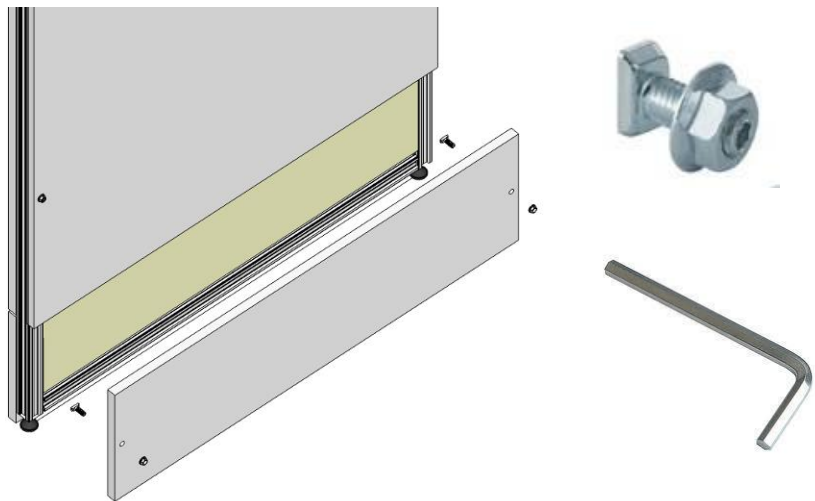


preassembly services



demountable kit-of-parts

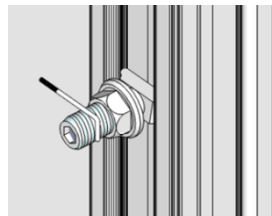
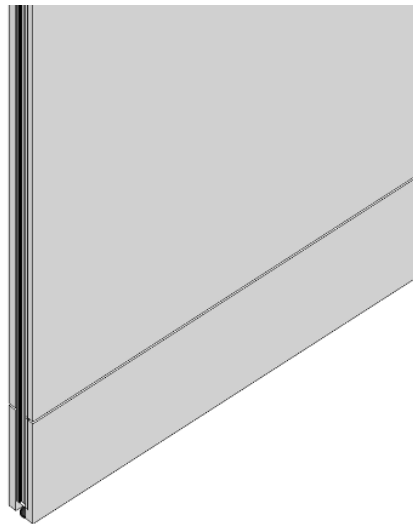
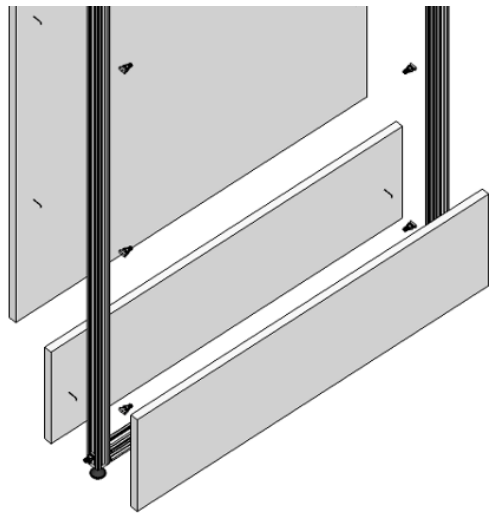




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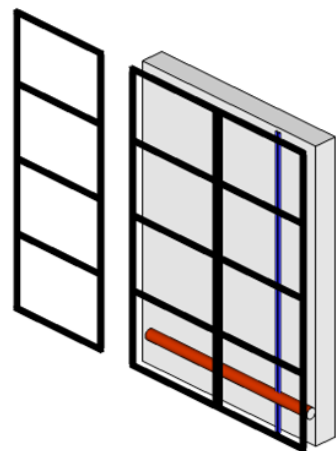
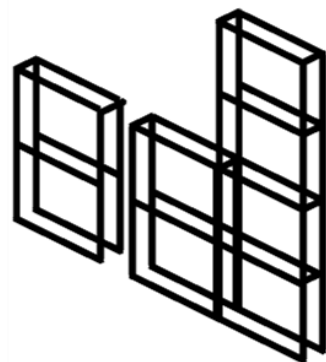
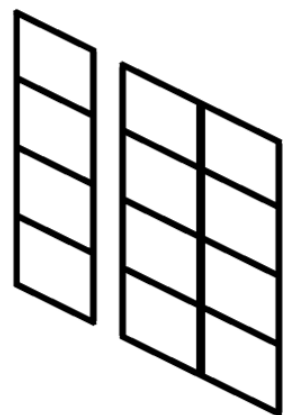
CIRCULAR  
RETROFIT  
LAB 



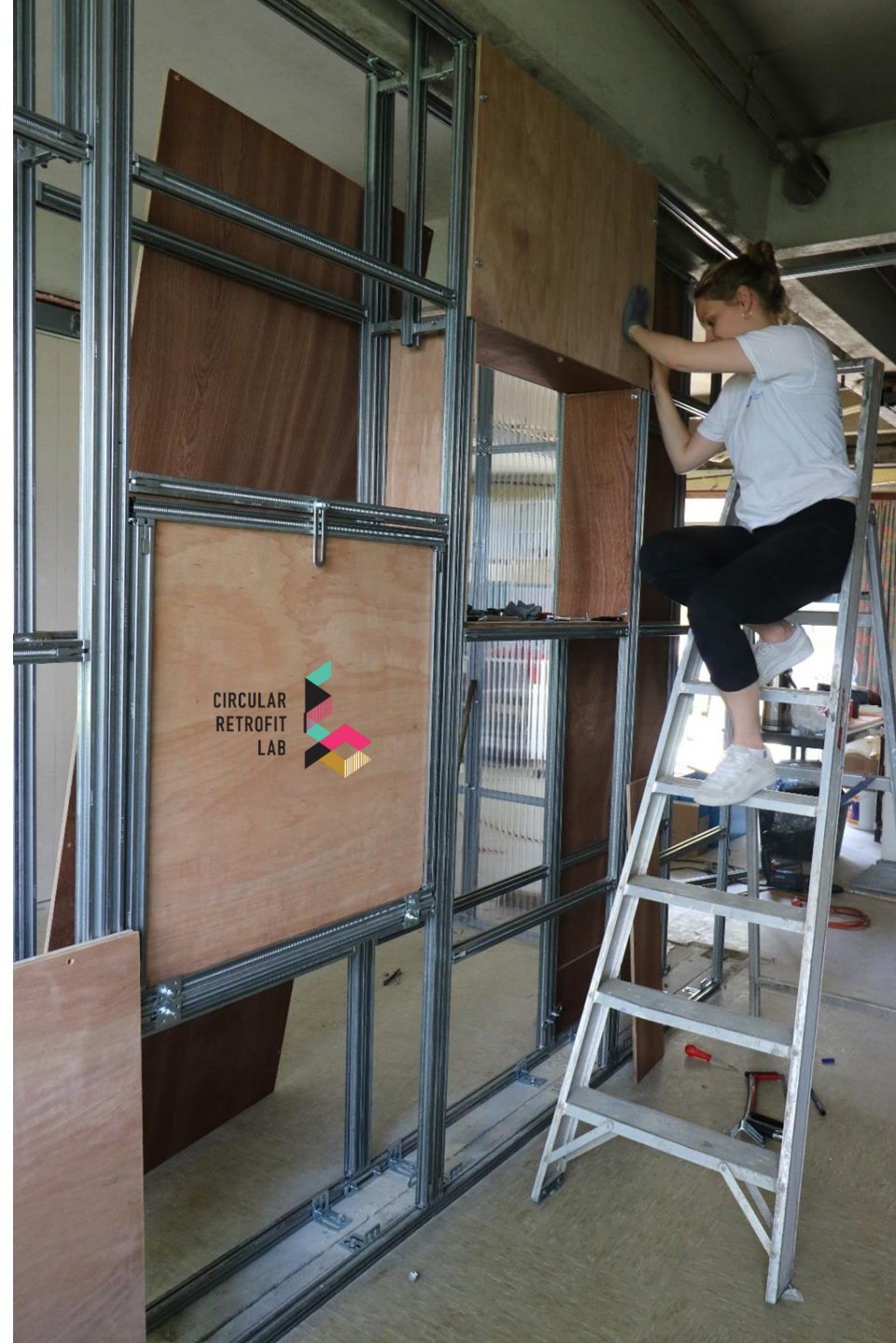
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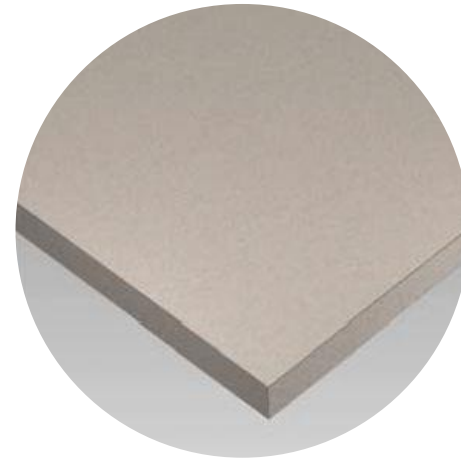


 **GEBERIT**





wooden frame



gypsum fibre board

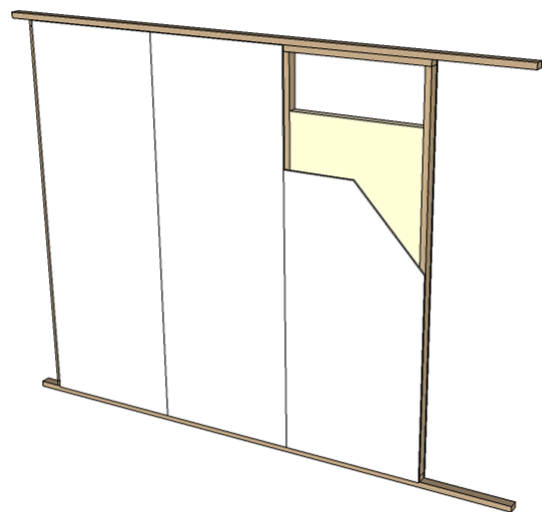
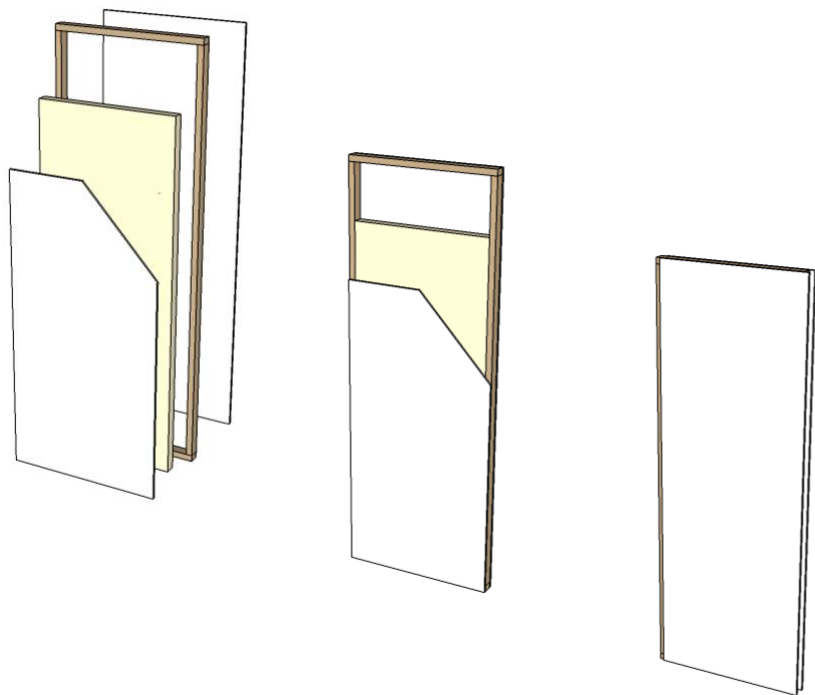


electricity



screws / clips







massive wooden beams



rubber strips

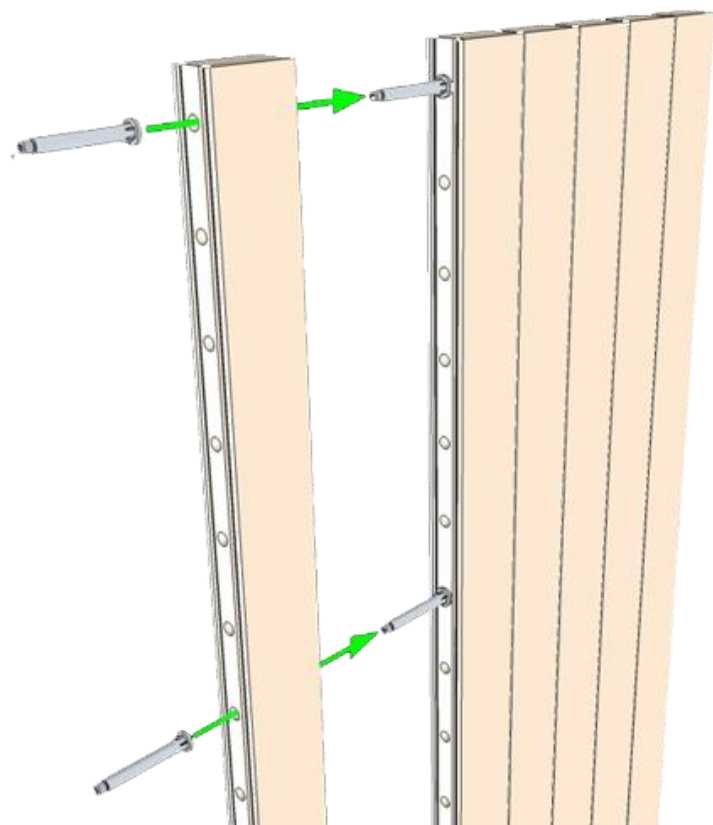


flexible services



steel connectors





  
**SYSTIMBER**



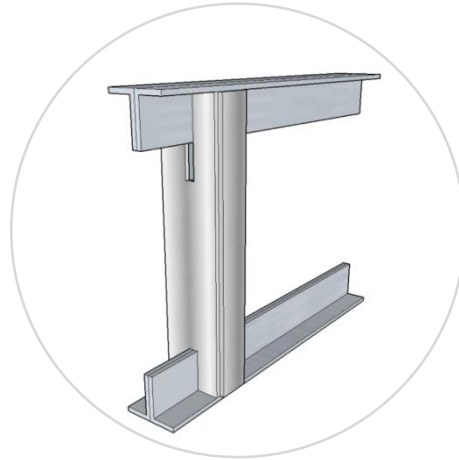
CIRCULAR  
RETROFIT  
LAB 



cardboard frame



gypsum plasterboard

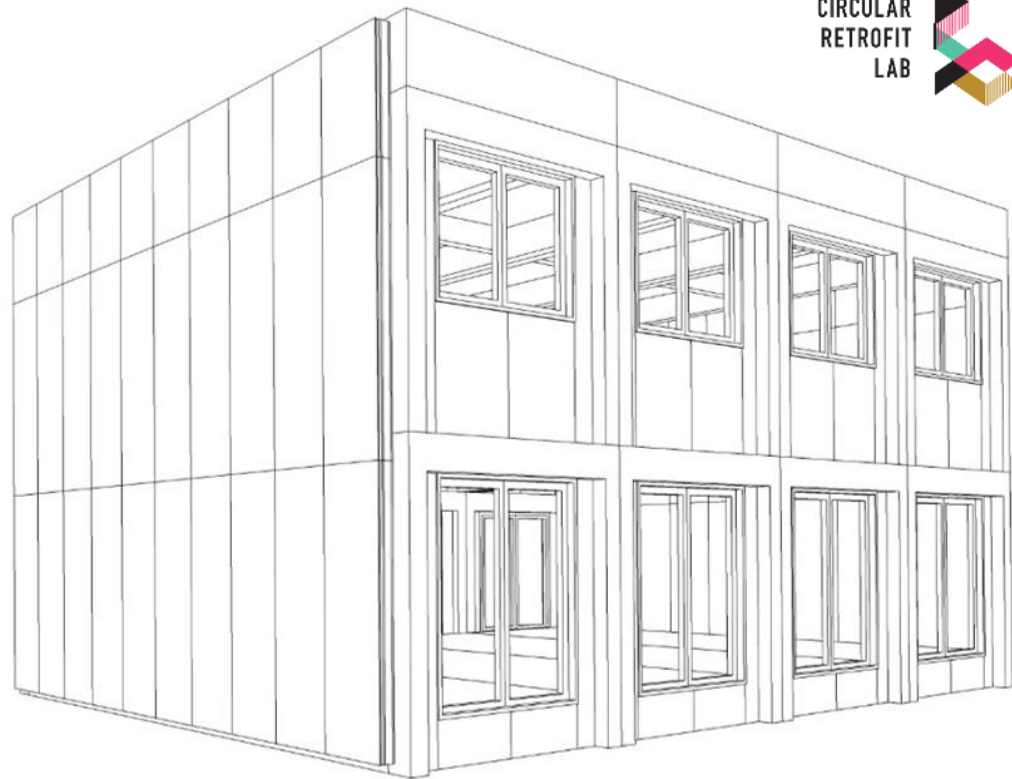


in situ

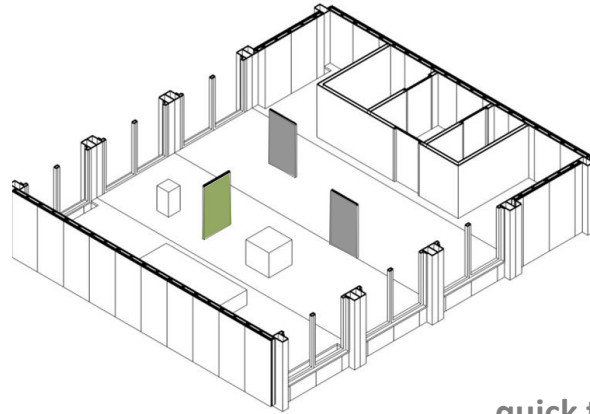


tape

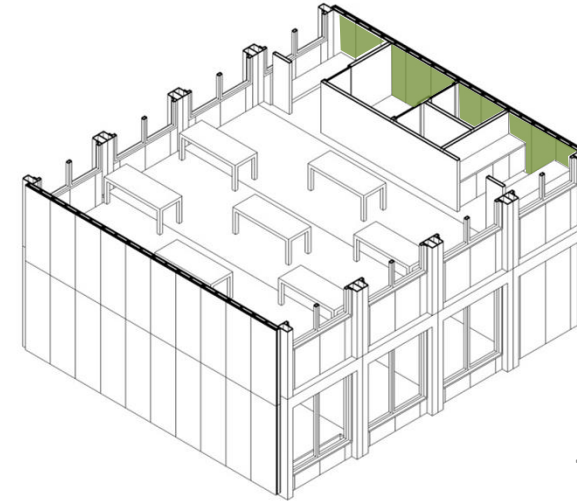




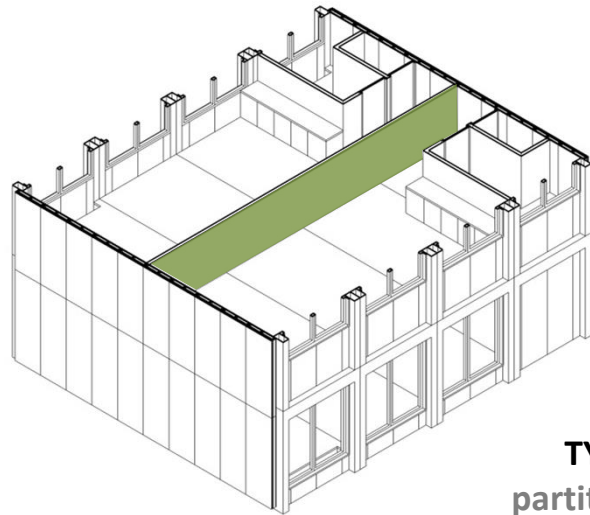
evaluation &  
implementation



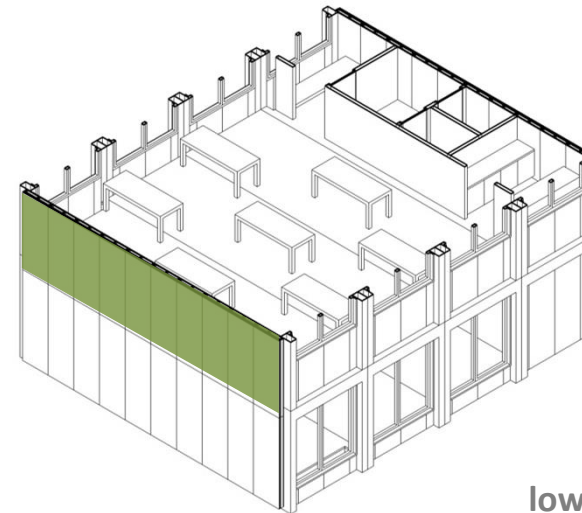
**TYPE 1**  
quick turnover wall



**TYPE 2**  
technical wall

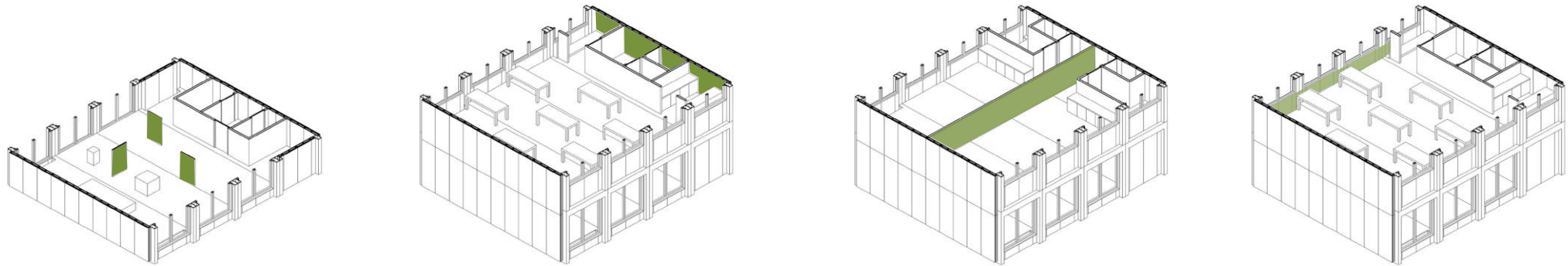


**TYPE 3**  
partition wall



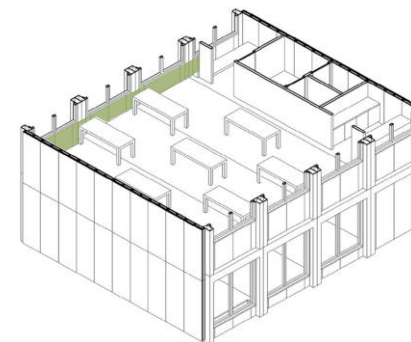
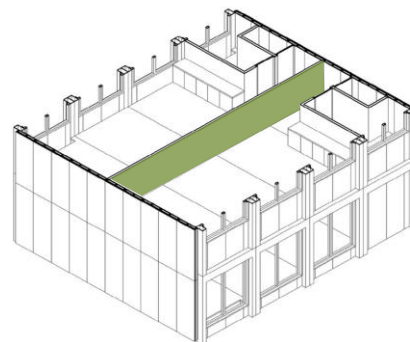
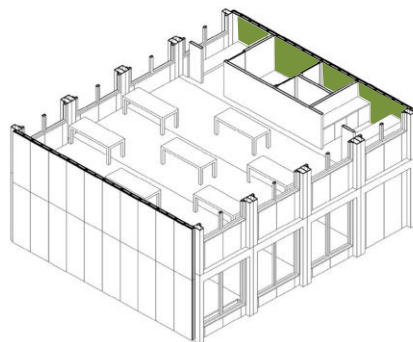
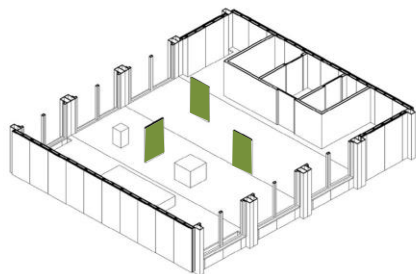
**TYPE 4**  
low turnover wall





- 1 Reversible solutions
- 2 Speed of (dis)assembly
- 3 Reuse of components
- 4 Standardised kit-of-parts
- 5 Independence of components
- 6 LCA
- 7 LCC
- 8 Visual aspect
- 9 Acoustical comfort
- 10 Flexible integration of services

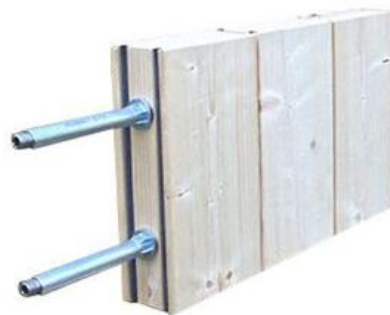




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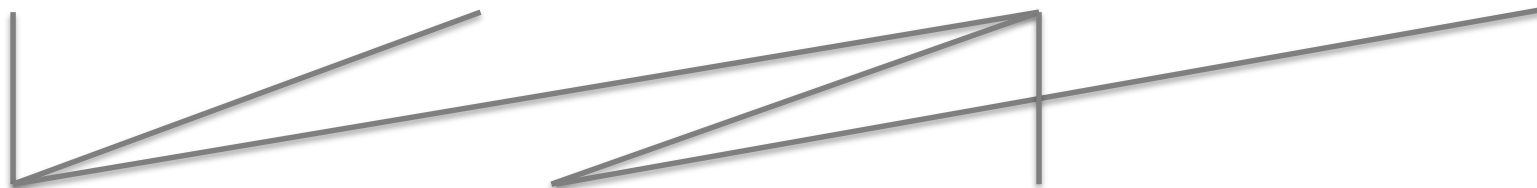
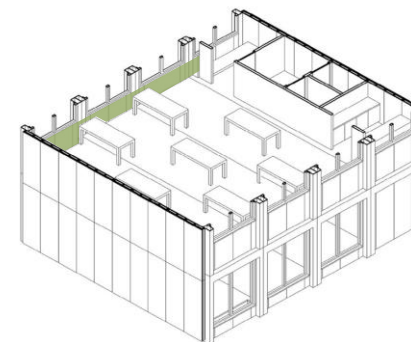
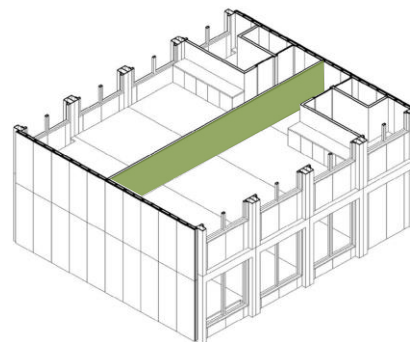
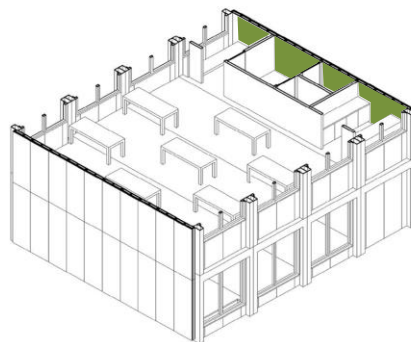
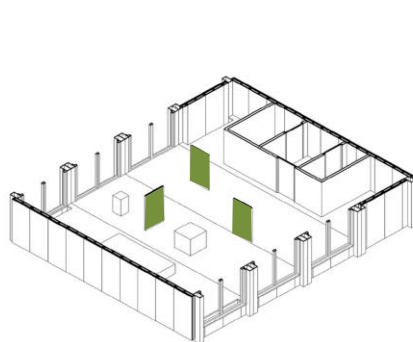


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**wall-linQ**  
TAPE DRY WALL SYSTEM<sup>®</sup>

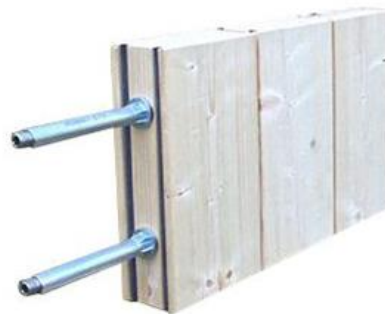




**■ GEBERIT**



**Gyproc**  
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**SYSTIMBER®**  
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**wall-linQ**  
TAPE DRY WALL SYSTEM®



## CONCLUSIONS

Lack of existing reversible solutions

Pioneers' work

Need for business cases

LCA / LCC further evaluation

Experiments - scaling opportunities





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