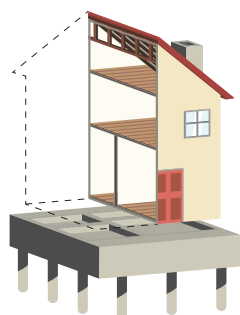
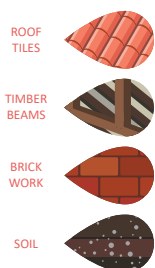




## REUSABLE MATERIALS



## CONSTRUCTION & DEMOLITION WASTE

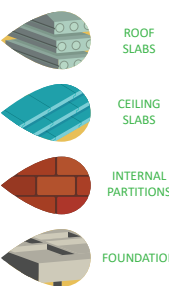
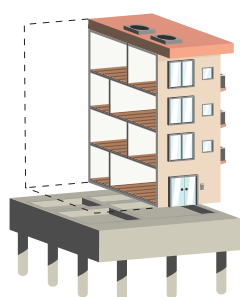
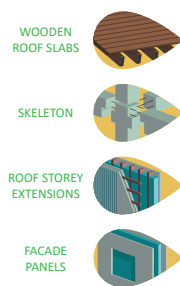


## RE<sup>4</sup> SORTING SYSTEM



PREFABRICATION OF ELEMENTS FOR BUILDINGS  
REFURBISHMENT & CONSTRUCTION

Up to 65% in weight of recycled materials  
from CDW in the final products



**Up to 80-90% of reusable structures for  
RE<sup>4</sup>-prefabricated building concept**

## Partners



# RE<sup>4</sup>

Project Coordinator:

Alessandro Largo (CETMA)

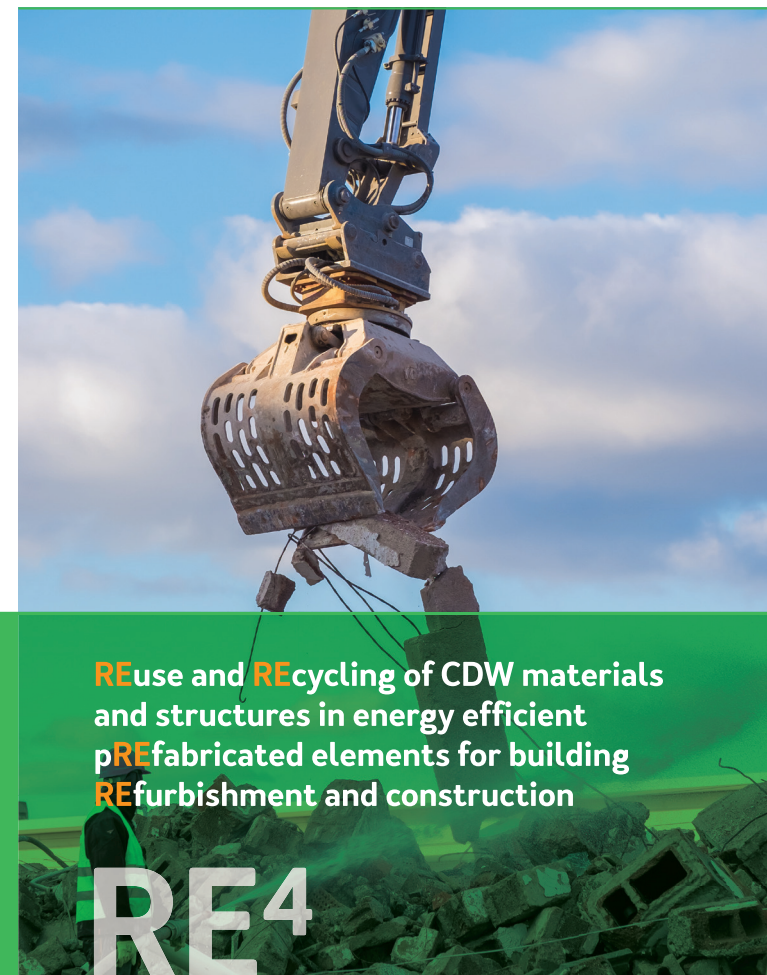
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**RE**use and **RE**cycling of CDW materials  
and structures in energy efficient  
**pRE**fabricated elements for building  
**RE**furbishment and construction

# RE<sup>4</sup>



This project has received funding from the European  
Union's Horizon 2020 research and innovation  
program under grant agreement No. 723583

## What is RE<sup>4</sup> project?

The RE<sup>4</sup> project aims to radically modify the construction process and off-site production by promoting the development of a fully prefabricated energy-efficient building made of components containing up to 65% by weight of CDW-derived materials and structures. The RE<sup>4</sup> building can be easily assembled and disassembled for future reuse.

This goal will be achieved building upon a set of self-standing industrial results, like:

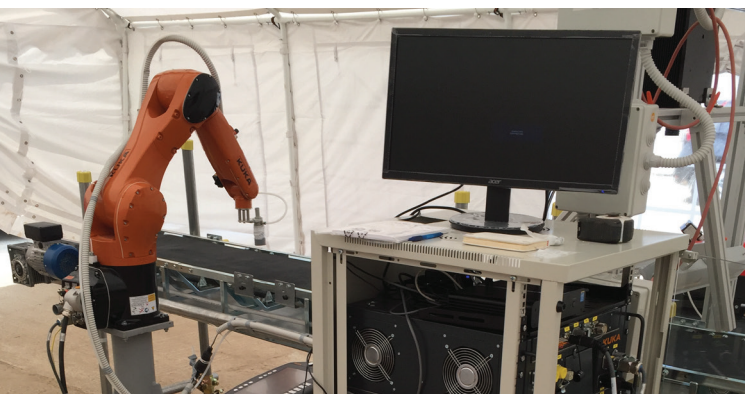
- an innovative CDW sorting system based on automated robotics to increase the quality of CDW-derived aggregates,
- a number of prefabricated building elements (including connections) based on CDW-derived materials and structures, suitable for both new construction and building refurbishment, and
- the related production processes and equipment.

The materials flows will be managed by a new BIM-compatible ICT tool.

## RE<sup>4</sup> CDW Robotic Sorting System

To properly separate a suitable material for the recycling, RE<sup>4</sup> partners developed a mobile CDW robotic sorting system that allows sorting the construction waste directly on site.

Bricks, tiles, stone, glass, wood, and plastic from CDW will be properly sorted paving the way for the use of high quality mineral and lightweight aggregates into eco-sustainable prefabricated elements.



## RE<sup>4</sup> building elements

### RE<sup>4</sup> timber facade element

Fully reversible and recyclable prefabricated timber façade element made of 75% CDW timber

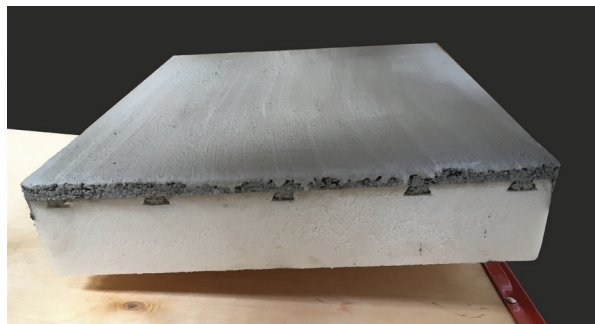


 75% CDW usage

 Reusable element

### RE<sup>4</sup> extruded panels

Façade panels are manufactured on the basis of a concrete recipe of extruded products, with fine sand (replaced with CDW sorted aggregate), Portland cement 4.25, water and superplasticizer.

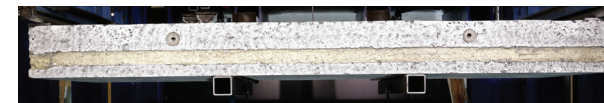


 Sand replaced with CDW

 100% reusable concrete layer

## RE<sup>4</sup> sandwich panels

Sandwich panel with carbon textile and HPC in architectural (outer) layer & SCC with reinforcing steel in inner layer



 50-90% CDW usage

 Reusable element

## RE<sup>4</sup> extruded tiles

Extruded tiles with easy installation and a future disassembly. Used for walls cladding just by hooking on metallic frame screwed on the substrate wall.



 85% CDW usage

 Reusable element

## RE<sup>4</sup> buildings

Four demo buildings will showcase:

- the RE<sup>4</sup> solutions for new construction in two different climatic zones (Spain and UK) and the RE<sup>4</sup> strategy for the disassembly and reuse of materials and structures from dismantled buildings,
- the RE<sup>4</sup> solutions for refurbishment (Italy),
- the replication potential outside EU (Taiwan).