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# Building As Material Banks: An Introduction

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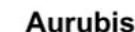


## WHAT IS BAMB?

# Developing Buildings as Material Banks, eliminating waste and establishing symbiosis in supply industries

Horizon 2020 – WASTE 1 2014 – Moving towards a circular  
economy through industrial symbiosis

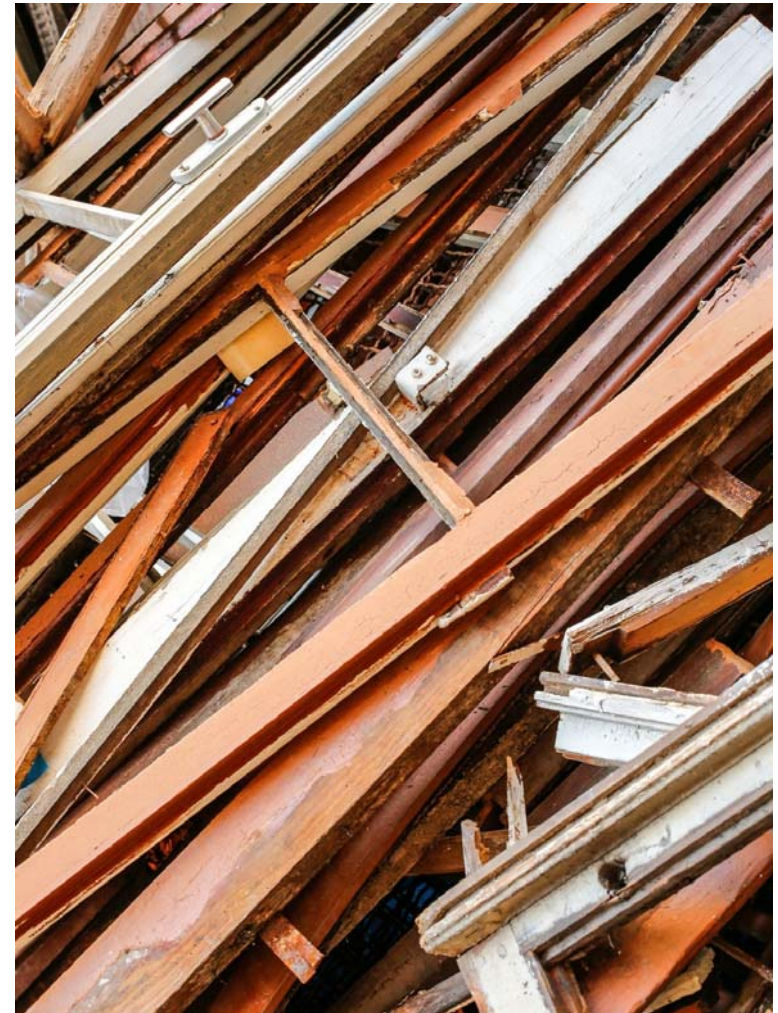
- Starting date: 1st of September 2015
- Duration of 3,5 years
- Consortium of 16 partners from 8 EU countries





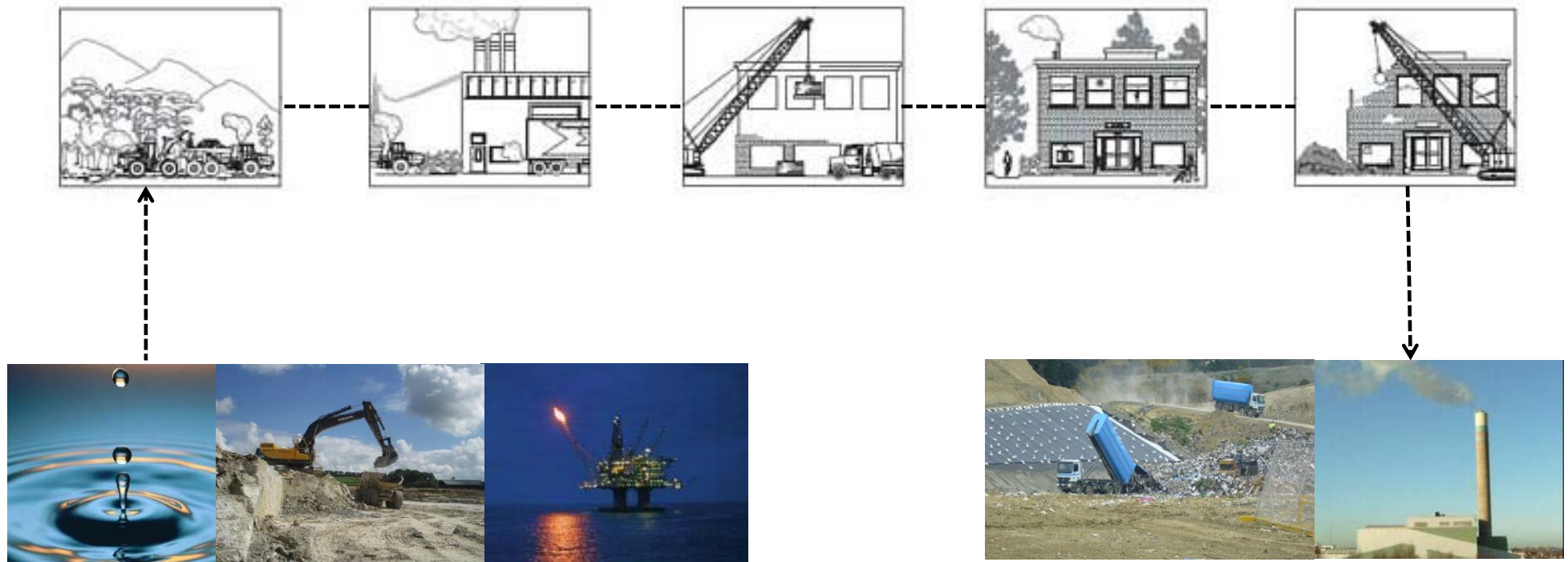
## PURPOSE OF BAMB

- Reduce waste and use of virgin materials in the building industry in Europe.
- Today over 30 percent of EU's waste comes from construction. Globally, the built environment consumes c. 24% of raw materials
- In a circular (building) industry the materials are kept in use.
  - The key is keeping the value of the materials, products or components
  - Materials are valuable if they are accessible, functional, and attractive.



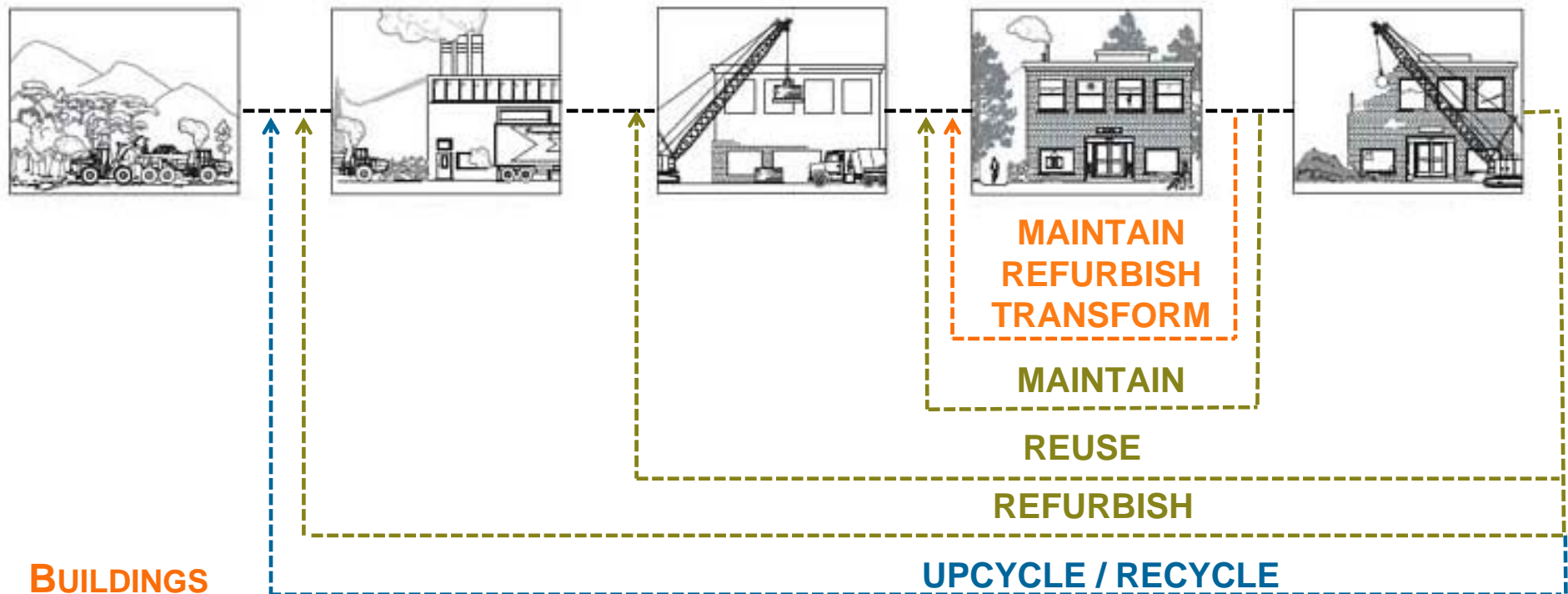
## OBJECTIVES

From a linear and static built environment ...



# OBJECTIVES

... to a circular and dynamic built environment

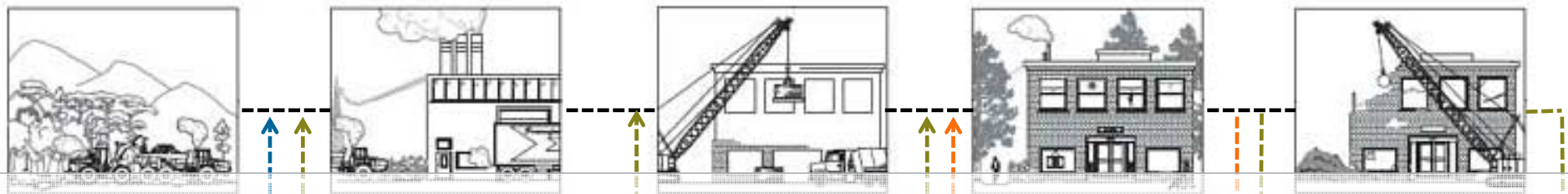


- BUILDINGS
- BUILDING PRODUCTS & SYSTEMS
- MATERIALS



## OBJECTIVES

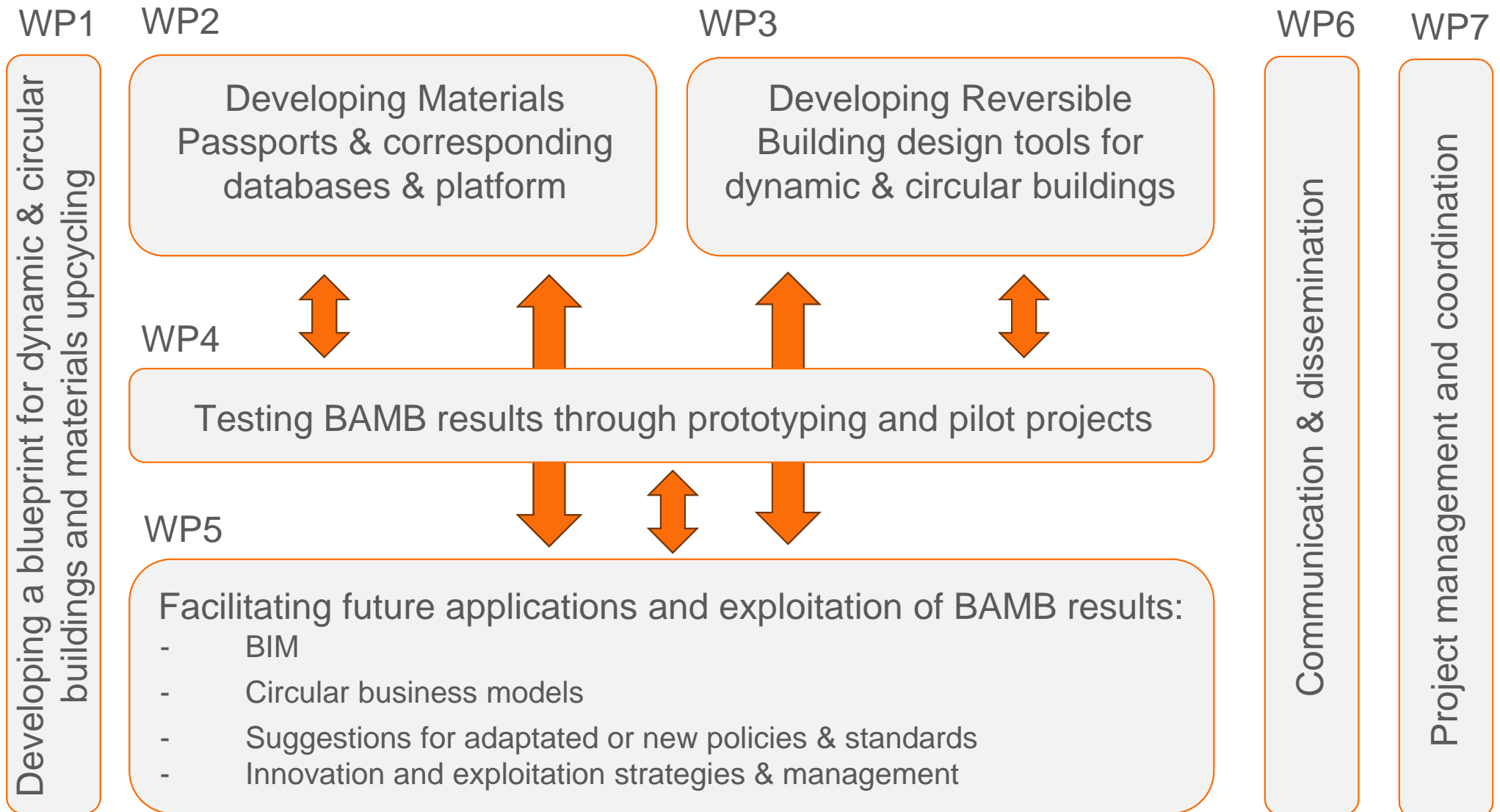
... to a circular and dynamic built environment



- Develop a sustainable life cycle management of materials, products and buildings, eliminating waste and reducing the use of virgin resources.
- Reduce the costs by managing resources rather than managing waste.
- Preserving the buildings, its components and materials' residual value so that manufacturers and owners will be able to make money out of their "waste" by way of high quality reuse and recycling strategies.

MAINTAIN  
REFURBISH  
TRANSFORM  
MAINTAIN  
DESIGN  
REFURBISH  
UPCYCLE / RECYCLE

## BAMB WORK PLAN



## BLUEPRINT

- Develop a common understanding of the context BAMB is working in and for
- Develop a shared vision and blueprint for dynamic and circular buildings and materials upcycling

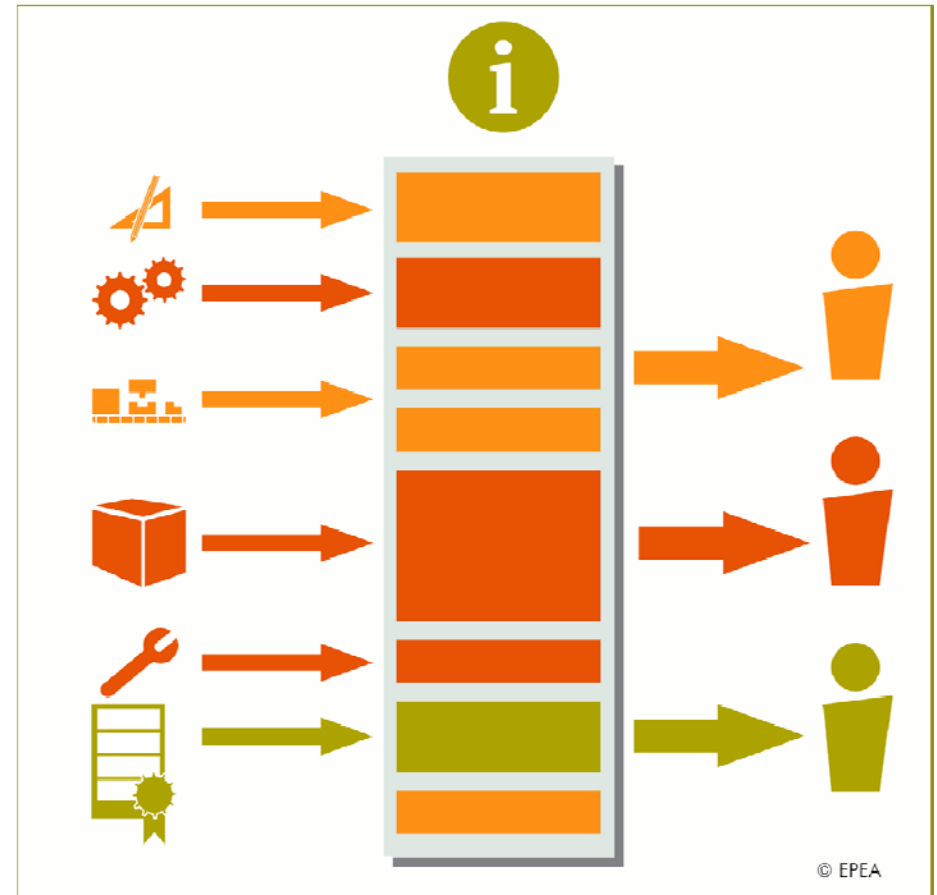




## MATERIALS PASSPORTS

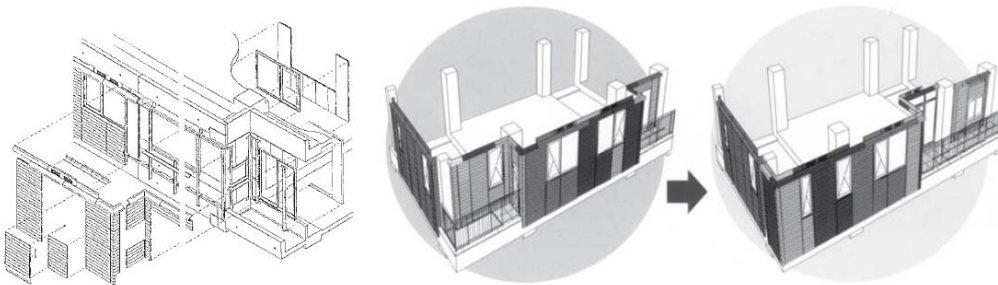
Electronic materials passports are a one-stop-shop for information on the characteristics of building materials, products and systems .

- Enabling circular product design, material recovery and chain of possession partnerships
- Improving quality, value and security of material supply



# RE-THINKING THE DESIGN AND BUILDING VALUE CHAIN

## Reversible Building Design



- Reversible design is a design strategy and approach that enables buildings to be easily adapted, transformed and disassembled:
  - Building level
  - System level
  - Product level

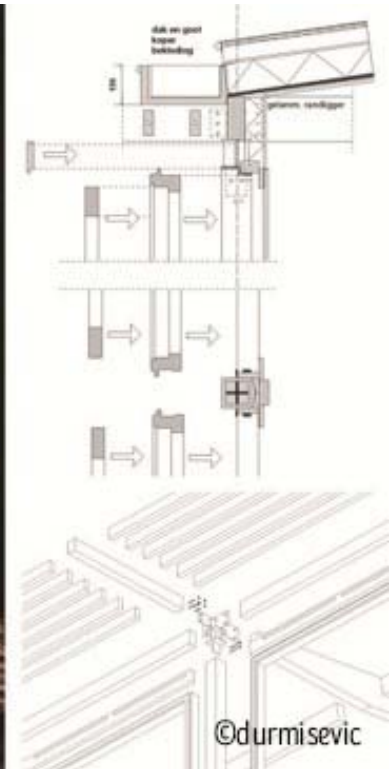
Source: loblolly-house, Maryland, USA, 2006

<http://kierantimberlake.com/pages/view/20/loblolly-house/parent:3>

## REVERSIBLE BUILDING DESIGN

BAMB will develop three tools to enable circular buildings:

- A reuse potential tool,
- A transformation capacity tool
- A design protocol for dynamic and circular buildings.

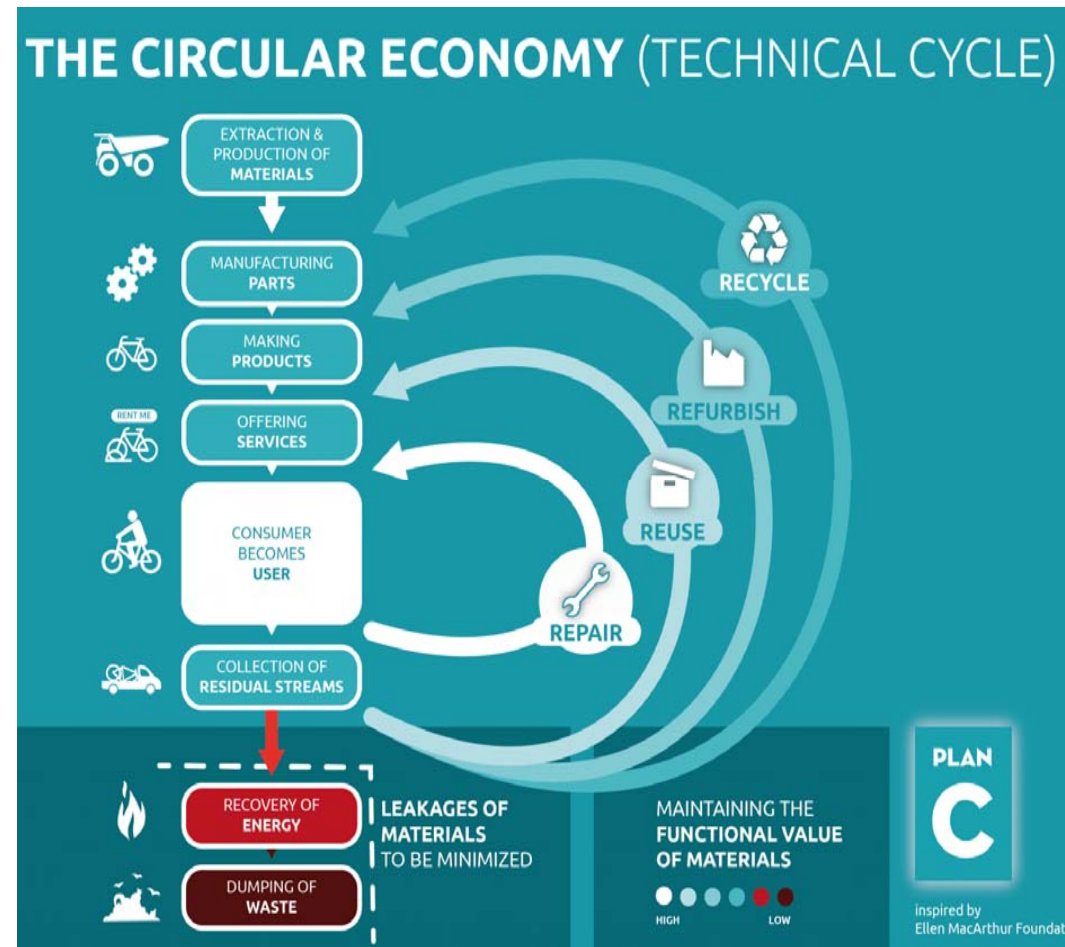




## BUSINESS MODELS

Business models are important to make a circular way of building feasible in our economy

- Enabling circular use of materials, products and components
- Ways to create added value for each stakeholder
- Identification of current bottlenecks and needed business capabilities



# DECISION MAKING MODELS

## Decision making models

- Methodology whereby the future resource use impact/value can be modelled in new and existing buildings
- Building level Integrated Decision Making Model
- BIM Resource Productivity Prototype



## DECISION MAKING SUPPORT OBJECTIVES

- New building - combine material/product information with design information, in such a way as to allow decision makers to see the 'future resource use' value/impacts.
- Existing building - retrospectively map the material/products incorporated into the building and the way in which they have been installed. Provide information to decision makers on the optimal way to manage the 'future resource use' value/impacts.
- Ongoing maintenance, refurbishment and end of life of buildings - maintain/enhance the 'future resource use' value/impacts, by enabling decision makers to clearly understand how to best undertake these activities.



## CASE STUDIES AND PILOTS

### Refurbishment Lab – VUB

Era: 24 m<sup>2</sup> / module  
Location: Brussels

- Refurbishment of student housing modules in 3 stages
  1. Test & showcase transformable internal infill
  2. Add transformable external walls
  3. Full transformation
- Multiple functions: transformed and changed regularly



## STAKEHOLDER NETWORK - 6 SPECIAL INTEREST GROUPS

1.

Materials Passports



2.

Reversible Building  
Design



3.

Data management  
(including BIM)



4.

Business Models



5.

Policies and Standards



6.

Case Studies  
and Pilots



## BRE – INFLUENCE THINKING

- Affiliate Member of the CE 100 Programme of the Ellen MacArthur Foundation
- Case studies of the built environment:  
<https://www.ellenmacarthurfoundation.org/assets/downloads/Built-Env-Co.Project.pdf>
- Steering Group Member of the Green Construction Board Circular Economy Working Group (#cethinking)
- <http://www.constructionproducts.org.uk/media/177748/gcb-circular-economy-april-2016-v3.pdf>
- PhD on circular economy at Loughborough University, funded by BRE Trust

