



Circular Building Assessment- A new tool made possible by BAMB

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BUILDINGS AS MATERIALS BANKS – EU H2020 PROJECT



UNIVERSITEIT TWENTE.

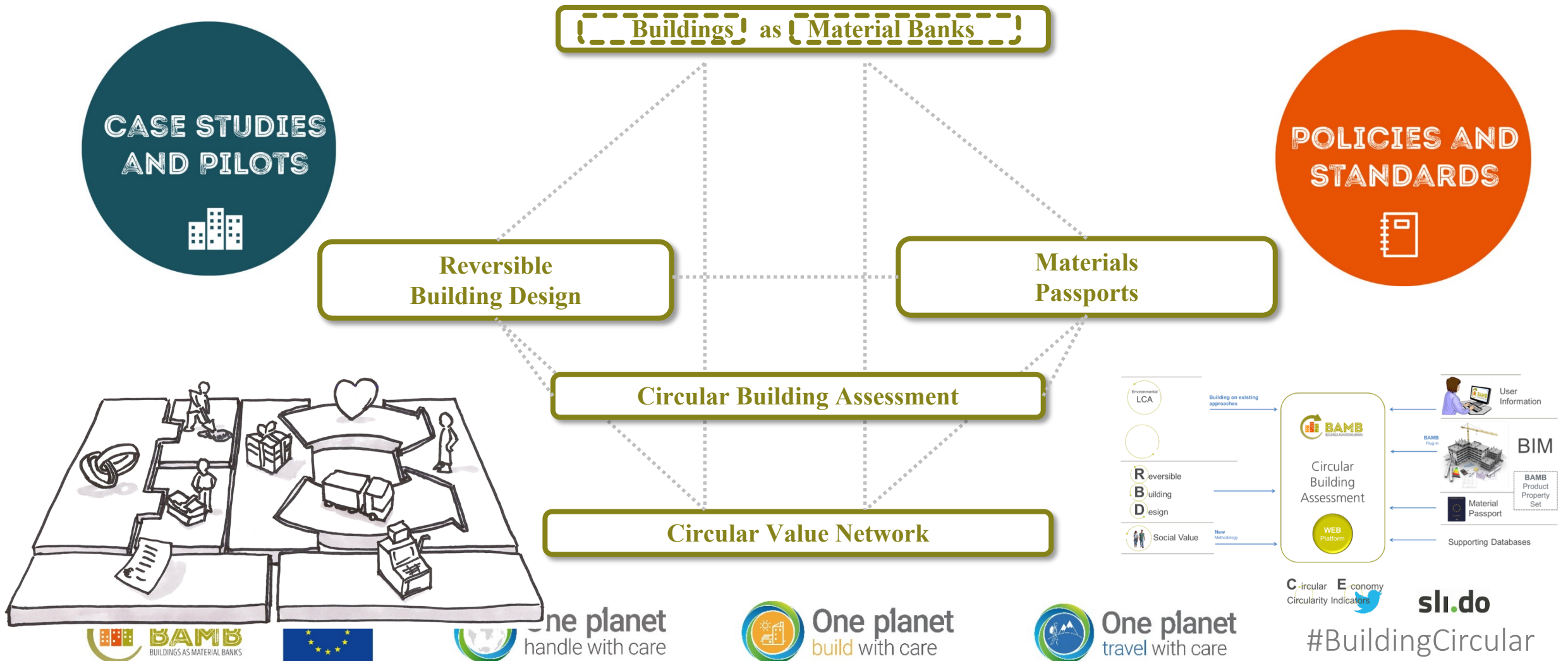


Universidade do Minho

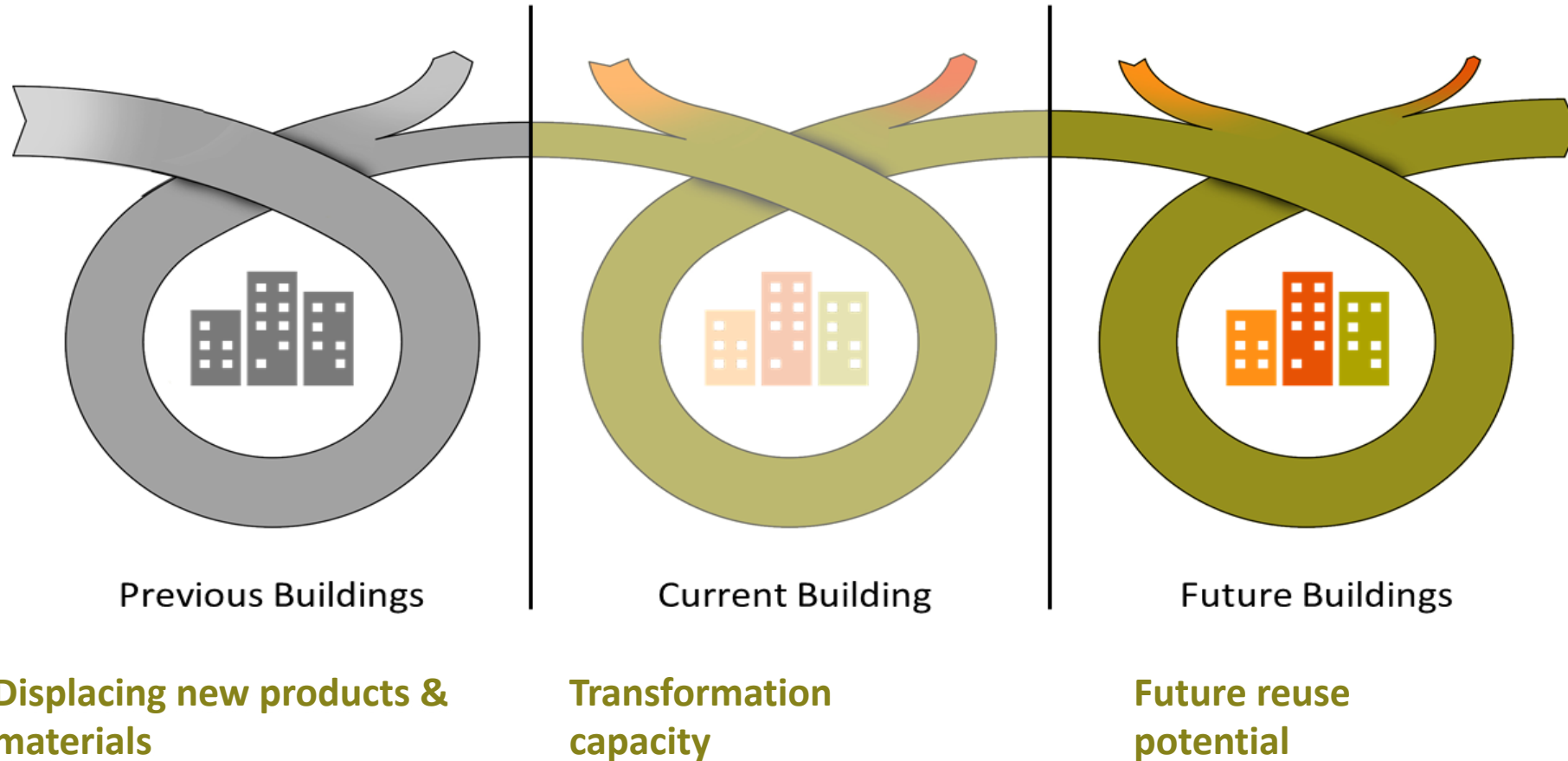


The BAMB project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 642384.

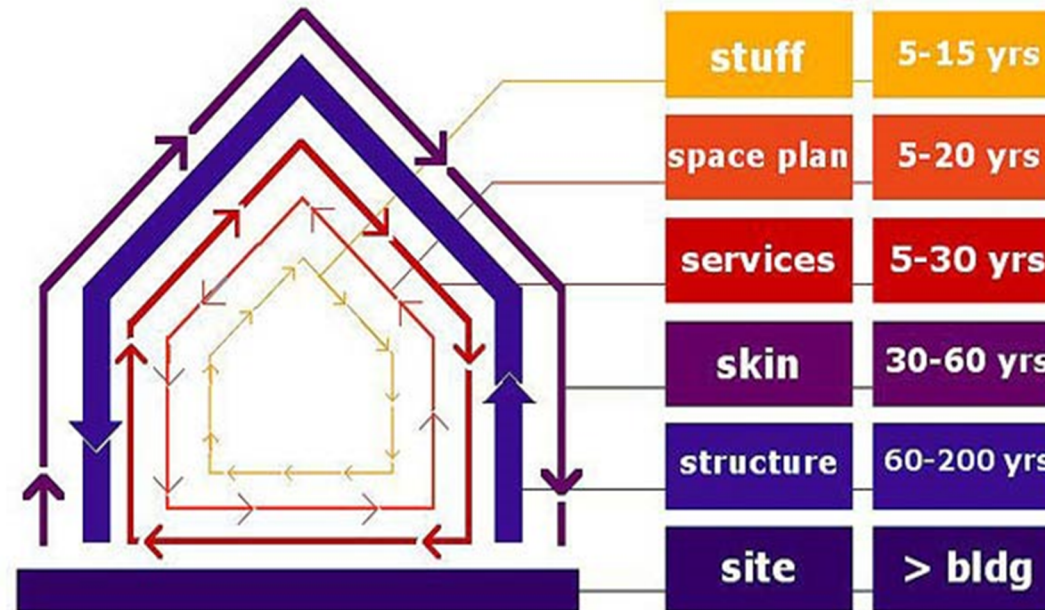
BAMB PROJECT OVERVIEW



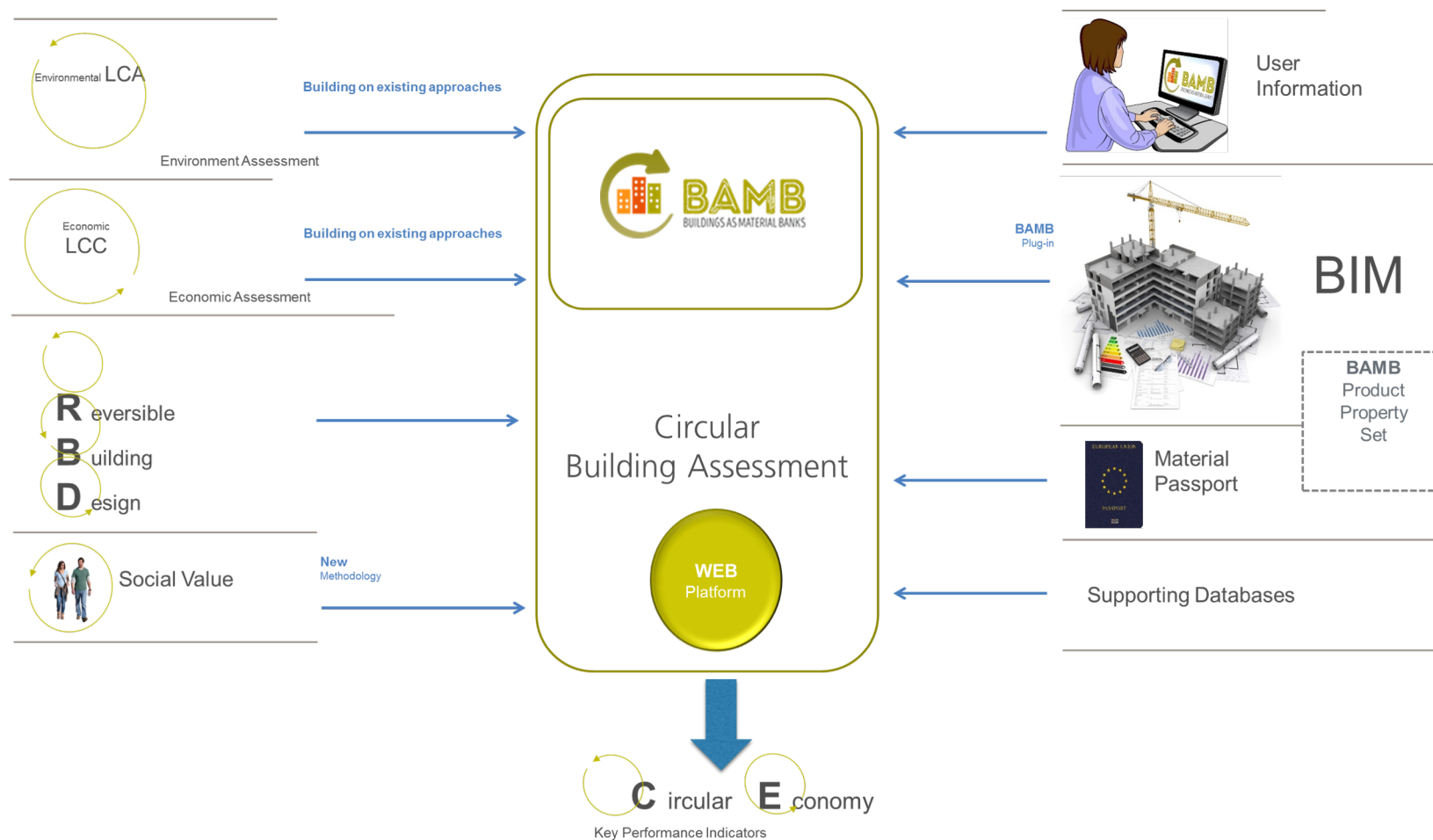
Circular Building Scenarios



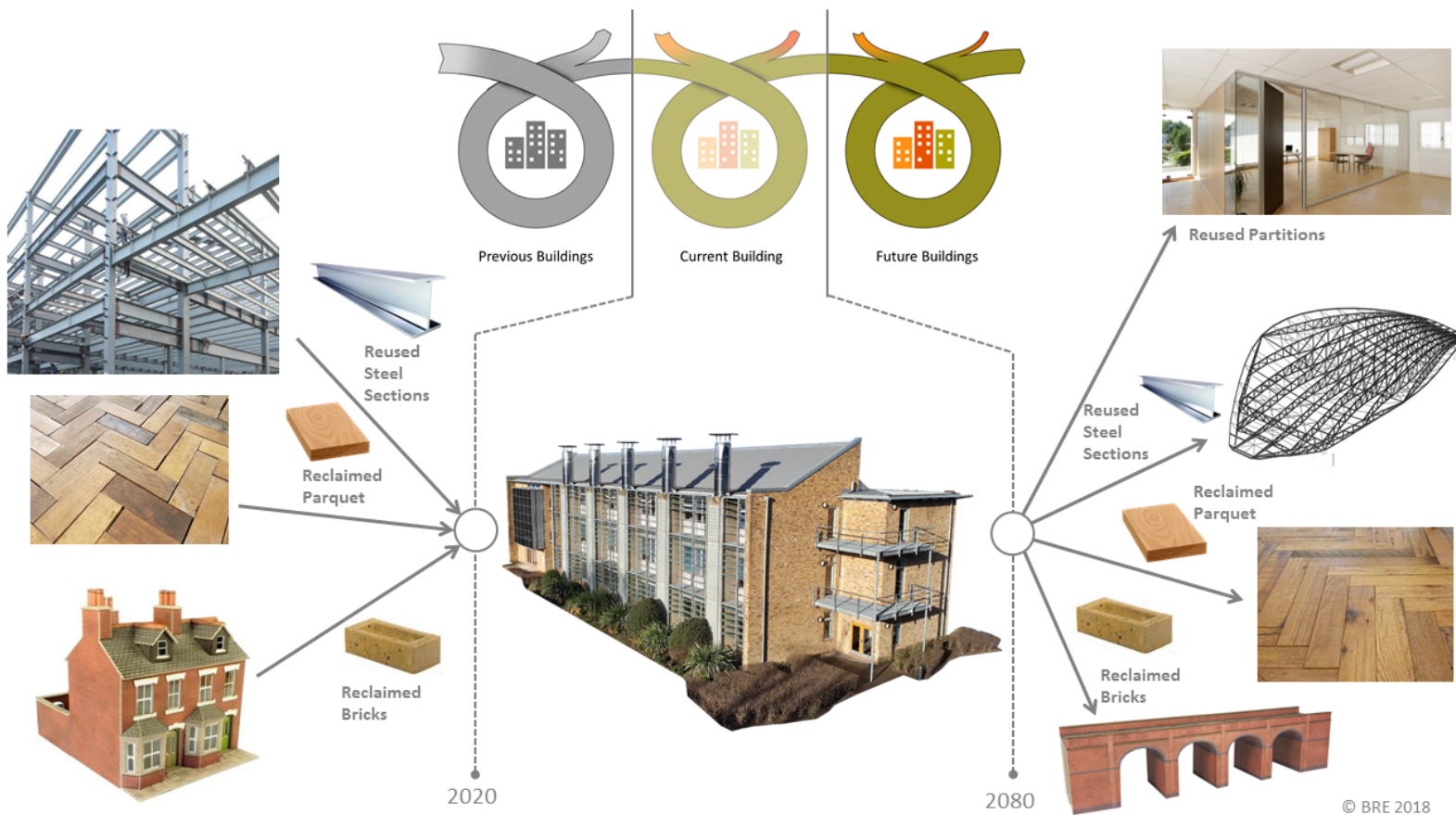
Evolving and Flexible Assessment



What is Circular Building Assessment



Environmental assessment



CE scenarios modelled:

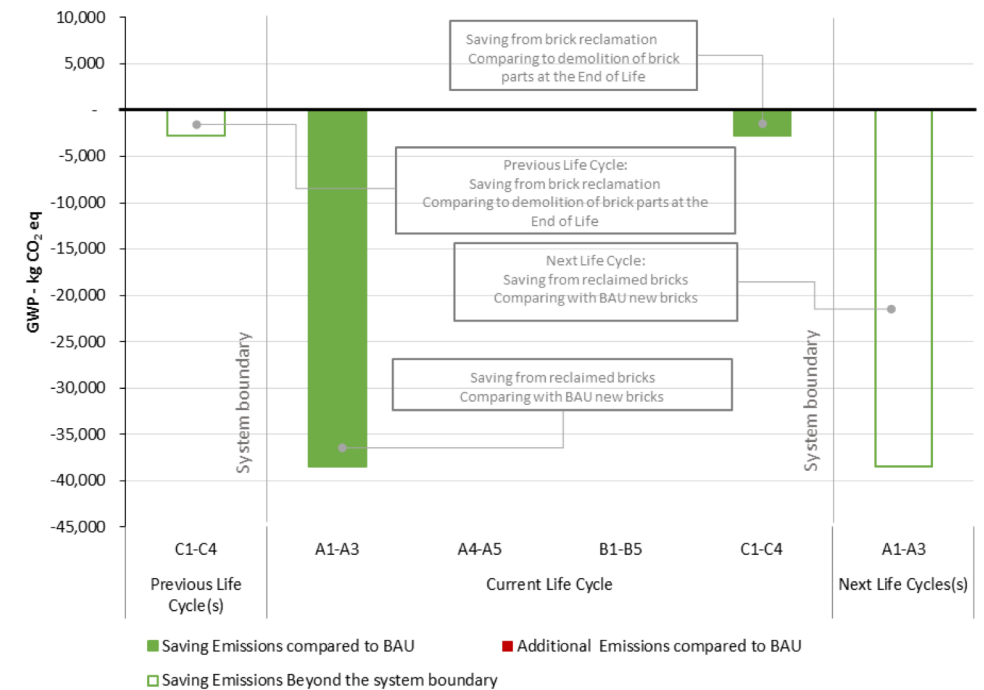
- **80 000 reclaimed bricks**
- **Future reuse potential of bricks**
- **Extending building life cycle**
- **Reuseable partitioning**



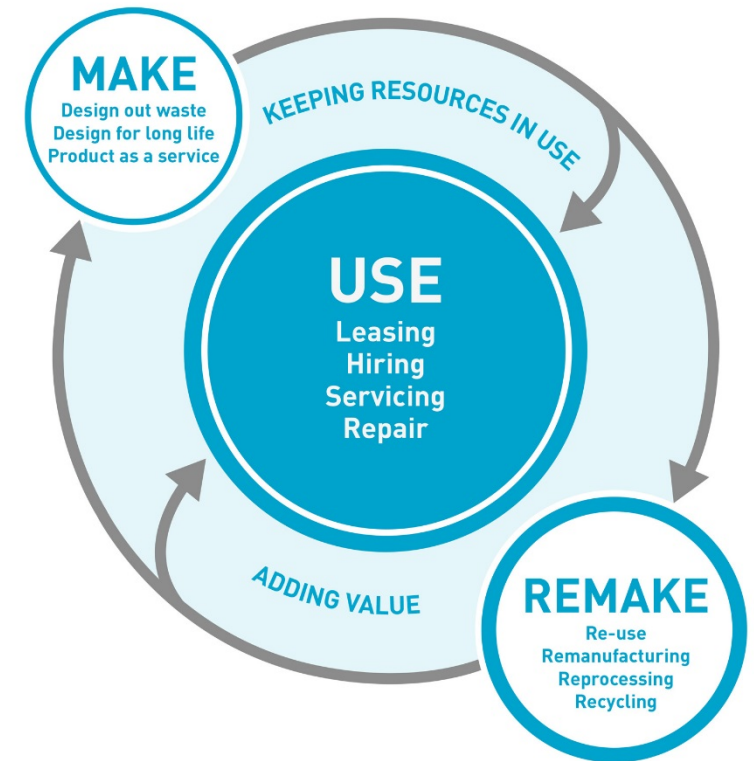
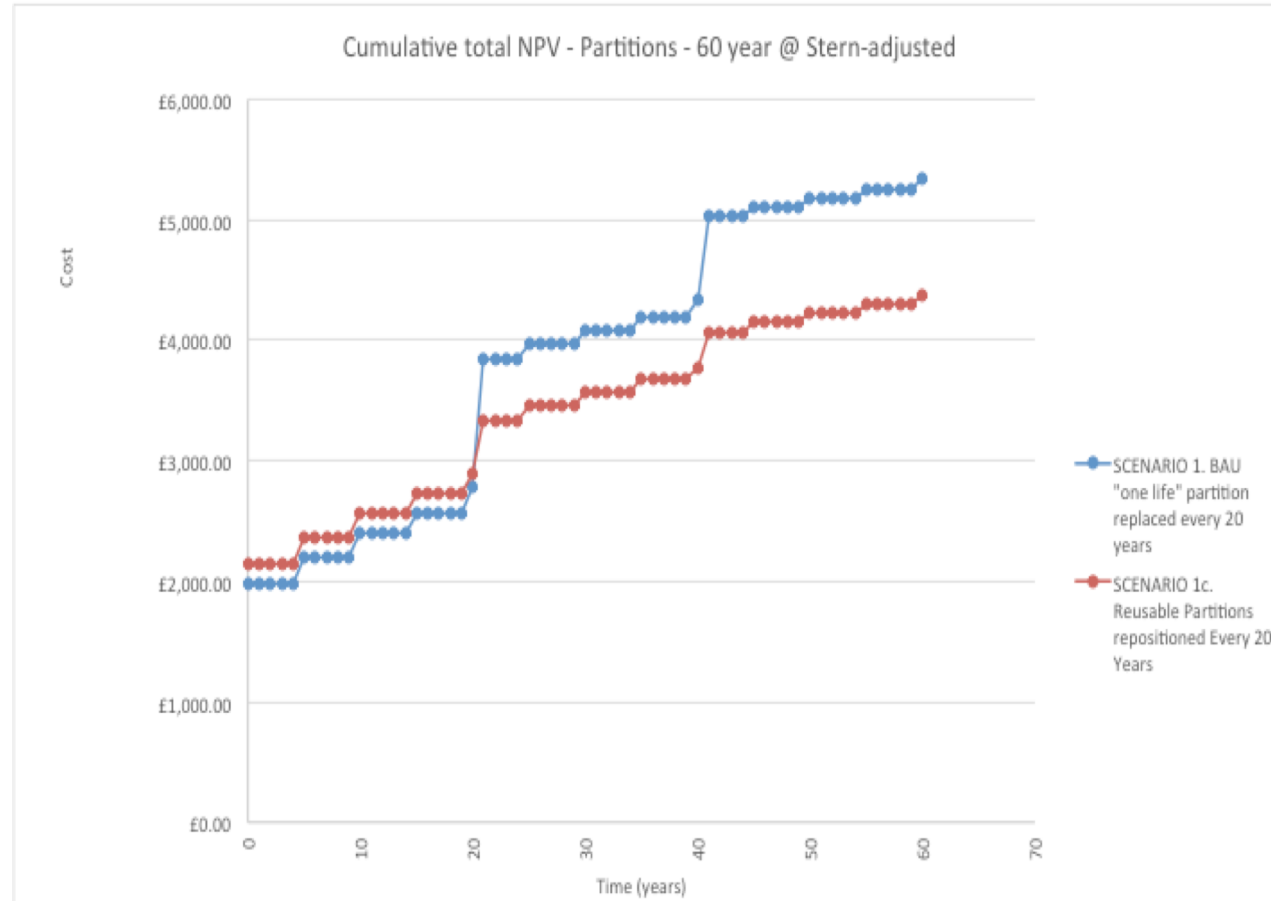
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SCENARIO 1B : USE OF RECLAIMED BRICKS FOR B16, THEN RECLAIMED AT END OF B16 LIFE

- Benefits measured over 3 building lifecycles
- Benefits for the previous building of 2.7 tonnes of CO₂eq as bricks have been diverted from landfill.
- Benefits to future buildings as the reclaimed bricks will be reused, saving another 38 tonnes of CO₂eq – assuming all bricks are reclaimed – in the next building (stages A1 to A3 only).

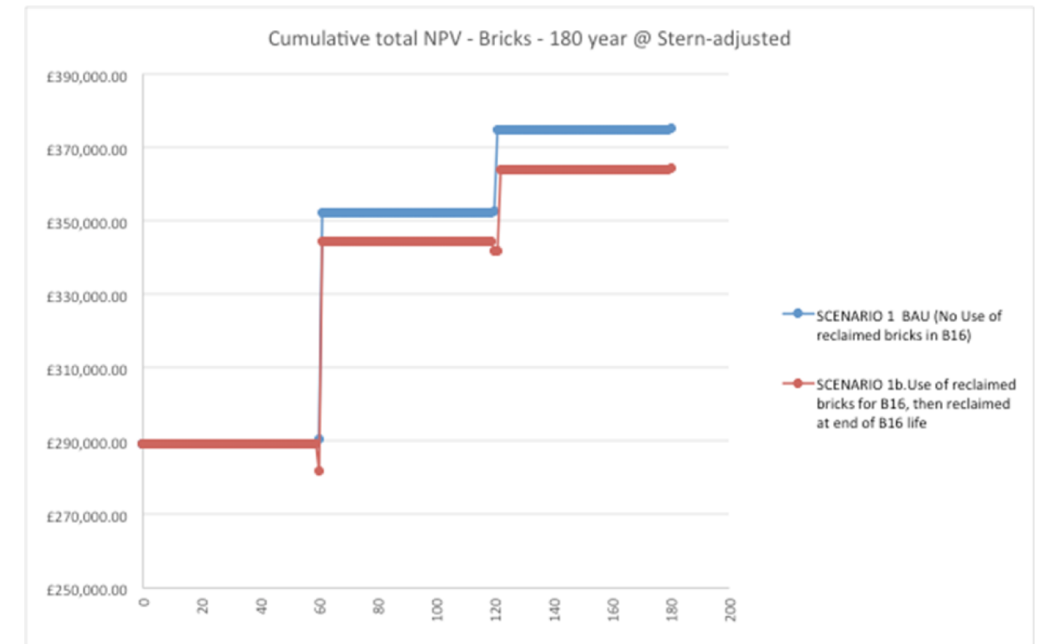


Economic Assessment



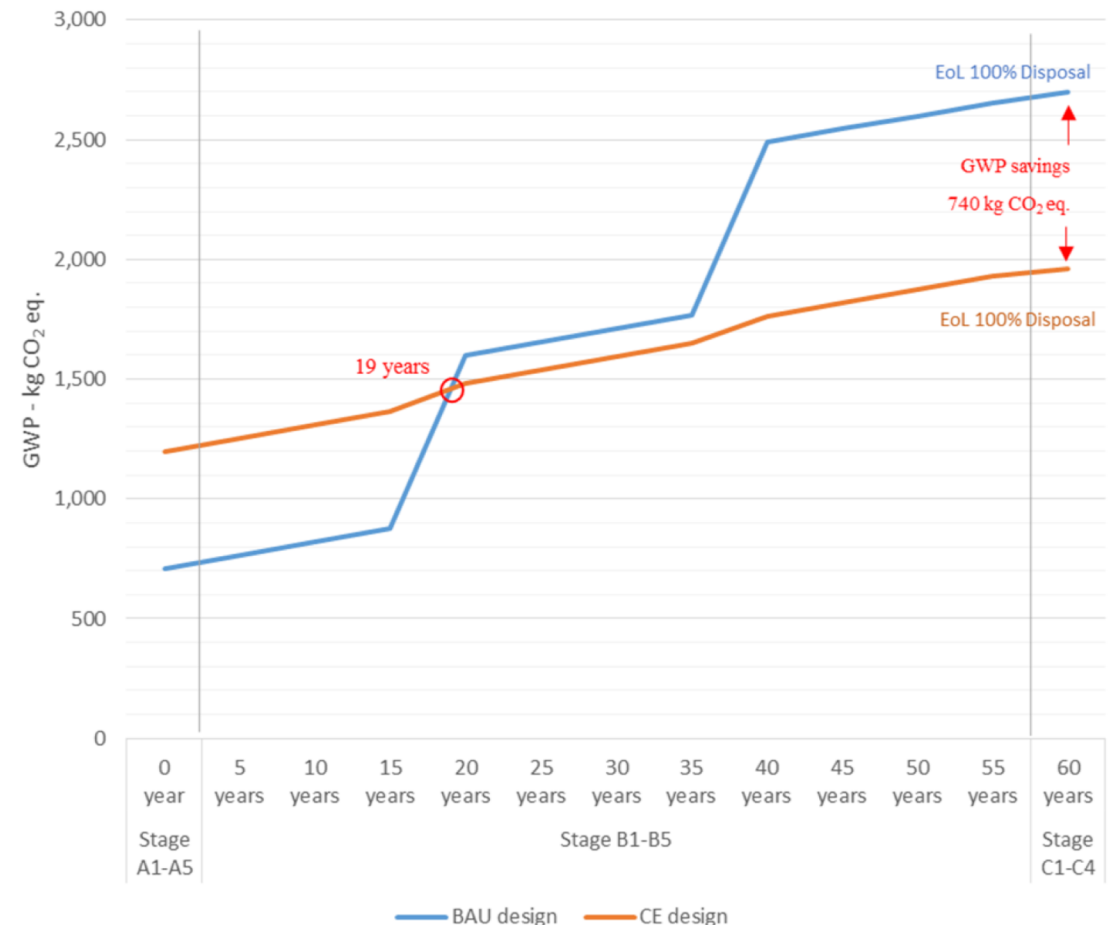
SCENARIO 1B: USE OF RECLAIMED BRICKS – 100% RECLAIMED AT THE END OF B16 LIFE AND FUTURE BUILDING VERSUS BAU

- The initial construction costs for BAU are lower as construction costs using reclaimed materials may be more
- The additional construction cost incurred is outweighed by sales income prior to the second lifetime of use
- For the building owner of the first building at the time of disposal a considerable proportion of the original costs can be reclaimed at the end of life of the building.
- However, the owner at year 60 is unlikely to be the same owner who incurred the original costs to procure the bricks.



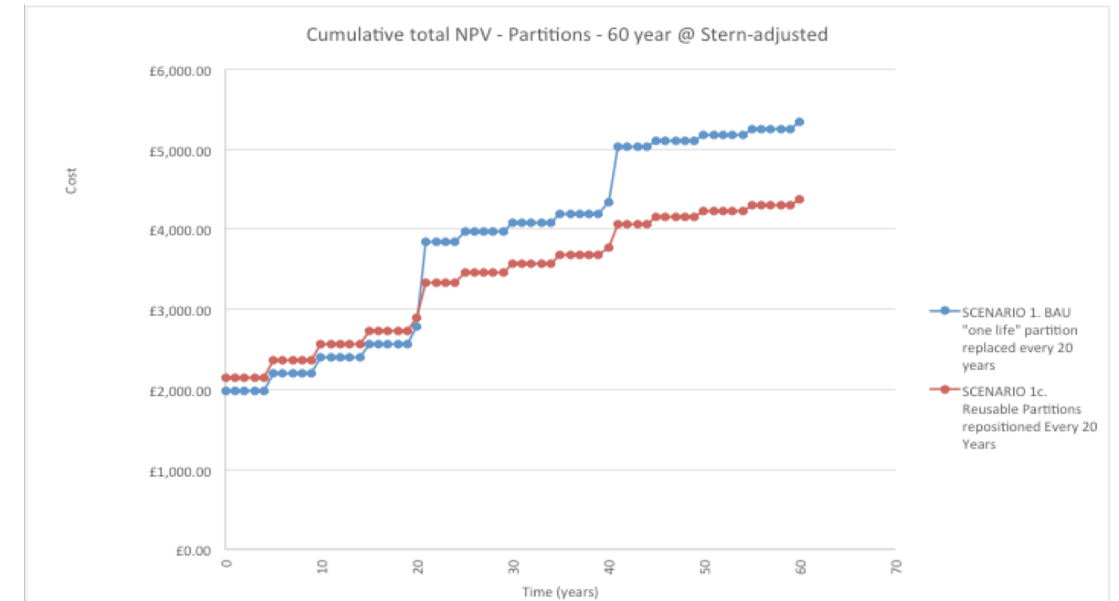
SCENARIO 1C – USE OF REUSABLE PARTITIONS MOVED EVERY 20 YEARS OVER A 60 YEARS STUDY PERIOD

- The results show that the initial burden of using a reusable partition is offset at 19 years against a BAU approach of using a “one life” partition.
- Over 60 years, the use of reusable partition will lead to a 740 kgCO₂eq saving

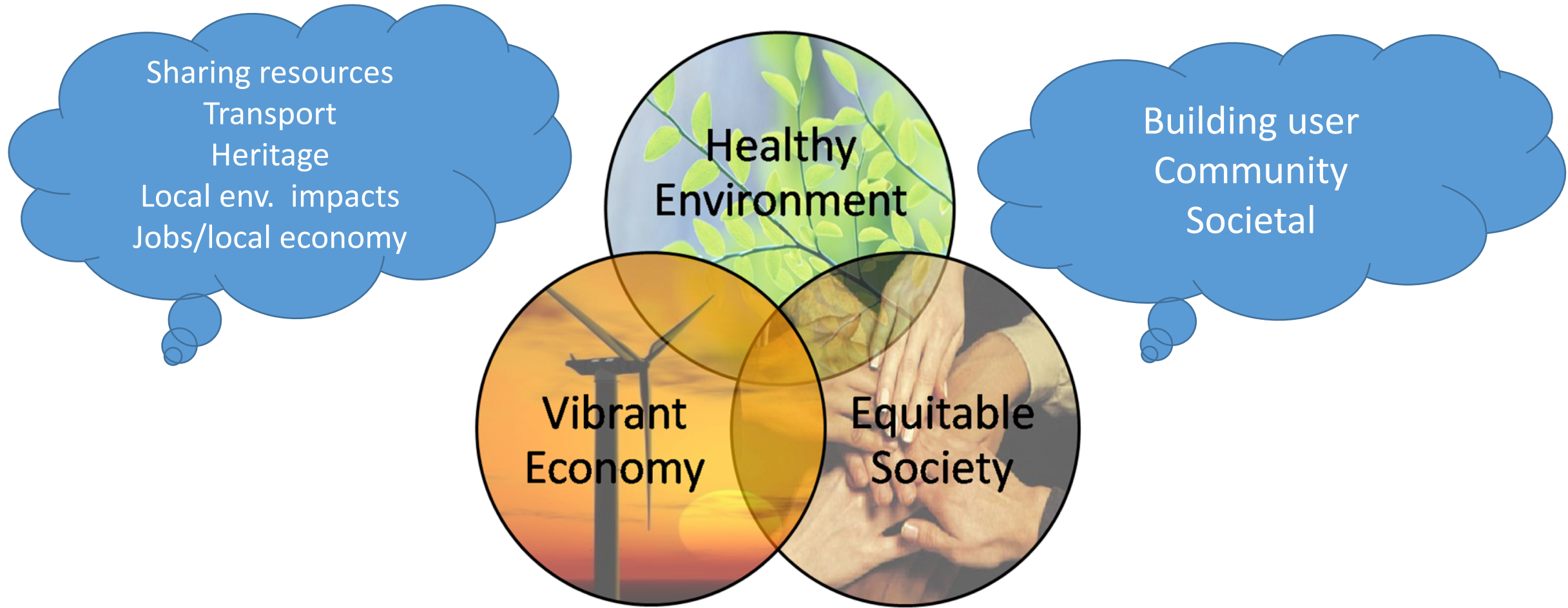


SCENARIO 1C: USE OF REUSABLE PARTITION MOVED EVERY 20 YEARS OVER A 60 YEARS STUDY VERSUS BAU

- Net Savings compared to BAU represent around £29/m² overall, or around £1/m² per year better in terms of the AEV
- For the first 20-year lifespan the additional initial construction cost of the reusable partitioning specification means that it is a less favorable solution
- As soon as a replacement occurs though the advantage of lower cost de-construction and re-use in situ means that the circular solution is preferable in economic terms.
- The issue of different ownership is less problematic than for bricks as the current owner of the building gains the advantage of lower operating costs. Only the initial procurer carries the additional initial cost.



Social Assessment



Prototyping and Piloting

CBA Home Projects

Projects Dashboard

SundaHus

Add new project

Logged in as: Christian Log out

Add new project

Project name

Building owner/Client name

Project code

Construction method

Project function

Address

Postal Code

Country

Latitude

Longitude

Description

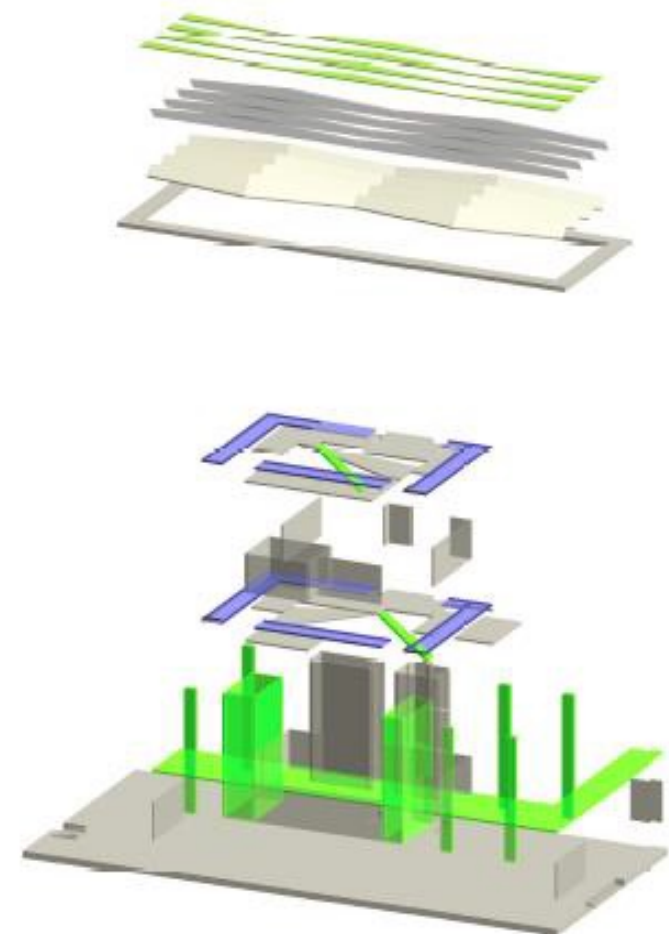
Construction start date

Operation date

Assessor

Assessor organisation

Add project Cancel



Complicated engine vs. Easy user experience



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External BIM Model / Project definitions Stage 1 - 4

Exchange Format

User

Manual input

BIM export

BIM input

Assessment output

BAMB
BUILDINGS AS MATERIAL BANKS
Circular Building Assessment Platform

output calls from CBA (in absence of information)

Where there poor system definition in COBie
Default system definitions retrieved to user to
choose

Where geom information is present begin
to use, or compensate with geomEngine

VirtualBuildingSimulator API

Reversibility API

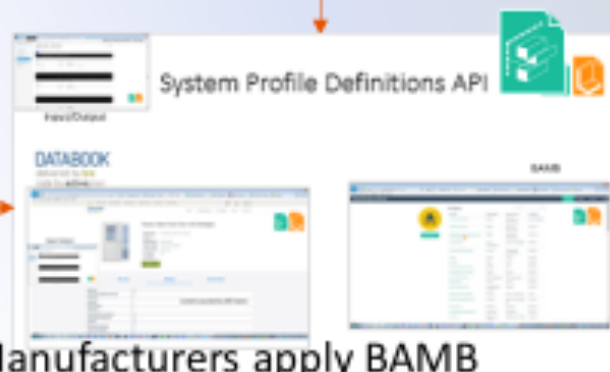
Manufacturers apply BAMB
templates to their products

BAMB Templates inform the outputs returned by various APIs

Users begin to apply the
BAMB templates direct in
their models which can be
exportable in the Exchange
format

BAMB Templates

Schema Exchange





Properties

Basic Wall
Bre-BRE_Cav-102_100_130_p

Walls (1)

Constraints

Location Line: Finish Face: Exterior

Base Constraint: 00_Ground

Base Offset: 0.0

Base is Attached: ☐

Base Extension Distance: 0.0

Top Constraint: Up to level: Roof

Unconnected Height: 10164.0

Top Offset: 0.0

Top is Attached: ☐

Top Extension Distance: 0.0

Room Bounding: ☒

Related to Mass: ☐

Structural

Structural: ☐

Enable Analytical Model: ☐

Structural Usage: Non-bearing

Dimensions

Length: 8185.5

Area: 86.143 m²

Volume: 29.719 m³

Identity Data

Image:

Comments:

Mark:

Phasing

Phase Created: New Construction

Phase Demolished: None

Data

COBie

COBie.CreatedBy: gareth.sewell@bre.co.uk

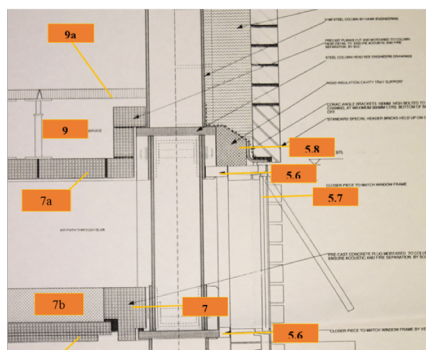
COBie.CreatedOn: 2016-07-05T11:58:42

COBie.Component.Name: Walls

COBie.Component.Space:

Properties help

Apply



Roof Structure

Roof Tiles

External Walls

Windows

Upper Floor Types

Internal Partitions

Ground Floors

Circularity Indicators

1,570.00

Cost

52%

Reclaimed Content

41%

Virgin/primary resource indicator

67%

Recycled Content

7.24

Reuse Potential/ RBD score

60

Life cycle co-ordination

5.75

Transformation capacity

6.24

Recyclability



Thank you!

Contact

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