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WHAT'S AFTER DIGITALIZATION?

@ BAMB & ONE PLANET NETWORK
BRUSSELS, 20TH OF SEPTEMBER 2018

Wim Debacker | [VITO](#)





WHAT'S AFTER DIGITALISATION?

1. What is the situation in 2018?
2. Transitioning to a Circular Economy
3. What needs to be done after the BAMB project?
4. What role can digitalisation play?

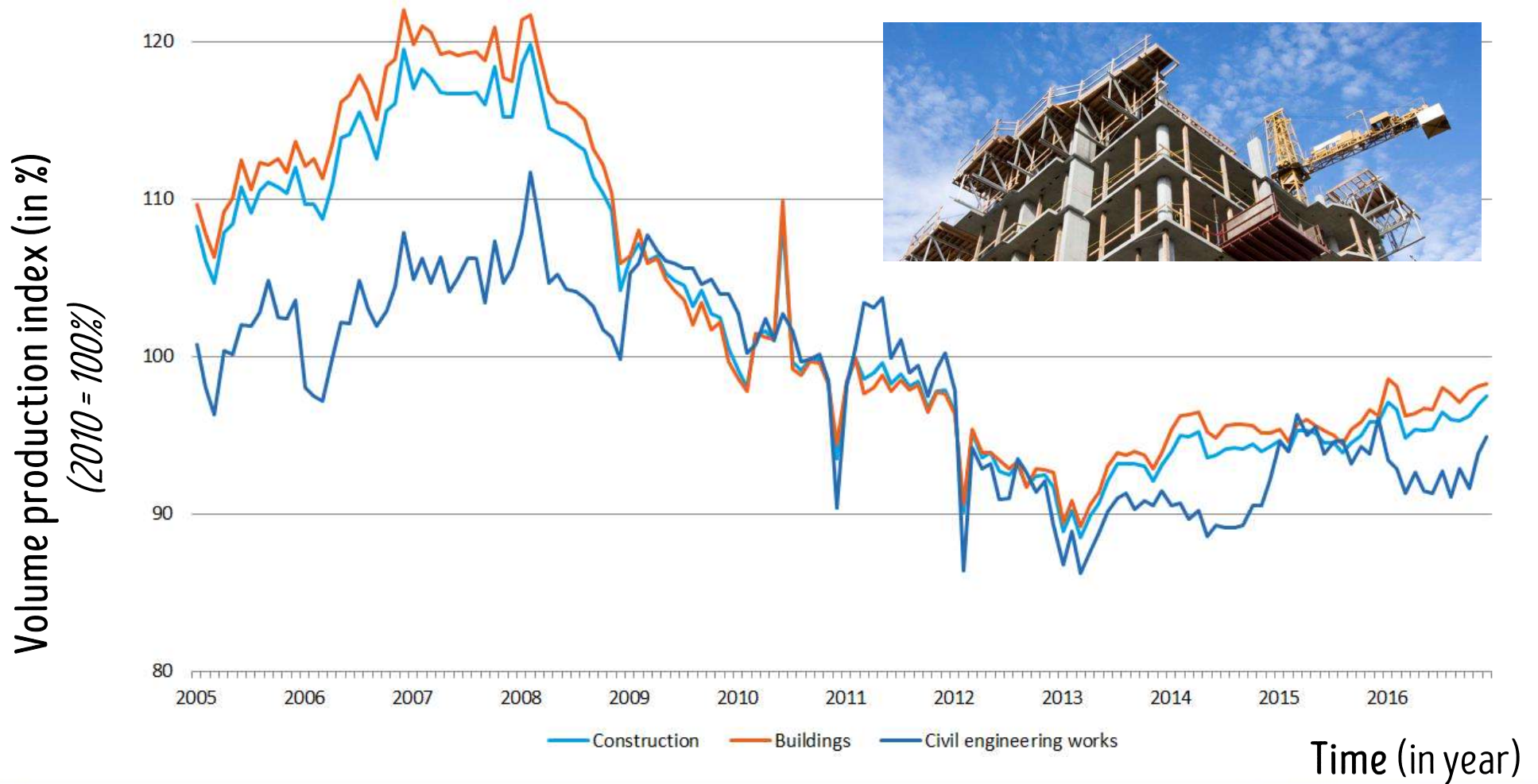


WHAT IS THE SITUATION IN 2018?

WHERE ARE WE IN 2018?

source: [Eurostat](#) (2018)

EU-28 Total construction, buildings and civil engineering



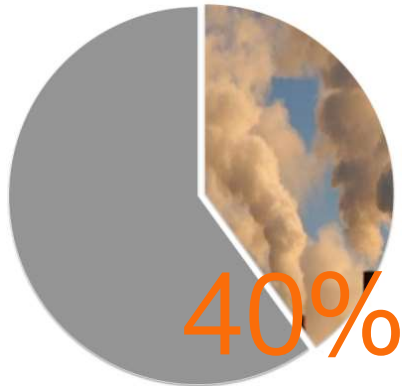
WHERE ARE WE IN 2018?

sources: EIB, 2015; EEA, 2001; Eurostat 2006; McCormick, 2016

Nearly Zero Energy Buildings have become the new standard...



but, the EU-28 built environment is still responsible for...



GHG emissions



resource extraction

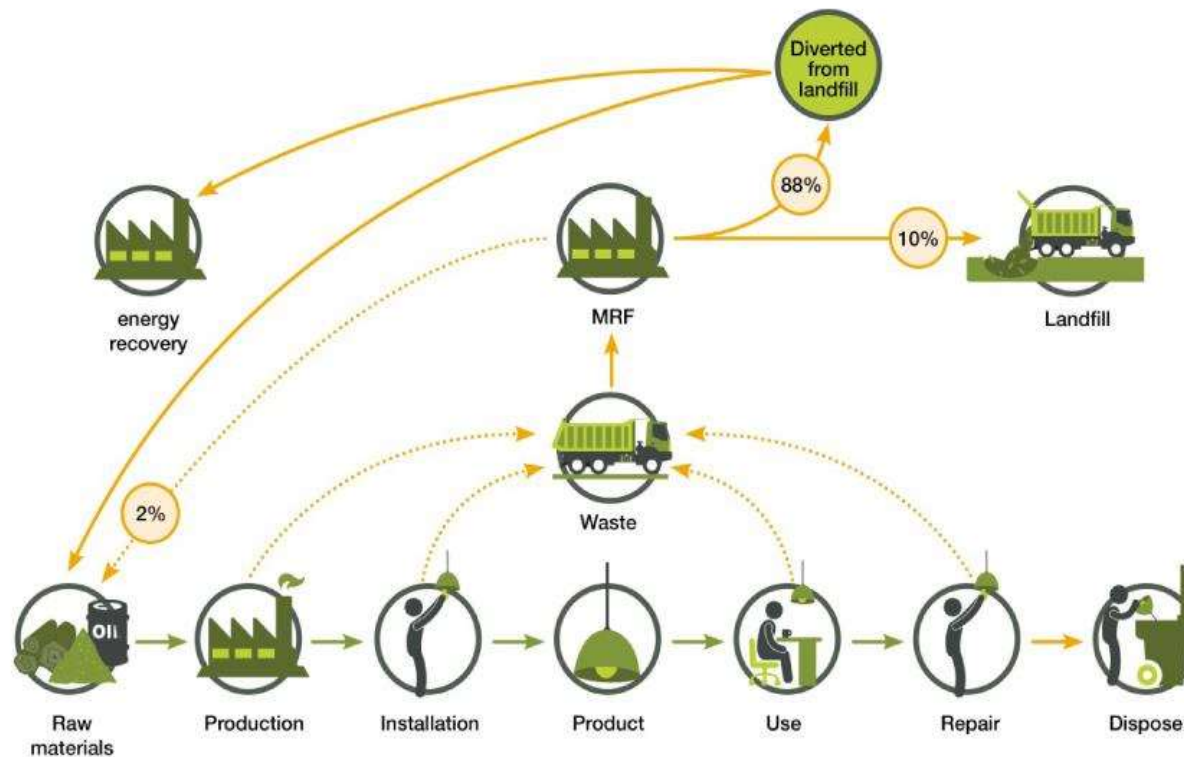


waste production

WHERE ARE WE IN 2018?

based on: Magdani (2016)

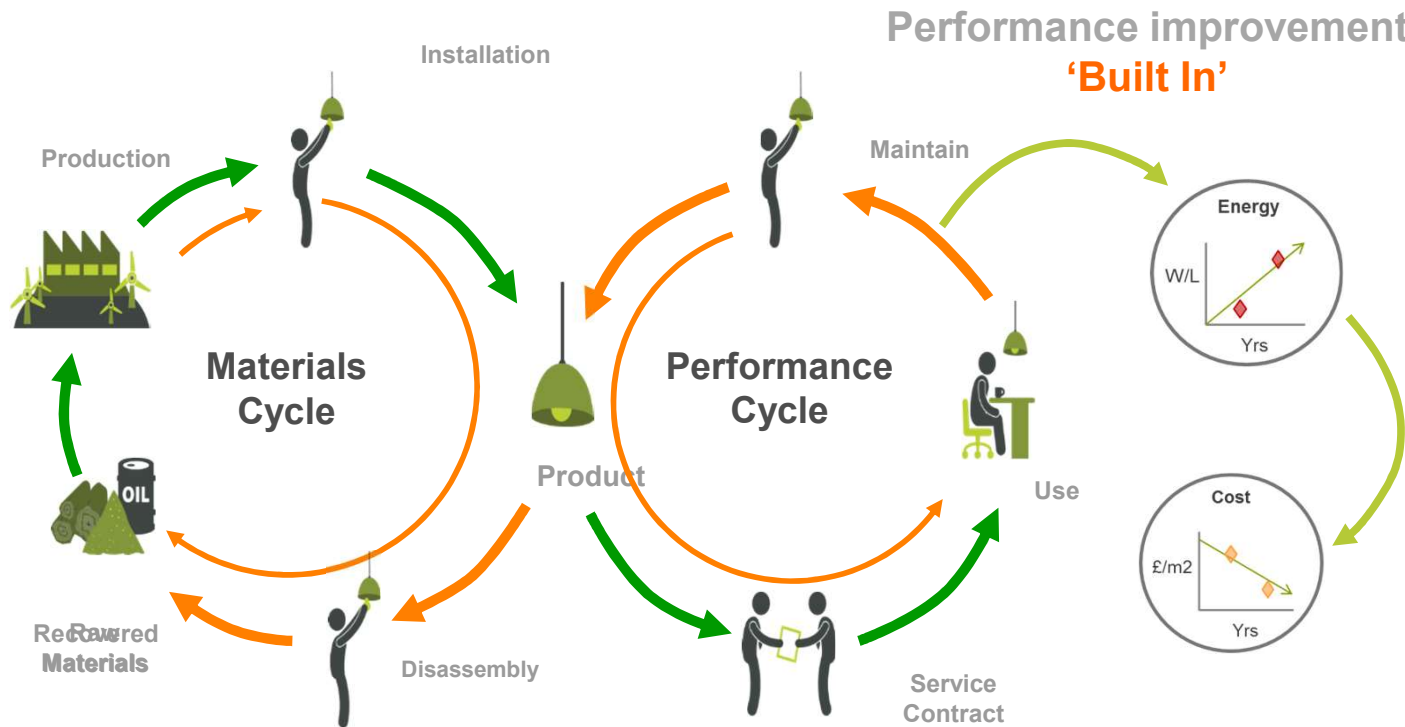
Linear supply chain model,
according to 



WHERE ARE WE IN 2018?

based on: Magdani (2016) and Turntoo

Circular value network model, according to 





BAMB
BUILDINGS AS MATERIAL BANKS

**TRANSITIONING
TO A CIRCULAR ECONOMY**



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source: www.bamb2020.eu/topics/blueprint/vision/



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TOPICS PARTNERS GET INVOLVED LIBRARY ABOUT BAMB CONTACT US

START TOPICS BLUEPRINT VISION



BUILDINGS AS MATERIAL BANKS: A VISION

Our growing cities are **constantly facing new needs** for qualitative housing, work, logistics and mobility. Still, buildings are often created with only one function in mind. When societal needs or user preferences change, these mono-functional buildings usually become out-dated or even obsolete, resulting in a high rate of building vacancy and premature demolition.

IMAGINE WHAT WOULD HAPPEN IF WE EMBRACED A WHOLE NEW VISION OF BUILDINGS: *BUILDINGS AS MATERIAL BANKS...*



MAJOR SYSTEMIC CHANGES



CHANGE IN DESIGN CULTURE



CHANGE IN VALUE DEFINITION



CHANGE IN COLLABORATION
ACROSS ALL ACTORS

CHANGE IN DESIGN CULTURE -
FROM MONO-FUNCTIONAL BUILDINGS TO MATERIAL BANKS

Generality
Reuse
Reversible
DESIGN
Upgradability
Deconstruction
Change
Disassembly
Adaptability



CHANGE IN DESIGN CULTURE - FROM MONO-FUNCTIONAL BUILDINGS TO MATERIAL BANKS

What is the reward in the long term?

TOWARDS a building stock characterised by:

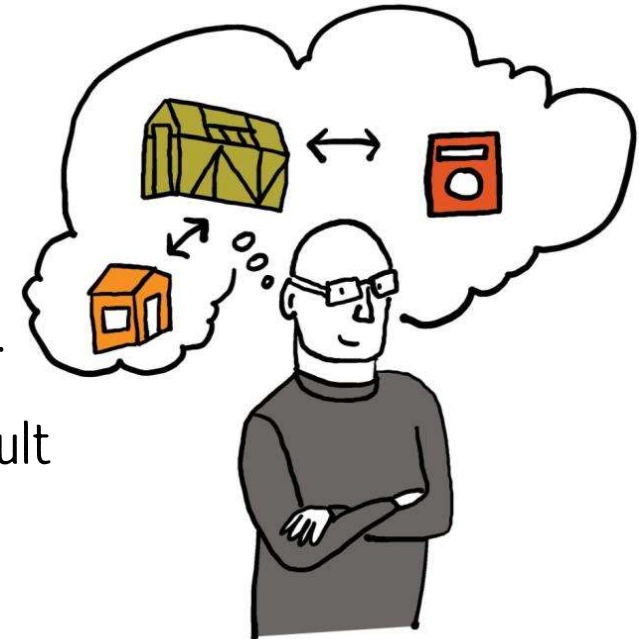
- **easy** maintainance and future transformations,
- **zero waste** construction and deconstruction activities
- **healthy** materials, using renewable resources where possible, while keeping non-renewable resources in high-quality material cycles



CHANGE IN DESIGN CULTURE - FROM MONO-FUNCTIONAL BUILDINGS TO MATERIAL BANKS

Why isn't it easy to initiate change today?

- The future role of building and product designers is unclear
- harmonisation process within the building industry is difficult
- Reversible Building Design is not rewarded today
- Product and building design are currently not aligned
- A lack of design guidelines and instruments



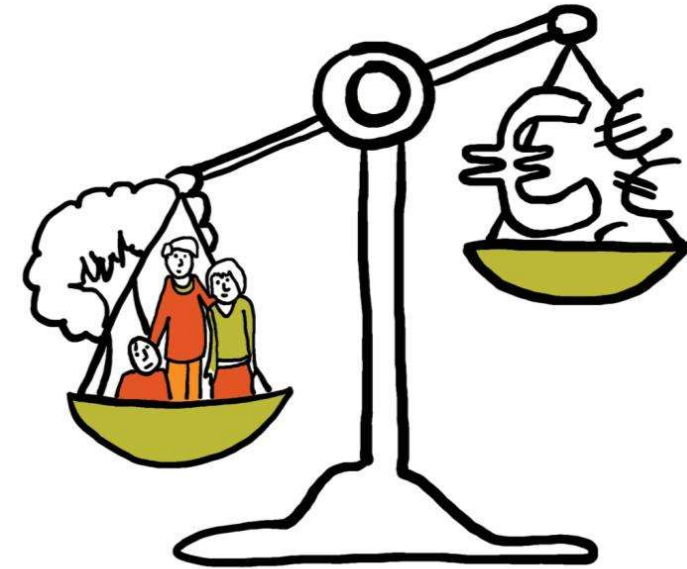
CHANGE IN DESIGN CULTURE - FROM MONO-FUNCTIONAL BUILDINGS TO MATERIAL BANKS

Leverages within the BAMB project?

- Development of design protocols for Reversible Buildings
- Development of BAMB Materials Passport Platform
- Learning by doing through Pilot projects
- Sensitizing through dissemination of practical information



CHANGE IN VALUE DEFINITION- FROM FINANCIAL COST & BENEFIT TO SOCIETAL ADDED VALUE



healthship
comfort usership pleasure
environment
ADDED-VALUE
fairtrade
wellbeing
services
resource-responsible
life-cycle

CHANGE IN VALUE DEFINITION- FROM FINANCIAL COST & BENEFIT TO SOCIETAL ADDED VALUE

What is the reward in the long term?

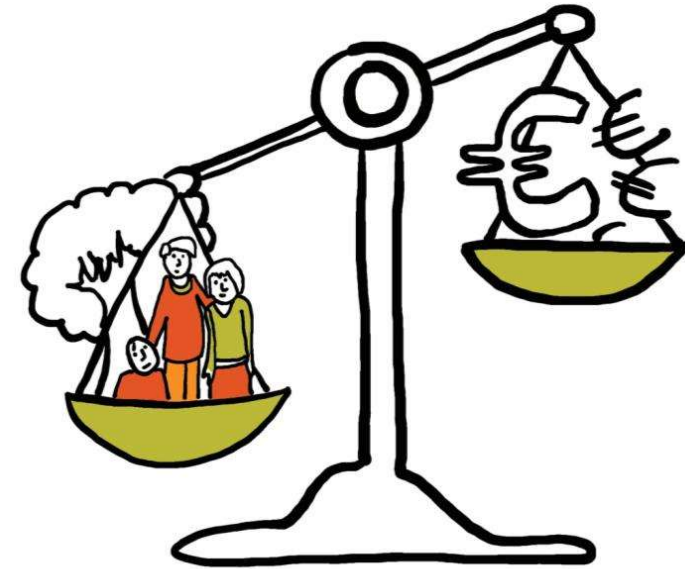
- TOWARDS a building stock gaining in real value
- TOWARDS buildings that have an overall positive impact
- TOWARDS safeguarding the future use of Earth's resources



CHANGE IN VALUE DEFINITION- FROM FINANCIAL COST & BENEFIT TO SOCIETAL ADDED VALUE

Why isn't it easy to initiate change today?

- lack of resources management and monitoring
- private ownership is stimulated in some EU member states
- lack of legal assistance and policy regulation
- lack of expertise on product service systems and financing
- Lack of decision-making instruments taking into account financial and societal costs and benefits together



CHANGE IN VALUE DEFINITION- FROM FINANCIAL COST & BENEFIT TO SOCIETAL ADDED VALUE

Leverages within the BAMB project?

- development of a circular building assessment method & proof-of-concept tool
- development of a framework of circular business models and operating models
- Learning by doing through Pilot projects



CHANGE IN COLLABORATION- FROM LINEAR SUPPLY CHAIN TO CIRCULAR VALUE NETWORK



BIM
passports
augmented-intelligence
DATA
trust
tracibility
value
learning

CHANGE IN COLLABORATION- FROM LINEAR SUPPLY CHAIN TO CIRCULAR VALUE NETWORK

What is the reward in the long term?

- TOWARDS digital storage & exchange of building information
- TOWARDS traceable information on the history and current use of building components and materials
- TOWARDS cognitive buildings, monitoring building performance and user behaviour



CHANGE IN COLLABORATION-

FROM LINEAR SUPPLY CHAIN TO CIRCULAR VALUE NETWORK

Why isn't it easy to initiate change today?

- Lack of alignment and standardisation regarding Building Information Modelling
- Augmented Intelligence within the built environment is still in its infancy
- Reclaimed building products may require different certification strategies, in order to not destroy valuable informal initiatives



CHANGE IN COLLABORATION- FROM LINEAR SUPPLY CHAIN TO CIRCULAR VALUE NETWORK

Leverages within the BAMB project?

- development of a BAMB Materials Passport Platform
- proof-of-concept for Circular Building Assessment with possibility to couple it with Building Information Modelling
- Learning by doing through Pilot projects





BAMB
BUILDINGS AS MATERIAL BANKS

WHAT NEEDS TO BE DONE AFTER BAMB?

MAJOR SYSTEMIC CHANGES



CHANGE IN DESIGN CULTURE



CHANGE IN VALUE DEFINITION



CHANGE IN COLLABORATION
ACROSS ALL ACTORS

LEVERAGES TO SUPPORT...



CHANGE IN DESIGN CULTURE

ALREADY IDENTIFIED SHORT-TERM OR LONG-TERM LEVERAGES

- **Open industrialisation (L)**, in which standardisation agreements concerning modular dimensions of components and connections are made within the entire building sector
- **additive manufacturing techniques (S-L)**, such as 3D printing, to democratize the production and remanufacturing of building components, with lower labour costs, less waste and shorter construction periods.
- **Large scale demonstration and ‘first-of-its-kind’ projects (S)**, in which additive manufacturing and open building systems are combined for change-supporting and circular buildings.
- **life-long learning initiatives (S-L)**, including practical design and construction guidelines, assessment and decision-making instruments, the use of Materials Passports and BIM, as well as experiences from up-to-date good and bad practices

ALREADY IDENTIFIED SHORT-TERM OR LONG-TERM LEVERAGES

- long term 'Design-Build-Maintenance-Transform' contracts (S) through which building creators (architect, engineers and contractors) will actually manage the design transformation activities,
- sensitizing the community (S) on the need for circular and reversible building design, and disseminating practical information (S) amongst building professionals
- Inspire building and product designers through public procurement (S-L), supporting reversible and circular building solutions

LEVERAGES TO SUPPORT...



CHANGE IN VALUE DEFINITION

ALREADY IDENTIFIED SHORT-TERM OR LONG-TERM LEVERAGES

- Internalization of **external environmental and social costs and benefits** in prices of building (product) solutions (L) as an effective instrument to sensitize stakeholders- in particular (end) users
- A framework for the development of **circular business models (S)** helping business developers and end users to take into account financial, social and environmental value creation through different kinds of **product service systems** and different contexts.
- **Alternative financial models (S-L)** covering risks related to shared ownership and big scale investment in circular and reversible building solutions
- **Sensitize different target groups (S)**, among which building users , on the potential benefits and drawbacks reversible and circular building solutions could provide them.

ALREADY IDENTIFIED SHORT-TERM OR LONG-TERM LEVERAGES

- Inspire building professionals and project developers through **public procurement (S-L)**, to adopt reversible and circular building solutions
- **Large scale demonstration and 'first-of-its-kind' projects (S)**, in which change-supporting and circular building solutions support experiments with circular business models and upfront capital costing.

LEVERAGES TO SUPPORT...



CHANGE IN COLLABORATION
ACROSS ALL ACTORS

ALREADY IDENTIFIED SHORT-TERM OR LONG-TERM LEVERAGES

- Harmonization (S) of the structure and data quality of Materials Passports, in order to make different Materials Passports Platforms complementary to each other, instead of competing with each other.
- Development of common European standards for BIM (S), specifying methodologies to define, describe, exchange, monitor, record and securely handle asset data (cf. CEN/TC 442)
- Gradually making the use of BIM mainstream, by enforcing it through **stepwise regulation (S-L)**: from publicly funded toward private building projects; from new construction towards refurbishment
- Development of quick-scan instruments (S-L) for new as well as existing buildings to characterize the material composition of existing buildings, allowing building professionals to better repurpose the building and its components.



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WHAT ROLE CAN DIGITALIZATION PLAY?



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