

H2020 DRIVE 0 Project

Driving decarbonization of the EU building stock by enhancing a consumer centred and locally based circular renovation process

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Jeffrey Cook Workshop,
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Ben-Gurion University, Beer Sheva, Israel



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H2020 DRIVE 0 Project

‘Driving decarbonization of the EU building stock by enhancing a consumer centred and locally based circular renovation process’

- **Duration:** 1 Oct 2019 – 31 Sep 2023
- **Call for proposal:** H2020-LC-SC3-EE-1-2018
- **Topic:** Decarbonisation of the EU building stock: innovative approaches and affordable solutions changing the market for buildings renovation
- **Funding scheme:** IA – Innovation action





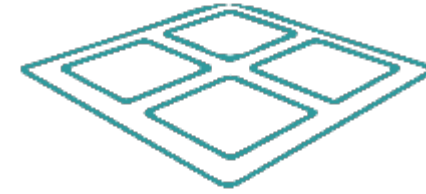
Circularity in the building sector - Materials



Interface



Component

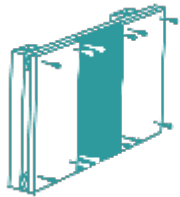


Composition



Material

Safe
Bio-based
Renewable
Upcycable



Element

Reversible
Simplicity
Fast

Compatible
Life span
Handable

Independent
Layered
Prefabricated



Building

Reversible

Expandable

Versatile



Renewable environmentally friendly materials



















Example for **biobased** materials: open source BioFab Forum

<https://biofabforum.org/>

Powered by Glimps. Communities

BioFab Forum Sign Up Log In

all categories ▾ **Categories** Latest

Category	Topics	Latest
Introductions & Social  Introduce yourself and your projects, talk about hobbies and life things or share funny cat videos!	67	 Welcome to Discourse 0 Dec '18
Manuals & Guides  The "Manuals & guides" sections groups all tried-and-tested manuals and hints, valuable discussions and a good starting point for beginners and experts alike who want to learn new biofabrication knowledge.	25	 How do I grow mushroom leather? 4 2h  Biomaterials
Biomaterials  This category is intended for discussion about all kinds of biomaterials and related topics such as colouring, recipes, processing techniques, production techniques etc.	186	 Intro to the world of fungal- and biomaterials by Jason Padvorac 0 7d  Manuals & Guides
Bioremediation	3	 Alternative for hemp in growing mycelium material 6 Oct 7  Biomaterials
		 3D printing materials 8 Sep 30  Biomaterials
		 Mushroom Meat Allast Ecovative Patented 3 Sep 26  Biomaterials
		 I'm back 1 Sep 26  Biomaterials
		 Acoustic panel from mycelium thesis 2 Sep 25  Biomaterials



Upcycable

Upcycling is recycle at an **equivalent quality level** as original.
For example, loose insulation material made from the corks of wine bottles.



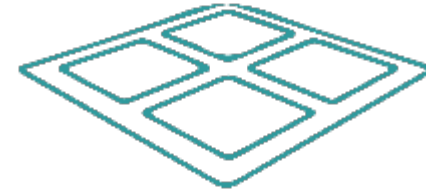
Circularity in the building sector - Elements



Interface



Component

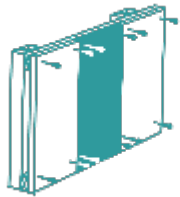


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System 1: Construclick
<http://www.facadeclick.be>



System 2: Facadeclick
<http://www.facadeclick.be>



System 3: Systimber
<https://www.systimber.com>



System 4: Clickbrick
<http://www.daasbaksteen.com>



System 5: Steko
<https://www.steko.ch>



System 6: Facatile
<https://www.wienerberger.be>

Simplicity.....



Bolts



Screws



Magnets

....and reversibility



Reversible connections



Bolts

+ strong, can be reused
- size, cost



Screws

+ easily removable
- limited reuse



Magnets

+ keeps component whole
- structurally weaker



Semi-reversible connections



Nails

+ speed of assembly
- difficult to remove



Rivet

+ speed of assembly
- difficult to remove



Staple

+ speed of assembly
- difficult to remove



Irreversible connections



Glue

+ strong and efficient
- difficult to separate



Welding

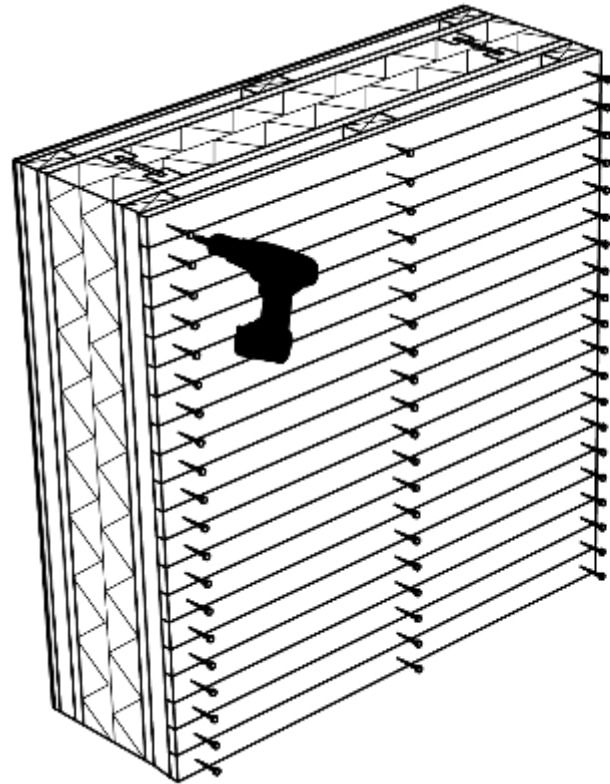
+ strong
- impossible to separate



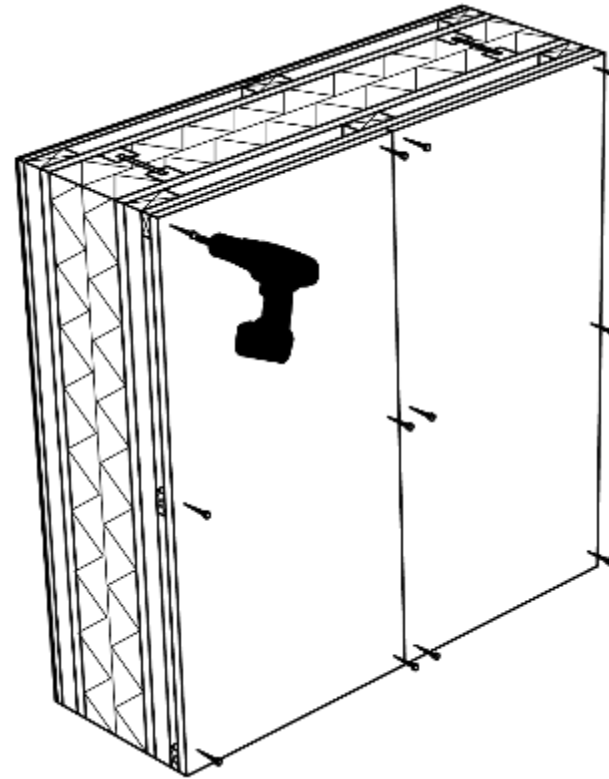
Cement mortar

+ strong
- difficult to separate

Fast



= 60 x



= 12 x



Handable and managable

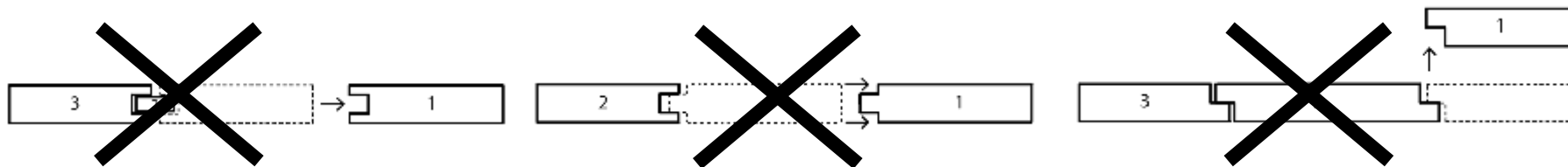
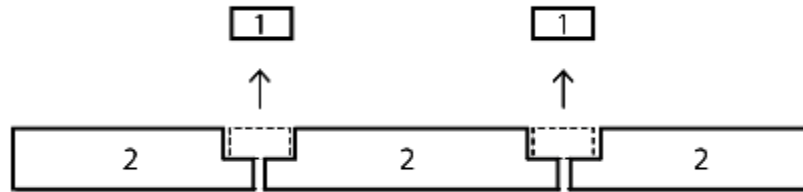
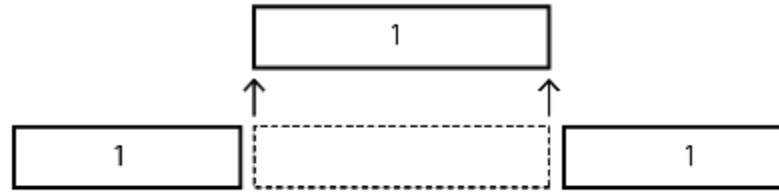


H2020 MORE-CONNECT pilot Tallinn, Estonia: Large and heavy boards are very demanding to install

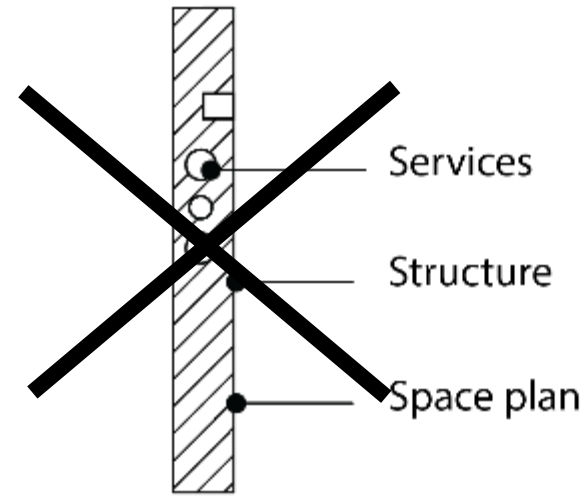
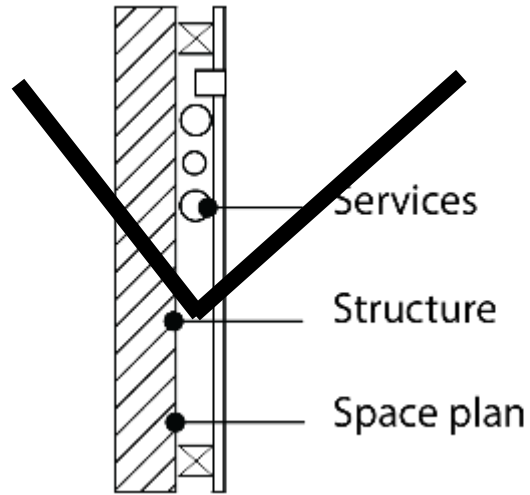
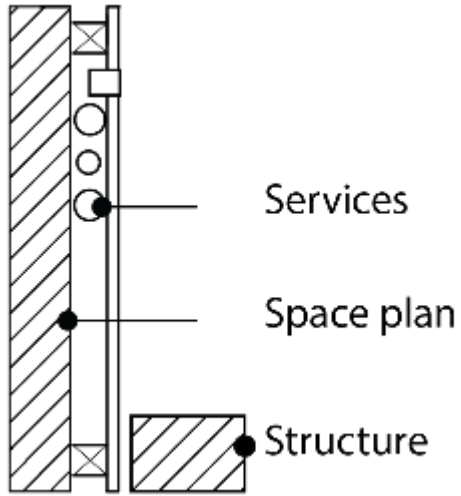


H2020 MORE-CONNECT pilot Arnhem, The Netherlands: Smaller and lighter boards, easier to handle

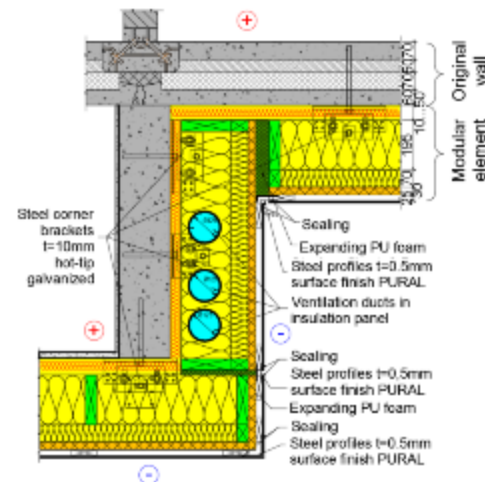
Independent



Layered

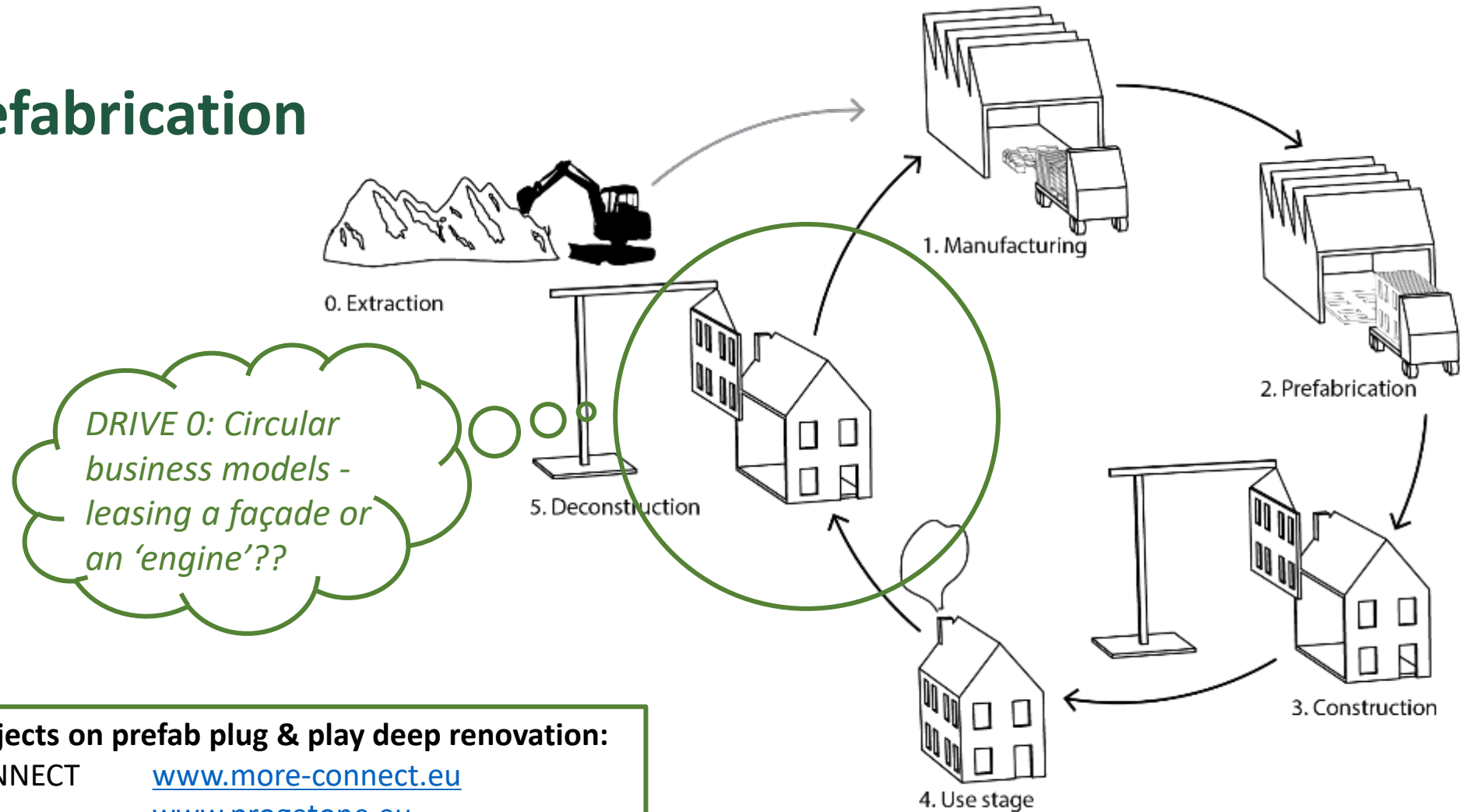


Example integrated multi-functional façade H2020 MORE-CONNECT (Pilot Estonia)



Concrete core activation

Prefabrication



H2020 projects on prefab plug & play deep renovation:

- MORE-CONNECT www.more-connect.eu
- ProGETonE www.progetone.eu
- P2Endure www.p2endure-project.eu
- 4RinEU <http://4rineu.eu/>
- BERTIM www.bertim.eu



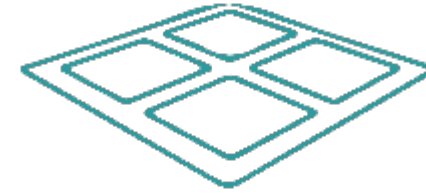
Circularity in the building sector - composition



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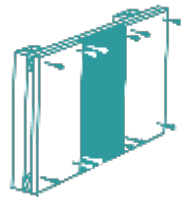


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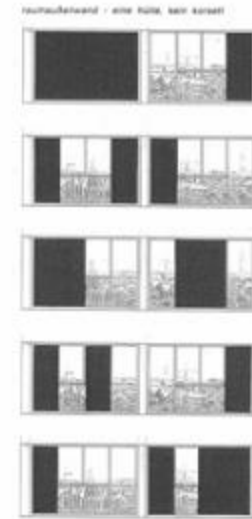
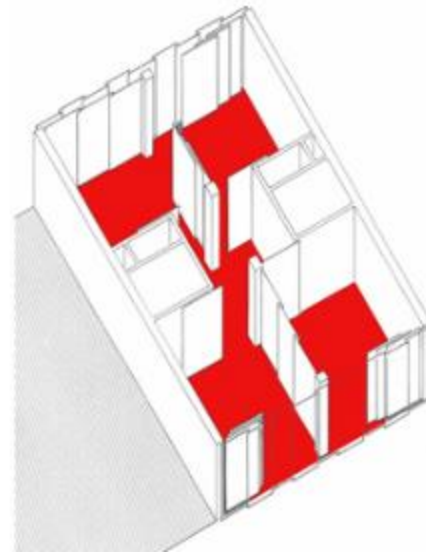
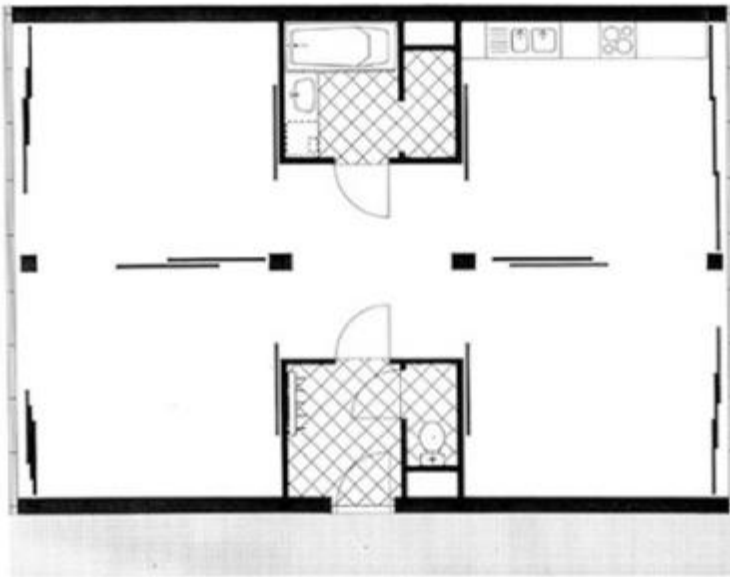
Reversible



Expandable and flexible Modularity

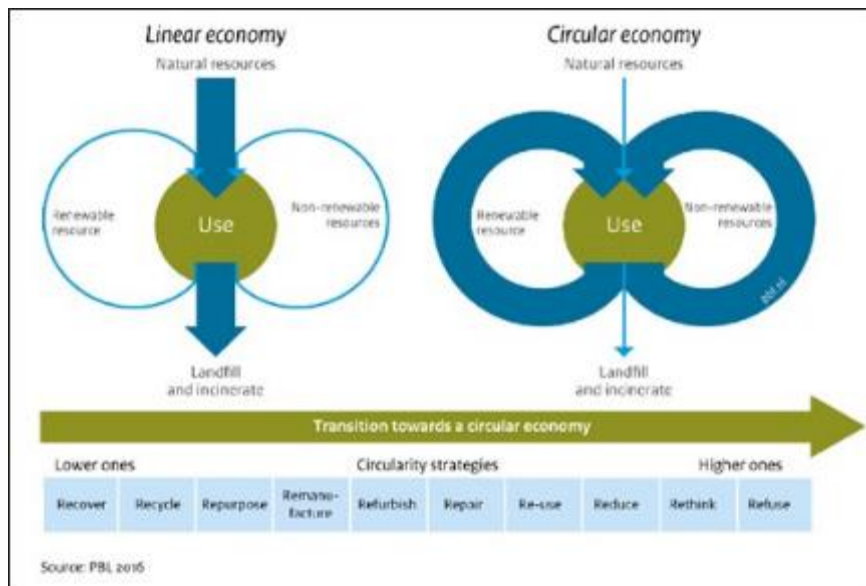


Versatile Multi-deployable



Drive 0: How can we apply this and go towards circular renovation?

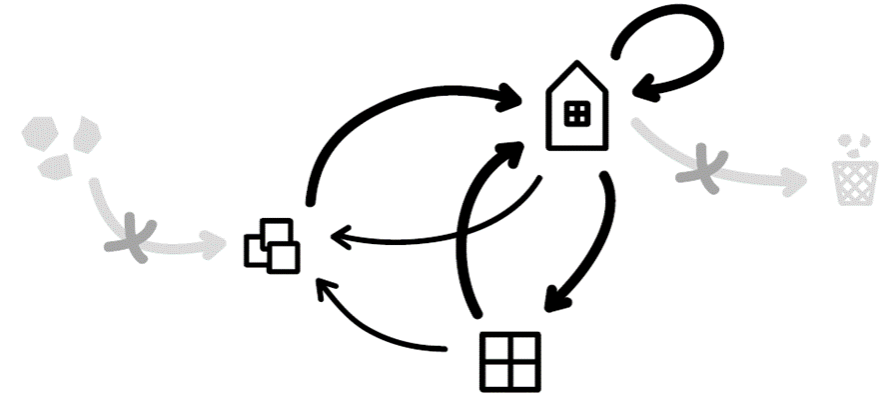
Definition: A **circular deep renovation**, which contributes to a circular built environment, is based on **100% life cycle renewable energy**, and all materials used within the system boundaries are part of **infinite technical or biological cycles** with **lowest quality loss** as possible.



The transition from a linear economy to a circular economy based on the 10-R model

The DRIVE 0 Approach

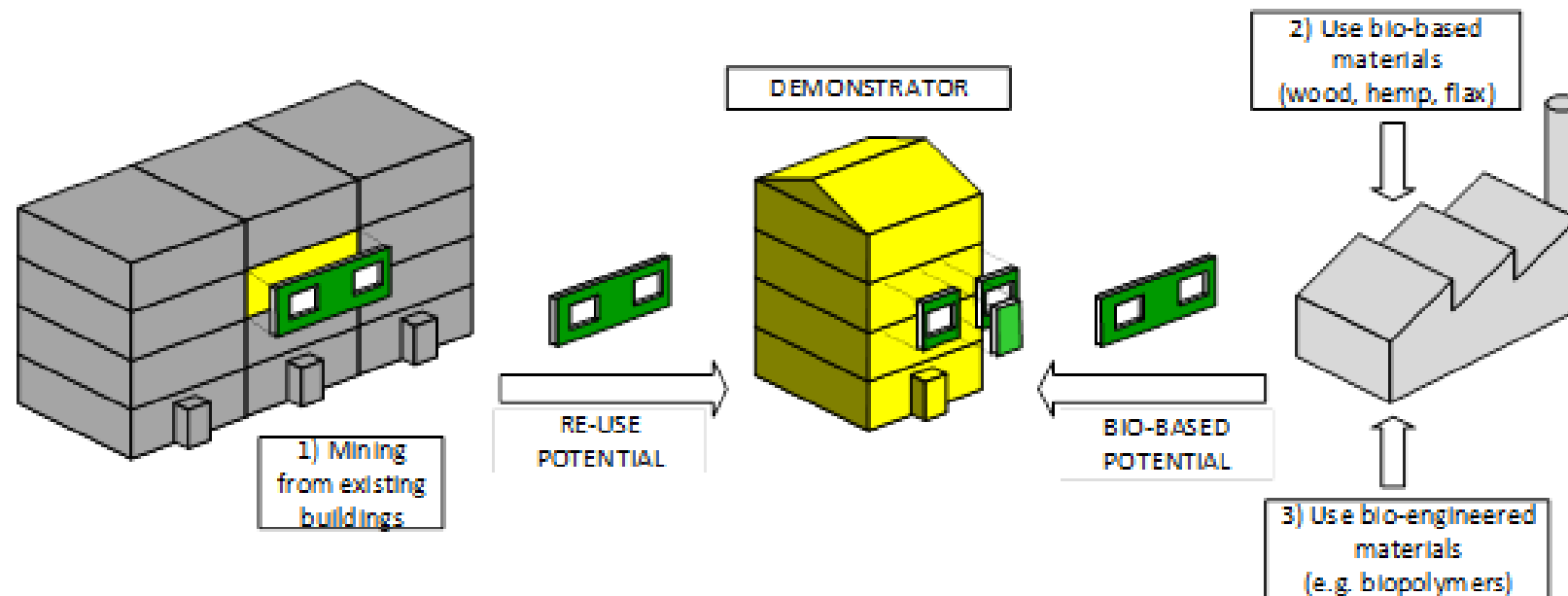
1. Market ready renovation products & concepts
→ *circular renovation products & concepts*:
 - Based on local availability;
 - Use of bio based materials and components;
 - Emphasis on modular plug & play prefab solutions for building envelope elements and services;
 - Automated BIM controlled production processes.
2. Developing attractive *consumer centred business models* based on circular renovation concepts.
3. Providing occupants with *attractive and understandable* information on building performances in use.
4. Providing relevant stakeholders evidence of performance of the developed DRIVE 0 solutions by *local study and demonstration cases* initiated by 'local drivers'.



Conceptual model of DRIVE 0 circular deep-renovation solutions

DRIVE 0 focuses on the following three strategies of developing and implementing (scaling up) of circular deep renovation solutions for the existing housing stock:

1. *re-using and recycling locally available materials by urban mining;*
2. *using renewable environmentally friendly materials;*
3. *using bio-based engineered materials.*



Solutions to be further circular developed in the Drive 0



WEBO Scaffold free facade



TIMBECO prefab construction



Factory 0 compact installation kits



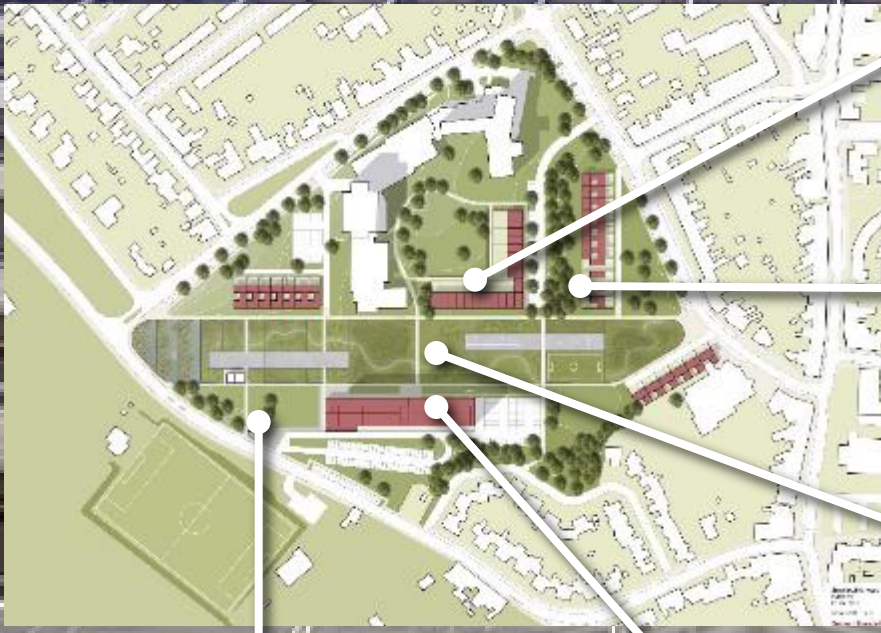
ALIVA Alucovering facade



Can we do it? Yes we can!

A practical example: The Super Circular Estate project (SUPERLOCAL)
Bleijerheide, Kerkrade, The Netherlands

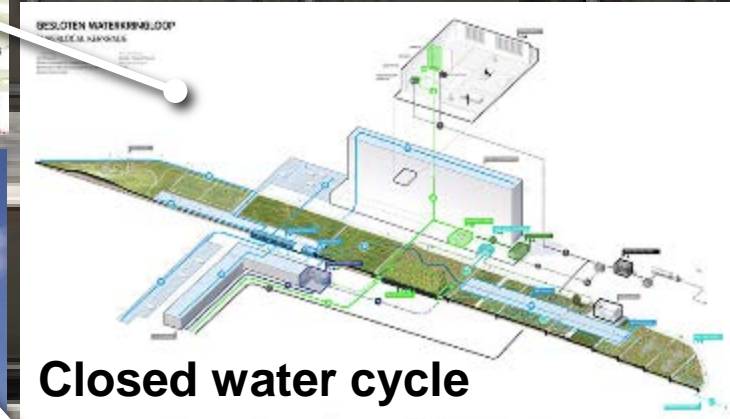




Upscaling:
20 single-family dwellings



Pilot: 3 dwellings



Closed water cycle



Experiment: Expo building



Renovation apartment building

EXPO-building



Fenix-3 pilot 3 circular dwellings

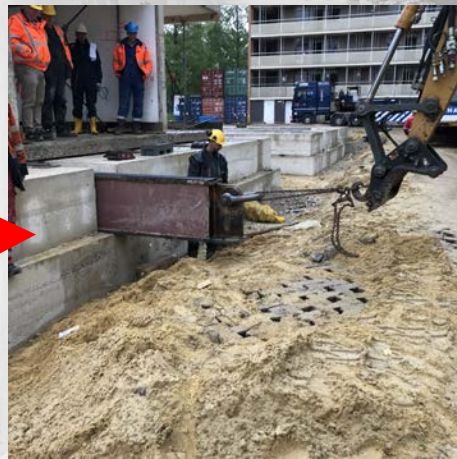
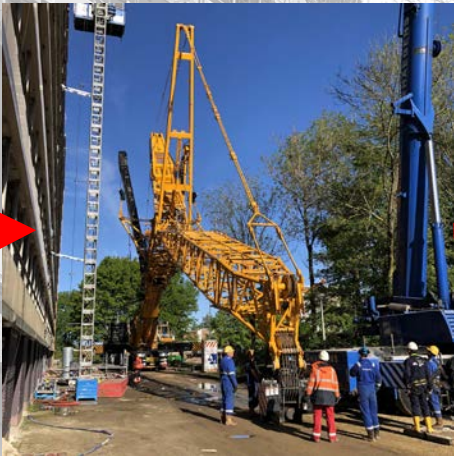




Zuyd
Research

ZU
YD





Can we do it alone? No, collaboration is the key!

Want to join the action?

Then join our **Drive 0 Stakeholders Advisory Board!**

Approach us during the break or write us to get more info: info@drive0.eu





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www.ace-cae.eu

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Housing Europe
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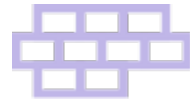
Zuyd Hogeschool

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www.zuyd.nl/



תודה על תשומת הלב





Thank you for your attention.

Any questions?



Feel free to contact us later

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