



Circular (de)construction in the Superlocal project

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Content of this presentation

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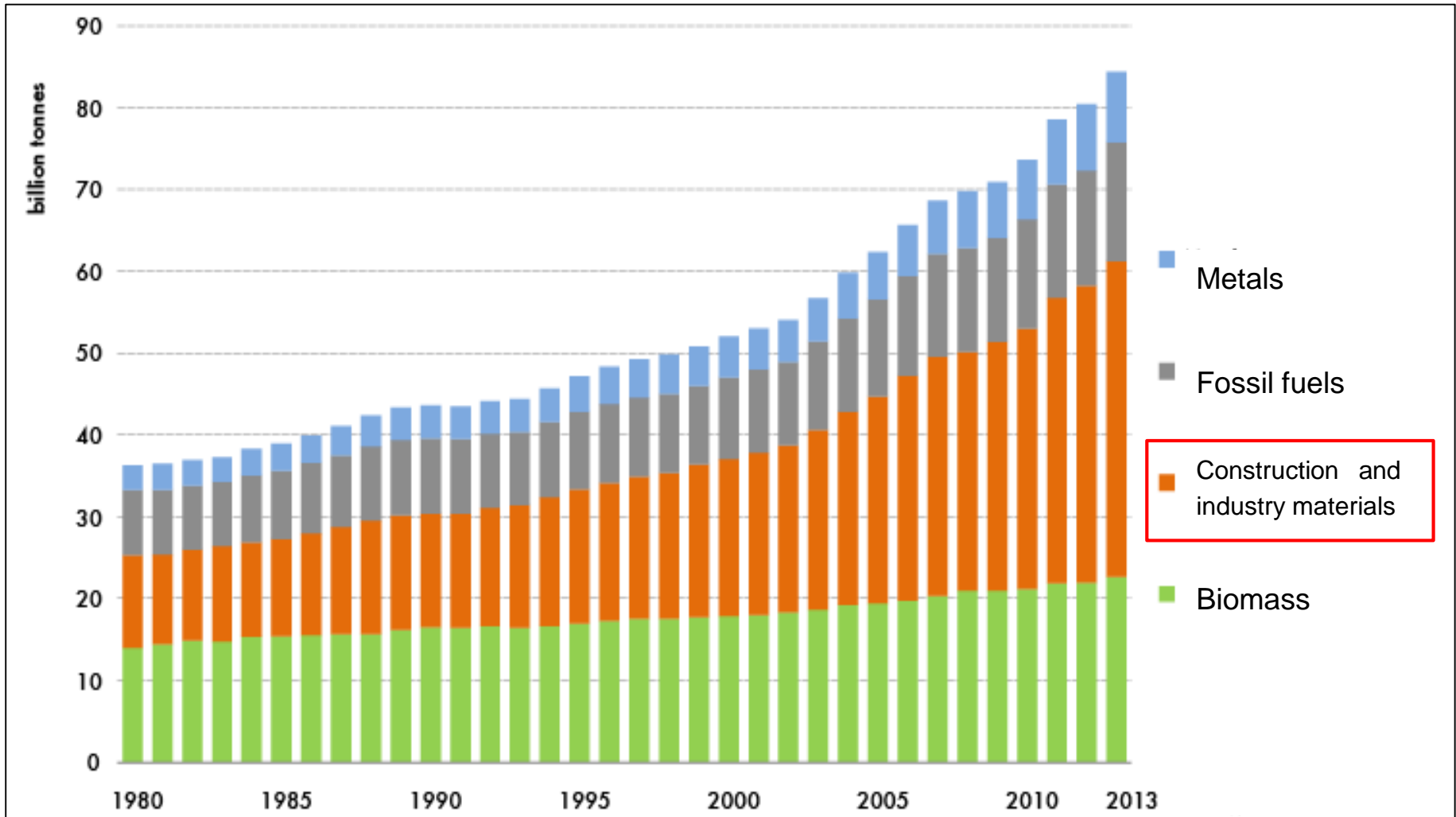


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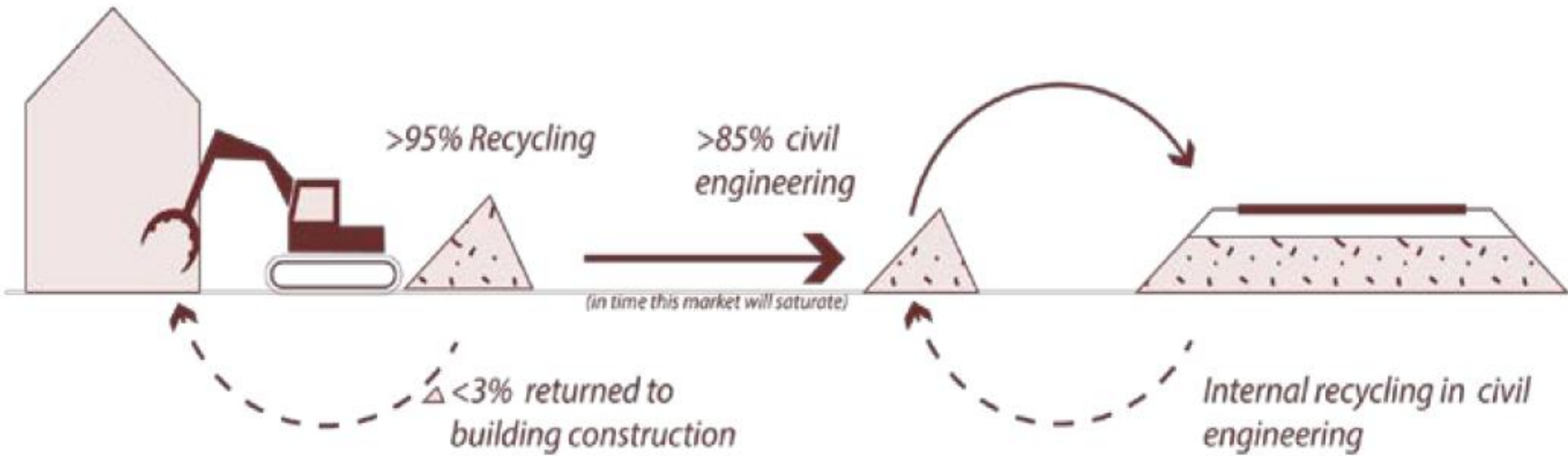
*A **circular built environment** is based on **100% life cycle renewable energy**, and all materials used within the system boundaries are part of **infinite technical or biological cycles** with **lowest quality loss as possible*** Ritzen, 2017.



Background

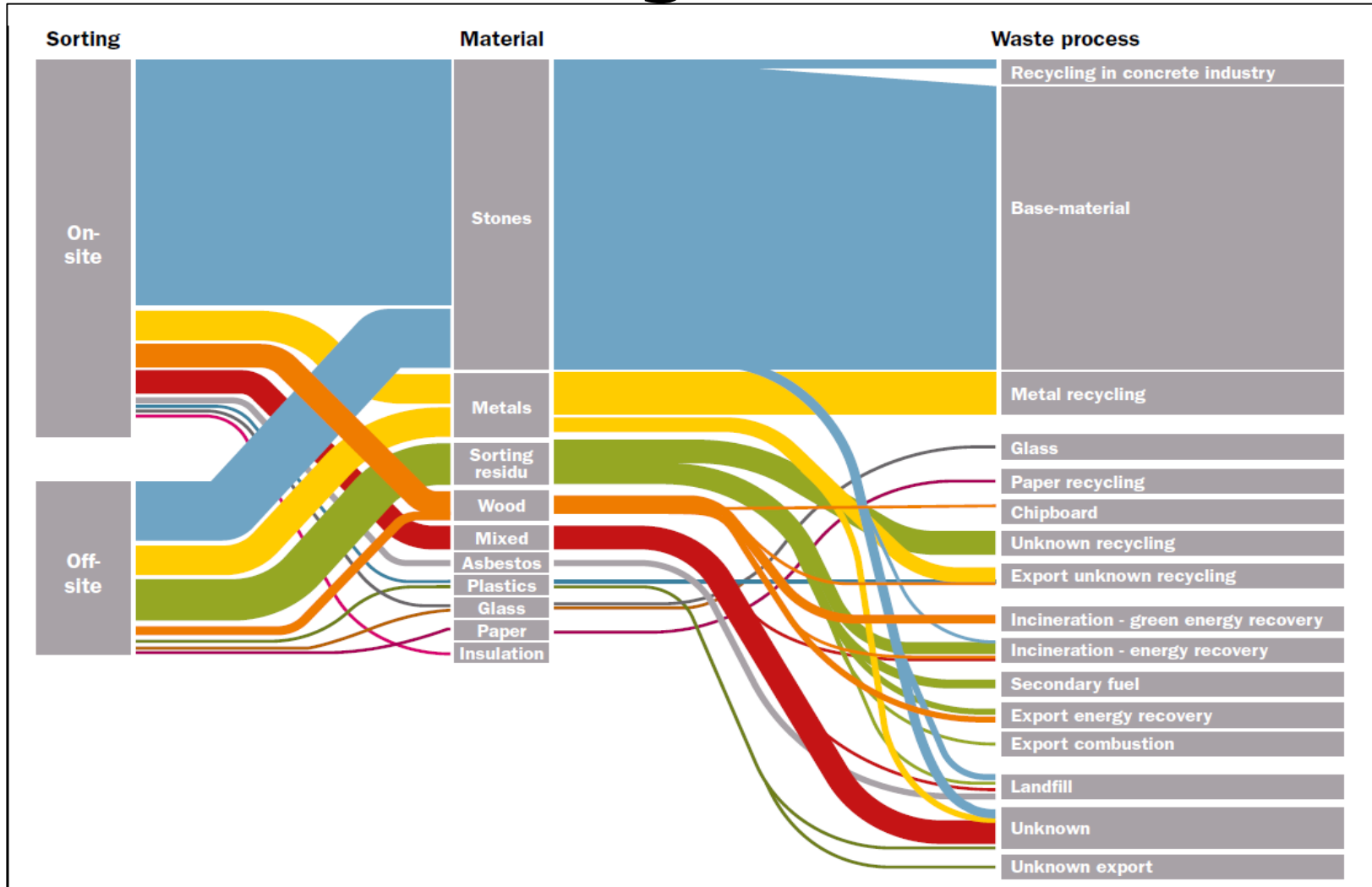


Background



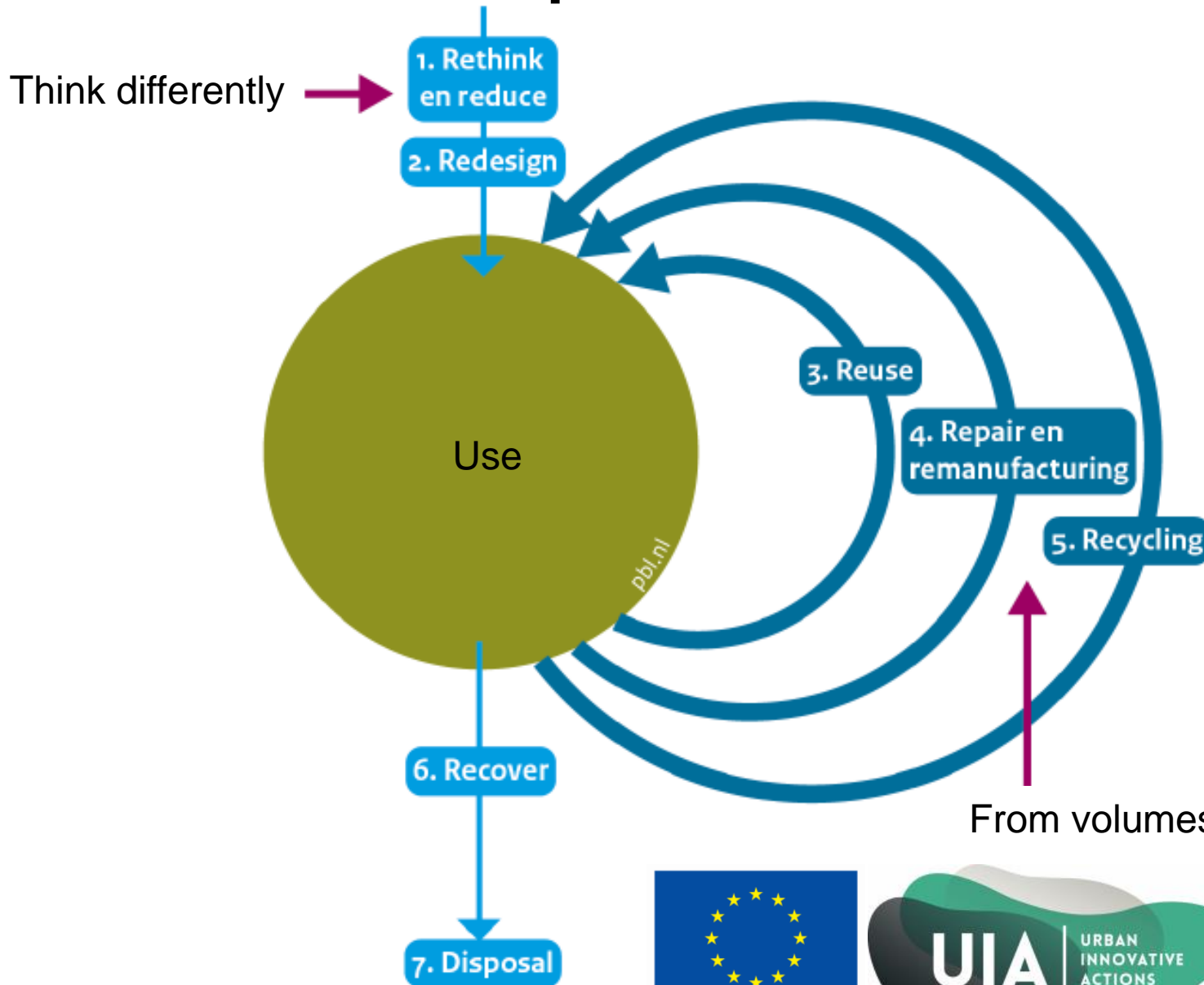
Only 3% of construction materials are recycled in the Netherlands.

Background





Superlocal



From volumes to values

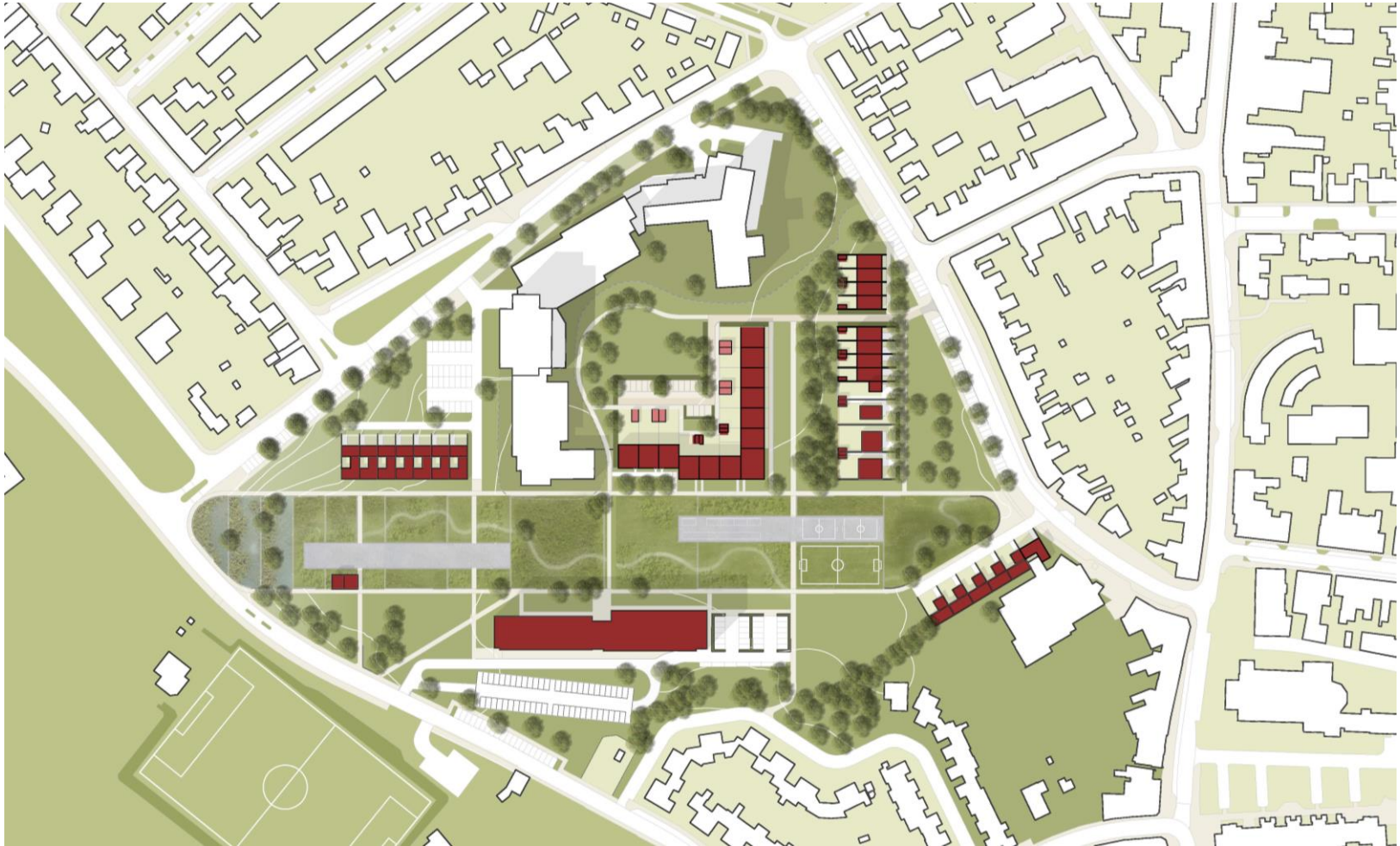


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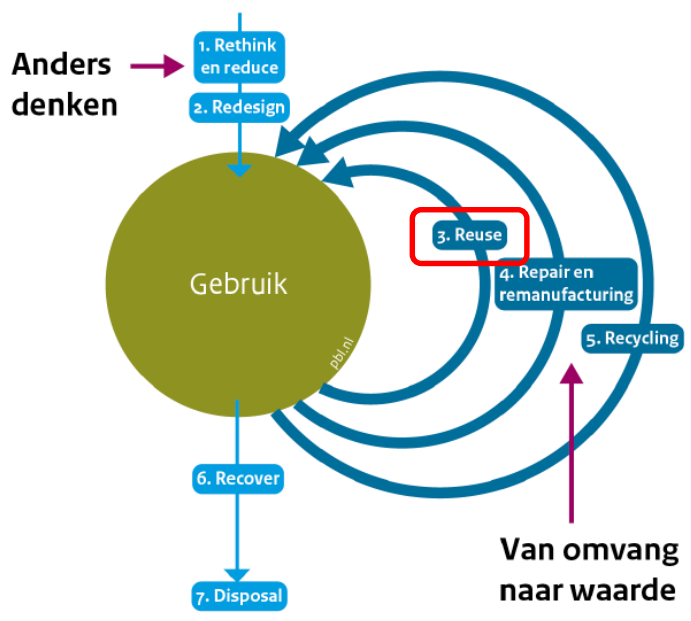
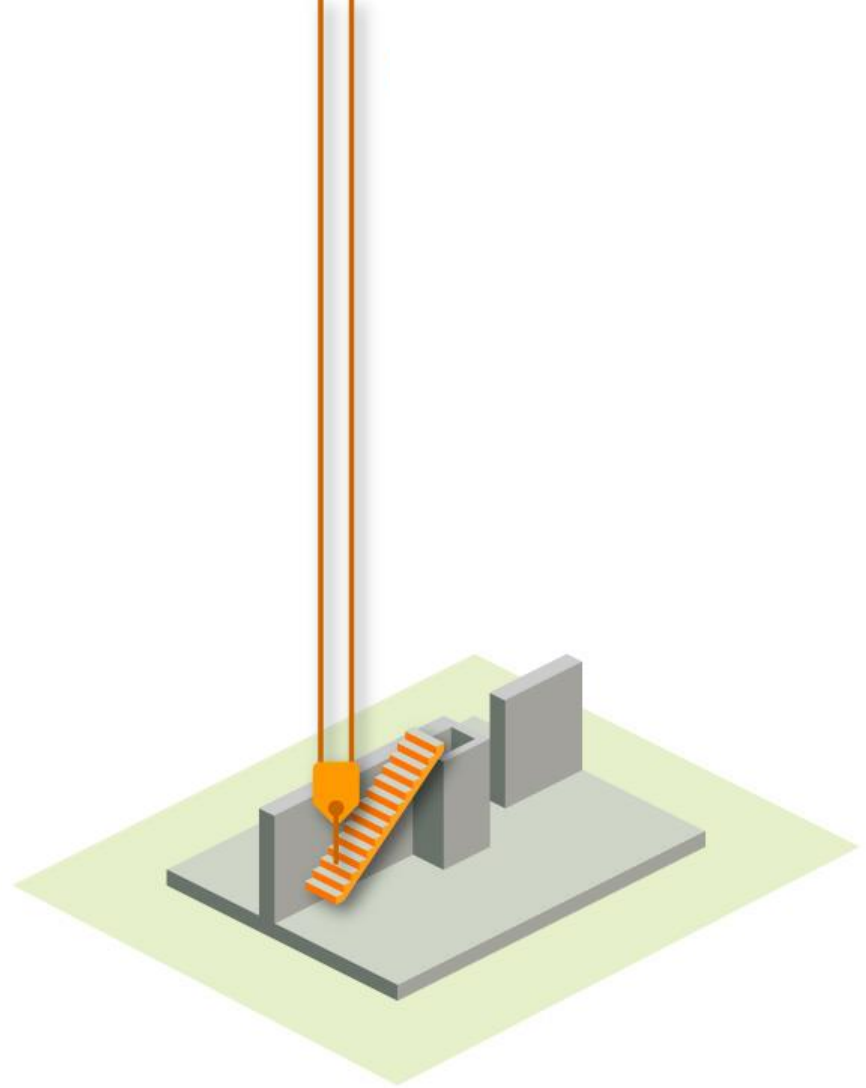
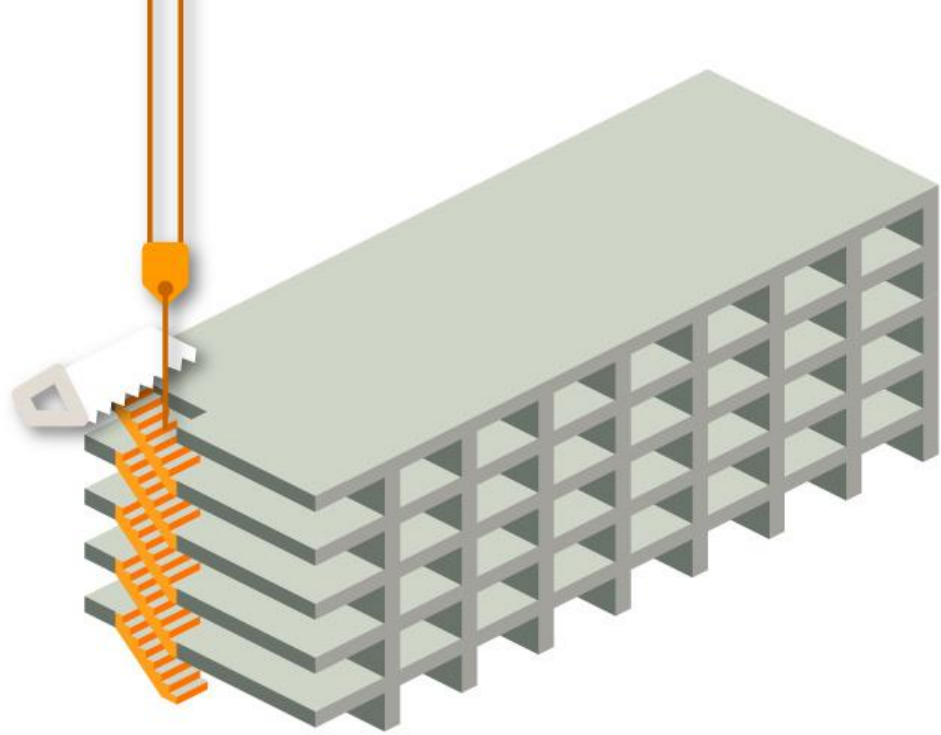
Superlocal

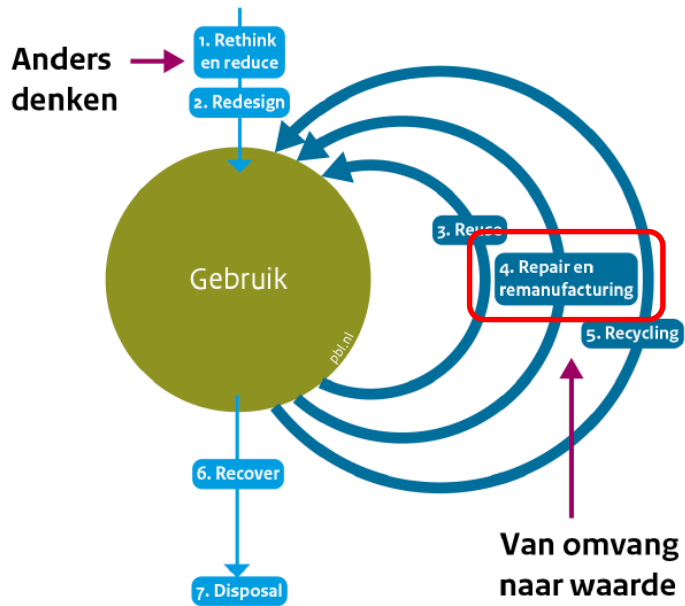
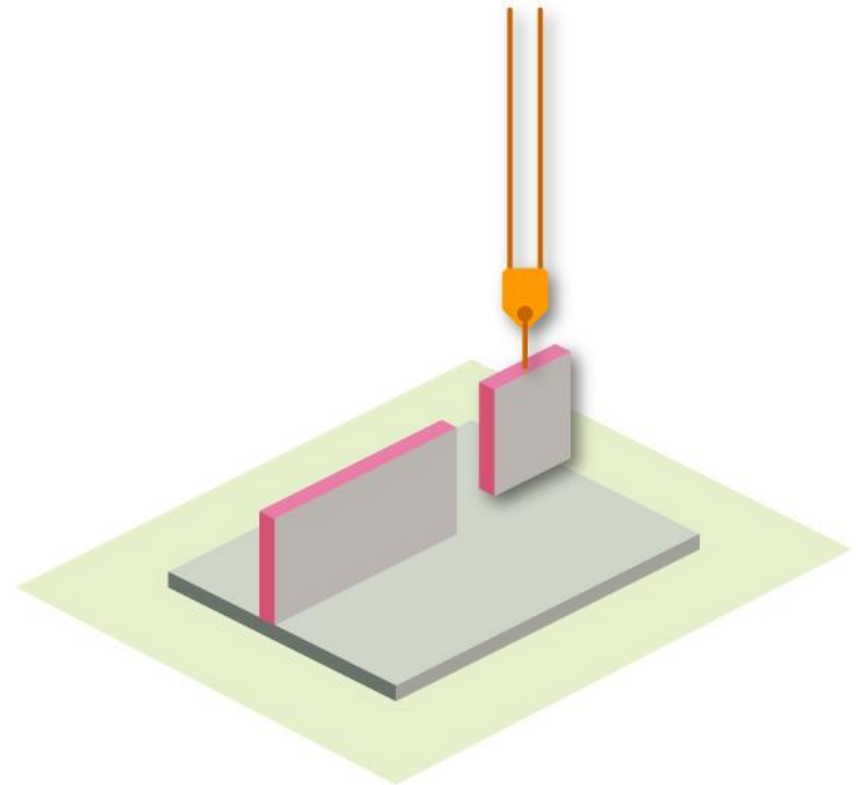
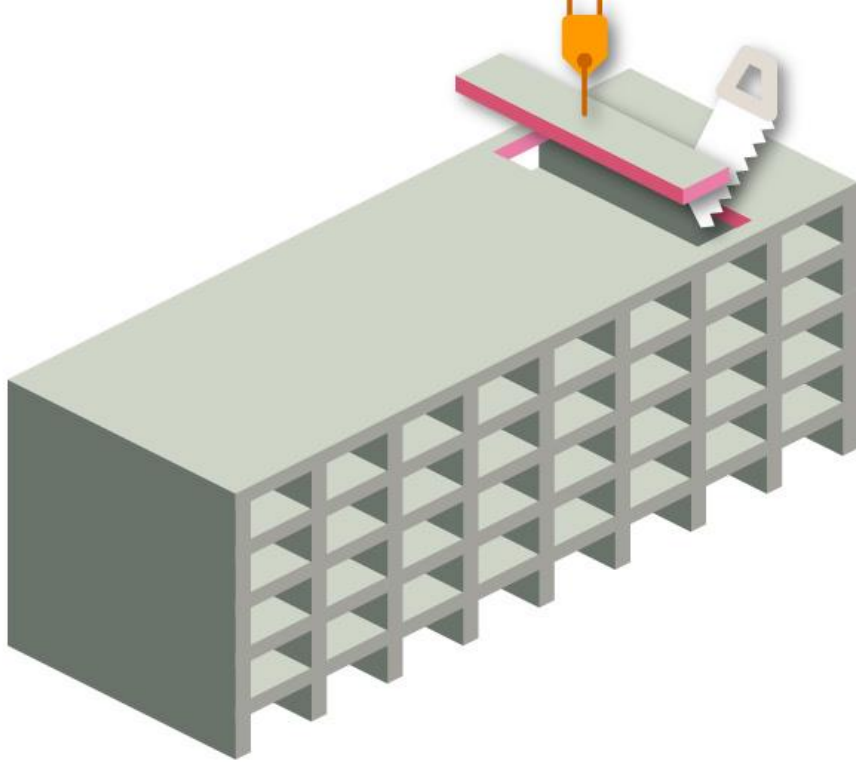


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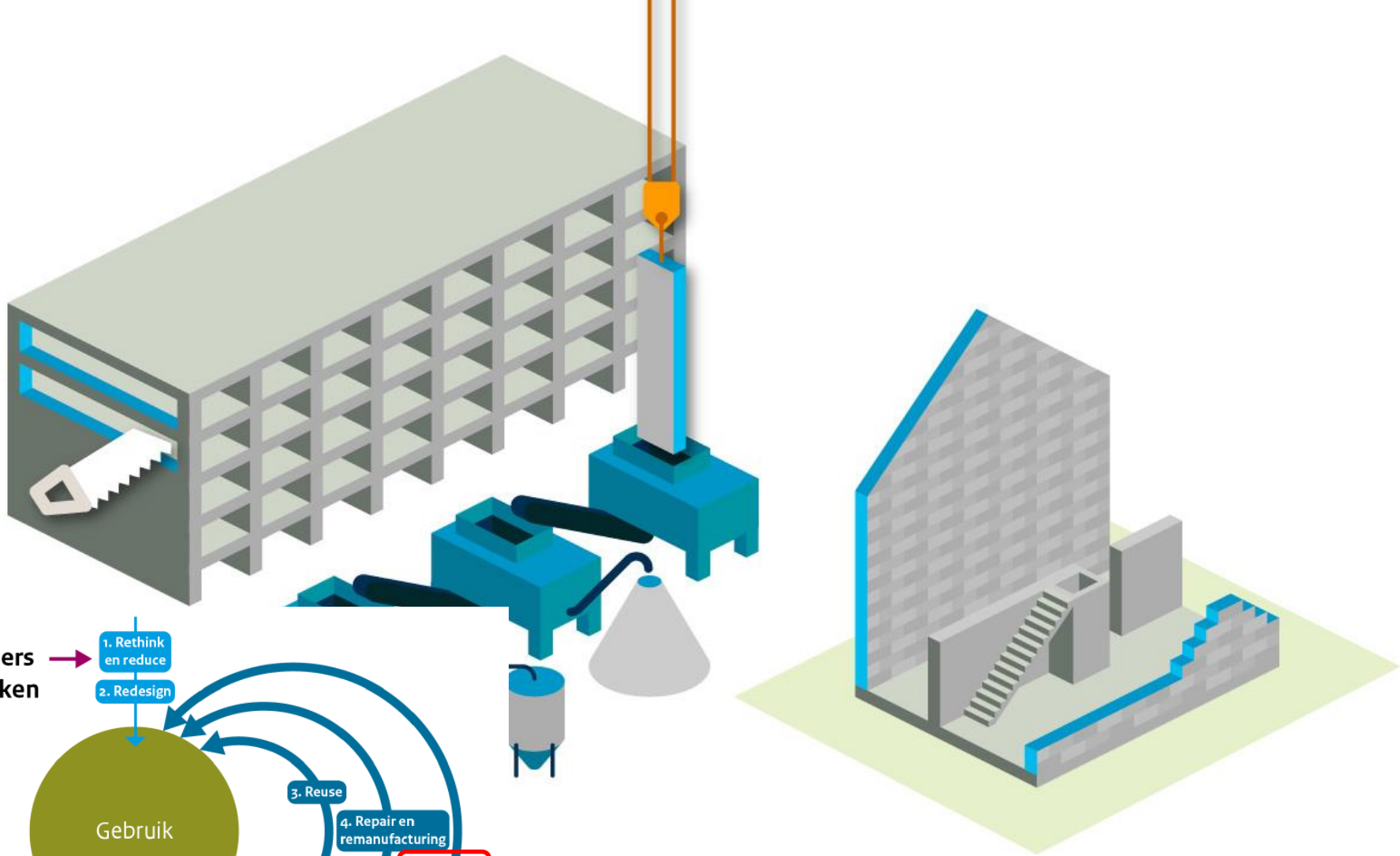


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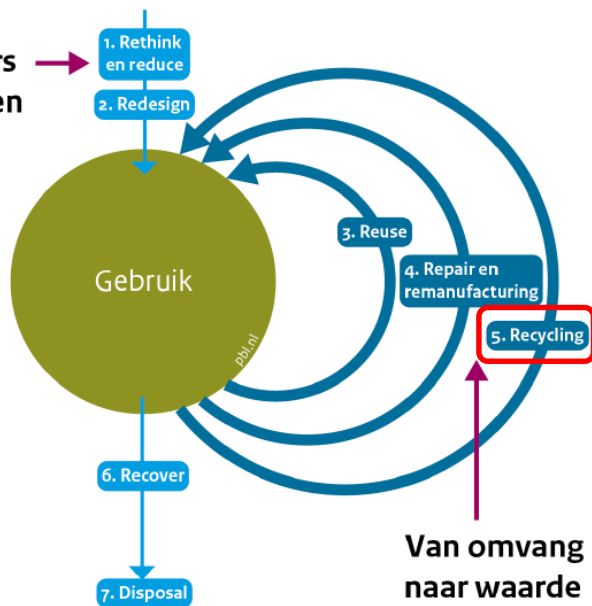




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Anders denken



Van omvang naar waarde



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Apartment building

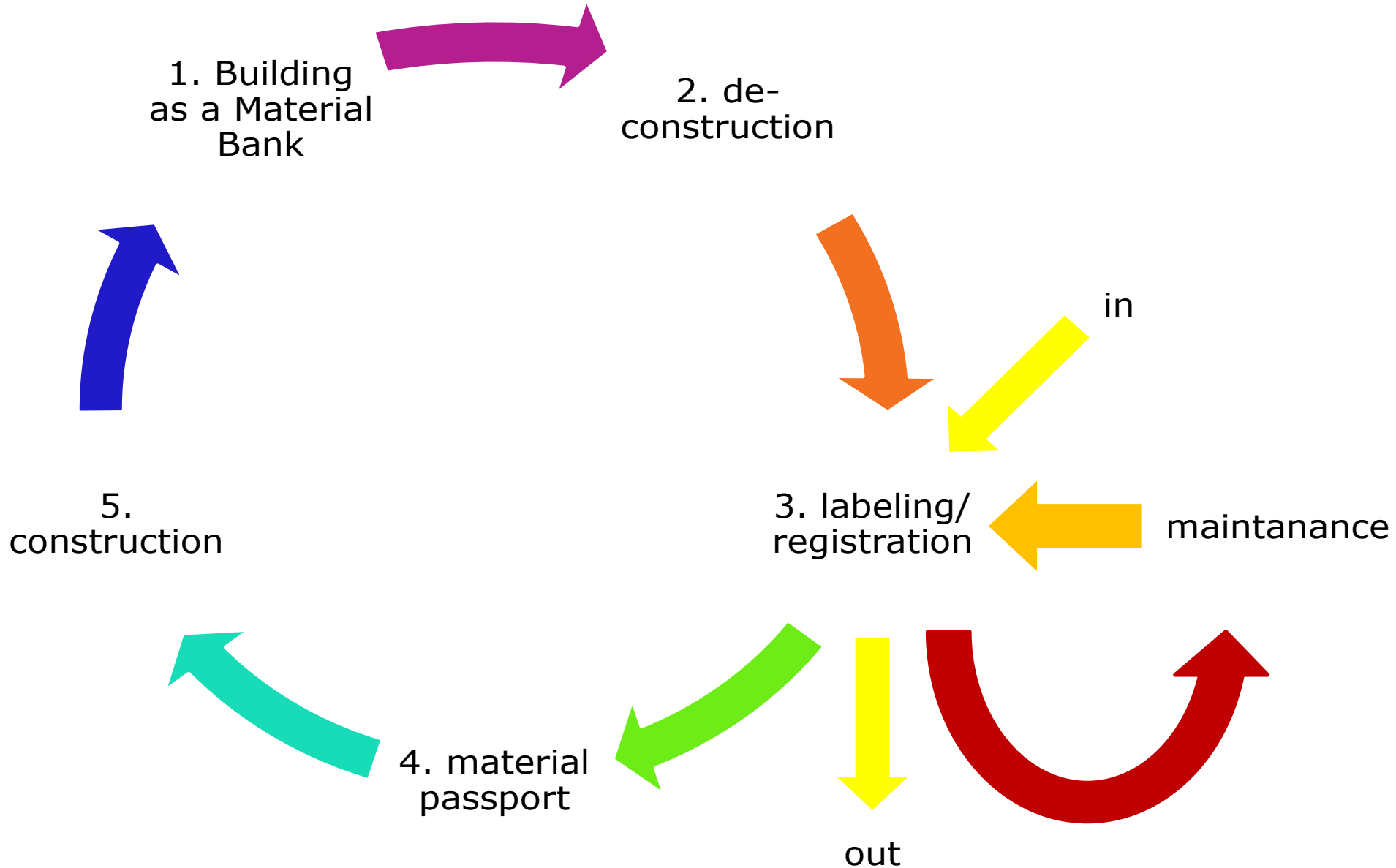


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Apartment building



Apartment building

material	quantity (ton)	embodied energy (GJ)	embodied CO2 (ton)	shadowcosts (€)
aluminium	1.03E+01	1.59E+03	8.45E+01	2.11E+03
asbestos	1.81E+02	1.34E+03	2.82E+02	7.05E+03
divers	1.78E+01	2.97E+02	6.23E+00	1.56E+02
ceramique elements	4.40E+01	5.50E+02	3.41E+01	8.52E+02
concrete	1.30E+04	1.33E+04	1.97E+03	4.93E+04
copper	7.45E+00	1.52E+02	9.81E+00	2.45E+02
glass	1.75E+01	4.26E+02	2.56E+01	6.40E+02
masonry	6.38E+01	1.92E+02	1.47E+01	3.67E+02
plastics	1.24E+01	1.00E+03	3.50E+01	8.74E+02
steel	3.26E+02	3.79E+03	3.00E+02	7.50E+03
natural stone	6.05E+01	5.12E+00	2.96E-01	7.40E+00
timber	7.15E+01	6.64E+02	1.00E+02	2.50E+03
total	1.38E+04	2.33E+04	2.87E+03	7.16E+04



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Housing unit

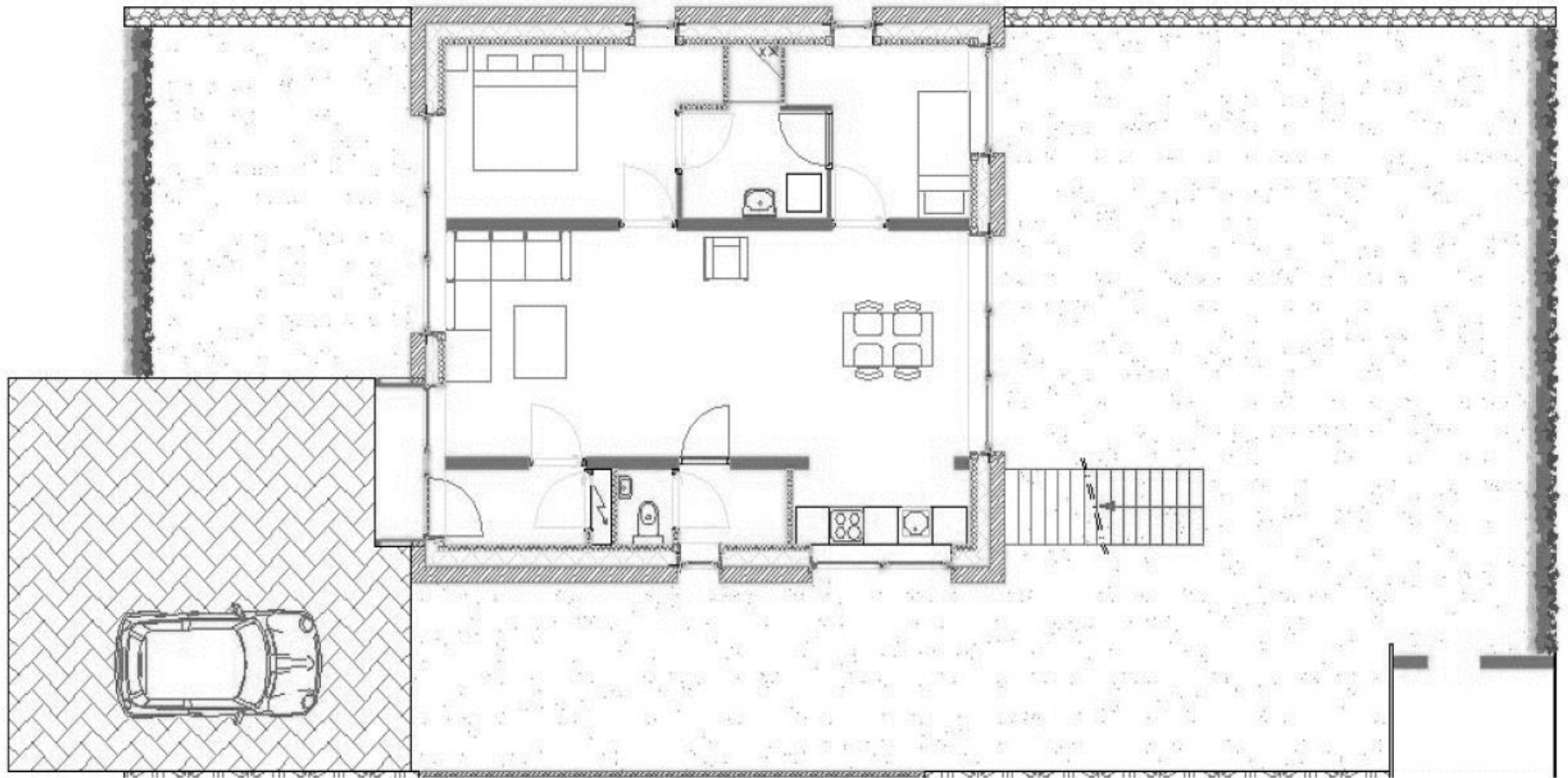


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Housing unit



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Housing unit

Material	Quantity (ton)	Embodied Energy (GJ)	Embodied CO2 (ton)	Shadowcosts (€)
Aluminium	2.60E-02	4.03E+00	2.14E-01	5.36E+00
Bricks	3.93E+00	1.18E+01	9.44E-01	2.36E+01
Ceramique	1.04E-01	1.97E+00	1.09E-01	2.74E+00
Concrete	1.96E+02	1.73E+02	2.59E+01	6.47E+02
Copper	3.25E-02	1.37E+00	8.46E-02	2.12E+00
Glass	3.38E-01	5.07E+00	2.91E-01	7.27E+00
Insulation	3.44E-01	1.36E+01	5.85E-01	1.46E+01
Paint	5.52E-02	3.25E+00	1.40E-01	3.50E+00
Plaster	6.24E-02	1.12E-01	8.11E-03	2.03E-01
Plastic	3.77E-01	3.10E+01	1.23E+00	3.09E+01
Rubber	9.84E-01	5.02E+01	3.74E-01	9.34E+00
Steel	1.24E+00	2.27E+01	1.78E+00	4.44E+01
Stone	5.00E-03	1.00E-02	5.80E-04	1.45E-02
Timber	1.23E+00	1.70E+01	1.45E+01	3.62E+02
Total	2.05E+02	3.35E+02	4.62E+01	1.15E+03

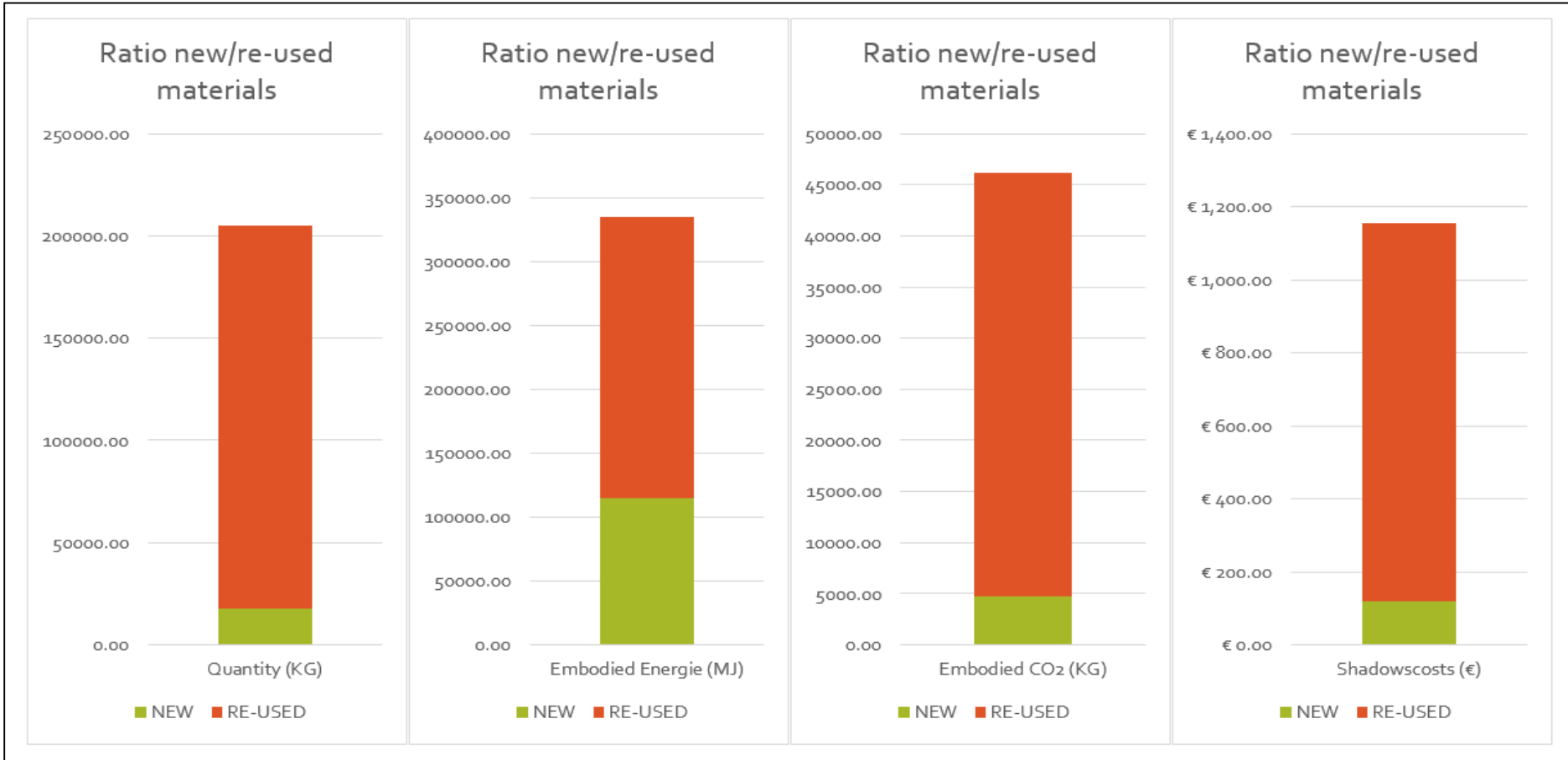


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Housing unit



Conclusions and outlook

1. The investigated housing unit has a lower embodied energy of 65%, lower embodied CO₂ of 90 %, and prevents €1k in shadow costs (€25/ton).
2. Carbon pricing will facilitate the uptake of re-using materials. Taking a price increase into account of €400/ton CO₂, the investigated solution would result in a price saving of €16k for the housing unit, contributing to a feasible business case.
3. Harvesting building components and materials turns out to be costly, and technological solutions have to be further improved.
4. In new designs it is necessary to define how elements of a building can be re-used in multiple cycles instead of the current linear approach.



Thank you for your attention!

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