Circular (de)construction in the Superlocal project

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3 Jongen Construction, Kerkrade, the Netherlands
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Content of this presentation

1. Background
2. Superlocal
3. Apartment building
4. Housing unit
5. Conclusions
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

- Metals
- Fossil fuels
- Construction and industry materials
- Biomass
Only 3% of construction materials are recycled in the Netherlands.
Superlocal

Think differently

1. Rethink
2. Redesign
3. Reuse
4. Repair en remanufacturing
5. Recycling
6. Recover
7. Disposal

From volumes to values

EUROPEAN UNION

UIA | URBAN INNOVATIVE ACTIONS

ZUYD
Superlocal
Anders denken 

1. Rethink en reduce 
2. Redesign 
3. Reuse 
4. Repair en remanufacturing 
5. Recycling 
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Van omvang naar waarde 

EUROPEAN UNION

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Van omvang naar waarde
Apartment building
Apartment building

1. Building as a Material Bank
2. de-construction
3. labeling/registration
4. material passport
5. construction

in
maintanance
out
<table>
<thead>
<tr>
<th>Material</th>
<th>Quantity (ton)</th>
<th>Embodied Energy (GJ)</th>
<th>Embodied CO2 (ton)</th>
<th>Shadowcosts (€)</th>
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Housing unit
Housing unit
## Housing unit

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<th>Embodied CO2 (ton)</th>
<th>Shadowcosts (€)</th>
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Housing unit

- Ratio new/re-used materials
  - Quantity (KG)
  - Embodied Energie (MJ)
  - Embodied CO2 (KG)
  - Shadowcosts (€)

[Graphs showing ratios of new and re-used materials in various categories with corresponding values provided.]
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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