A greenhouse that reduces greenhouse effect
How to create a circular activity with construction waste?

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Tomato Chili project, an example of industrial symbiosis creating financial, social and environmental value.
1. “Tomato Chili” project and business model

2. Comparison of environmental impact using Life Cycle Assessment
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The greenhouse is of +95% locally reclaimed materials: formwork wood and window frames.
The greenhouse is transformable, demountable, and recyclable.
Thanks to its modular design, the greenhouse can be easily extended according to the client’s needs.
The greenhouse is circular by three main design characteristics

Reuse content,
It is made out of discarded construction materials.

Service life extension,
through adaptability and modularity.

End-of-life strategy,
It is designed for a future cascading of materials.
Tomato Chili is an independent business, no longer supported by regional subsidies.
Tomato Chili is selling greenhouses and services based on the use of the greenhouse

**Customization** and 3D simulation; Implementation and sizing advice for the greenhouse,

**Start guide** to construct the greenhouse by yourself,

**Maintenance services** in order to keep the greenhouse up-to-date (help of the client in the workshop to learn to paint a layer of wood protection),

**Coaching to grow by yourself** vegetables and fruits (permaculture training),

Help for the group purchase of seeds,

**Team building** sessions (well-being at work) in partnership with [Skyfarms.be](http://Skyfarms.be),

**Networking** and practical information for disassembly, re-use or recycling at end of life,
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Life cycle assessment (LCA) estimates the material flows involved in the production, use and waste treatment of a product.
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What?
9 m² greenhouse with transparent walls and roof

How long?
15 years of use

Where?
in Brussels
The circular greenhouse was compared to an aluminium greenhouse.
These material flows are associated with **potential environmental impact**, through indicators (climate change, land use, resource depletion,...).
There is no real consensus on how to model the LCA of ‘circular’ products.

- Disassembly + Waste treatment
- Reuse of glass panels at end-of-life
- Impact of remanufacturing
- Impact of the maintenance
- No impact for production of the reclaimed materials
1 aluminium greenhouse generates more environmental impact than 3 circular greenhouses.

We checked the sensitivity of the results to lifespan length and maintenance pace.
With a long lifespan length and no maintenance, the circular greenhouse has environmental impacts 8 times lower than the aluminium greenhouse.

<table>
<thead>
<tr>
<th></th>
<th>ReCiPe Points</th>
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<tbody>
<tr>
<td>Long lifespan, no maintenance</td>
<td>8.7</td>
</tr>
<tr>
<td>Long lifespan, frequent maintenance</td>
<td>14.4</td>
</tr>
<tr>
<td>Short lifespan, no maintenance</td>
<td>13.0</td>
</tr>
<tr>
<td>Short lifespan, frequent maintenance</td>
<td>18.7</td>
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<tr>
<td>Aluminium greenhouse</td>
<td>69.9</td>
</tr>
</tbody>
</table>

Preliminary LCA realised with SimaPro 8, based on Ecoinvent v3 databases. Method: ReCiPe Endpoint (H) V1.12 / Europe ReCiPe H/A / Single score / Excluding infrastructure processes. Unit: ReCiPe Points
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Tomato Chili project, an example of industrial symbiosis creating **financial**, **social** and **environmental** value.
Waste ?

Resources !
Contact

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Action in the framework of the Brussels regional program in circular economy (PREC). Camille Vandervaeren is SB PhD fellow at Fonds Wetenschappelijk Onderzoek (FWO).