Circular building design

Opportunity, or yet another constraint?

VUB Architectural Engineering
Bâti Bruxellois : Source de nouveaux Matériaux

Prof. dr. ir. arch. Waldo Galle
Researcher and policy advisor sustainability transitions, Vrije Universiteit Brussel

Benelux Builds Circular
Benelux House Brussels, March 12th 2020

9/10 designers sees their growing responsibility as a serious threat

Source *Architectenmonitor* (Netwerk Architecten Vlaanderen, 2016) in Van Tornhaut, L. *De architect en het bouwteam. Dringt een nieuwe rol voor de architect zich op?* (Ghent University, 2016)

Source Van Tornhaut, L. *De architect en het bouwteam. Dringt een nieuwe rol voor de architect zich op?* (Ghent University, 2016). **Photo** Groep Van Roey

In innovative collaborations designers have a weaker position

Source Willeghems & Bachus (2018) *Employment impact of the transition to a circular economy: literature study*. **Photo** Rotor DC

VUB ARCHITECTURAL ENGINEERING

LE BATI BRUXELLOIS SOURCE DE NOUVEAUX MATERIAUX

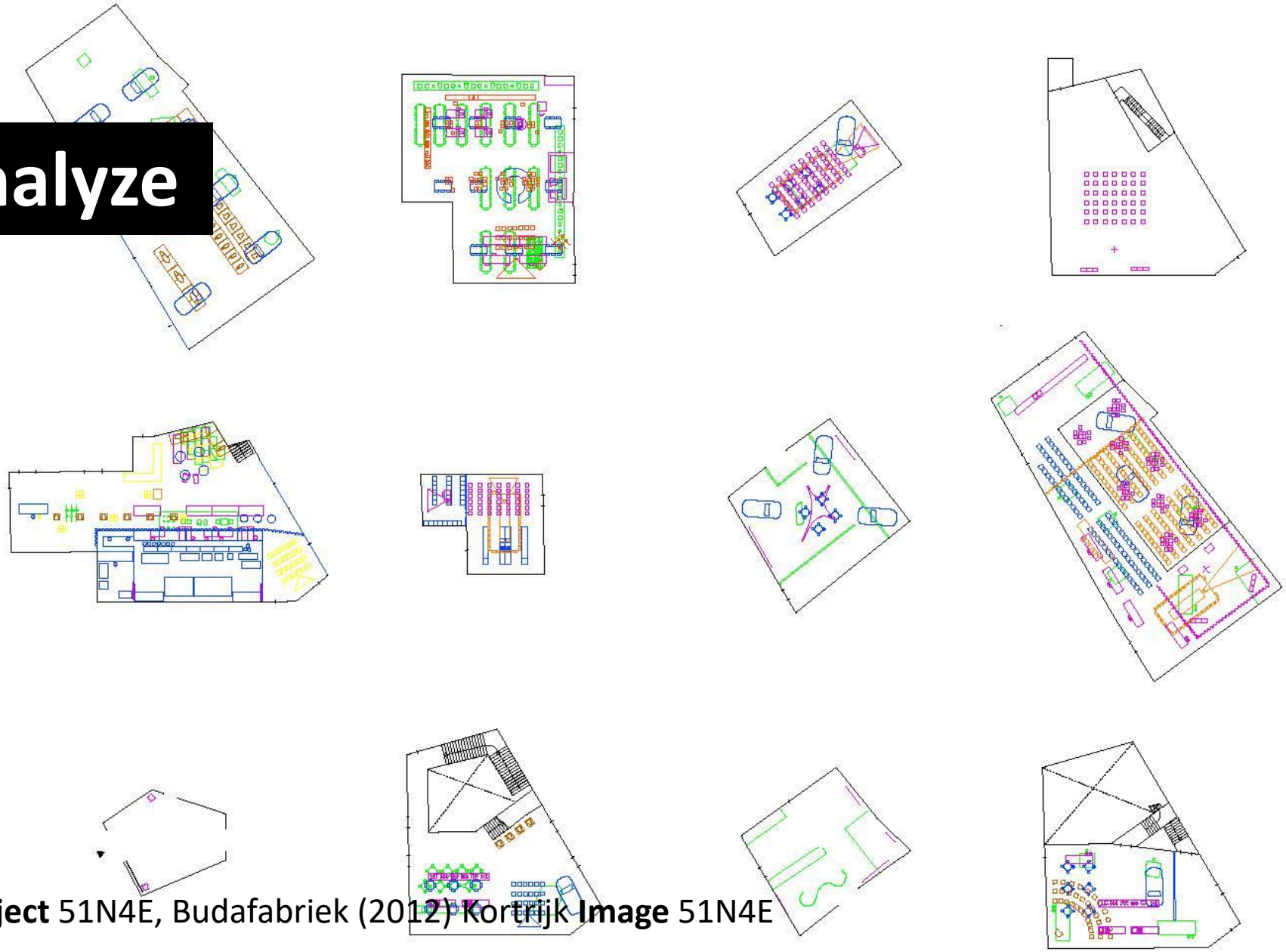
AUCH, WHAT NOW?

Opportunities for a renewed role of
architectural designers in the circular economy.

Photo Learning network meeting, Le Bati Bruxellois, Source de Nouveau Matériaux Meeting (24/5/2018) Bozar, Brussels

Doing and learning together

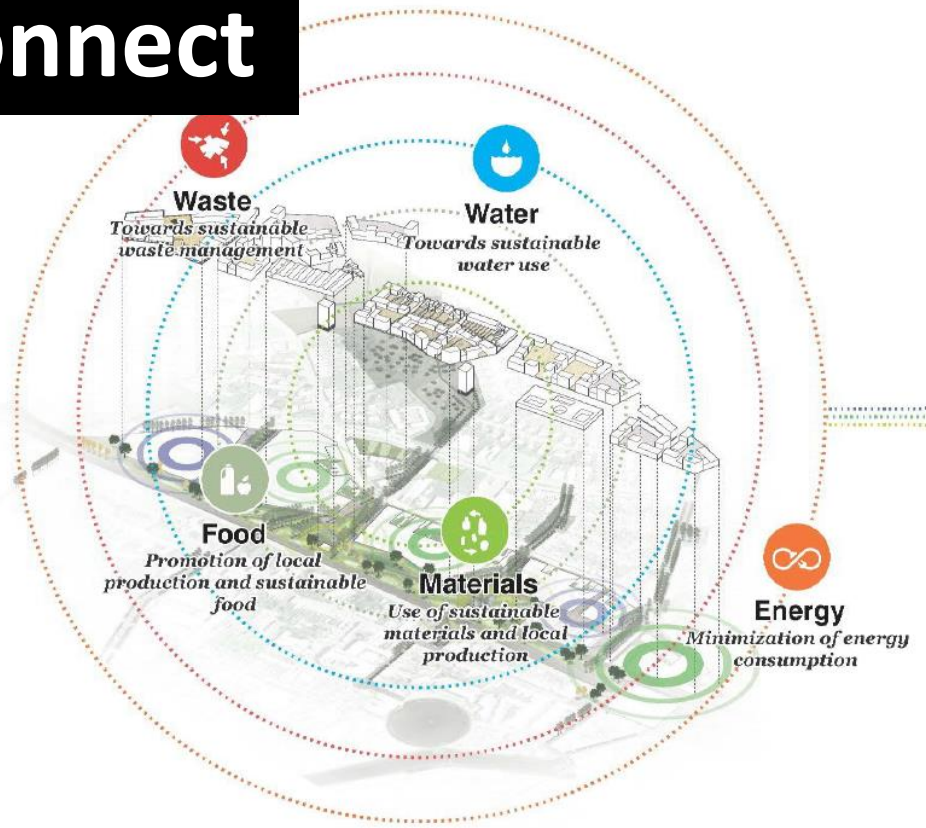
Analyze



Project 51N4E, Budafabriek (2012) Kortrijk **Image** 51N4E

Project Bureau SLA & Overtreders W (2017) People's Pavilion, Eindhoven. **Photo** Filip Dujardin

Connect

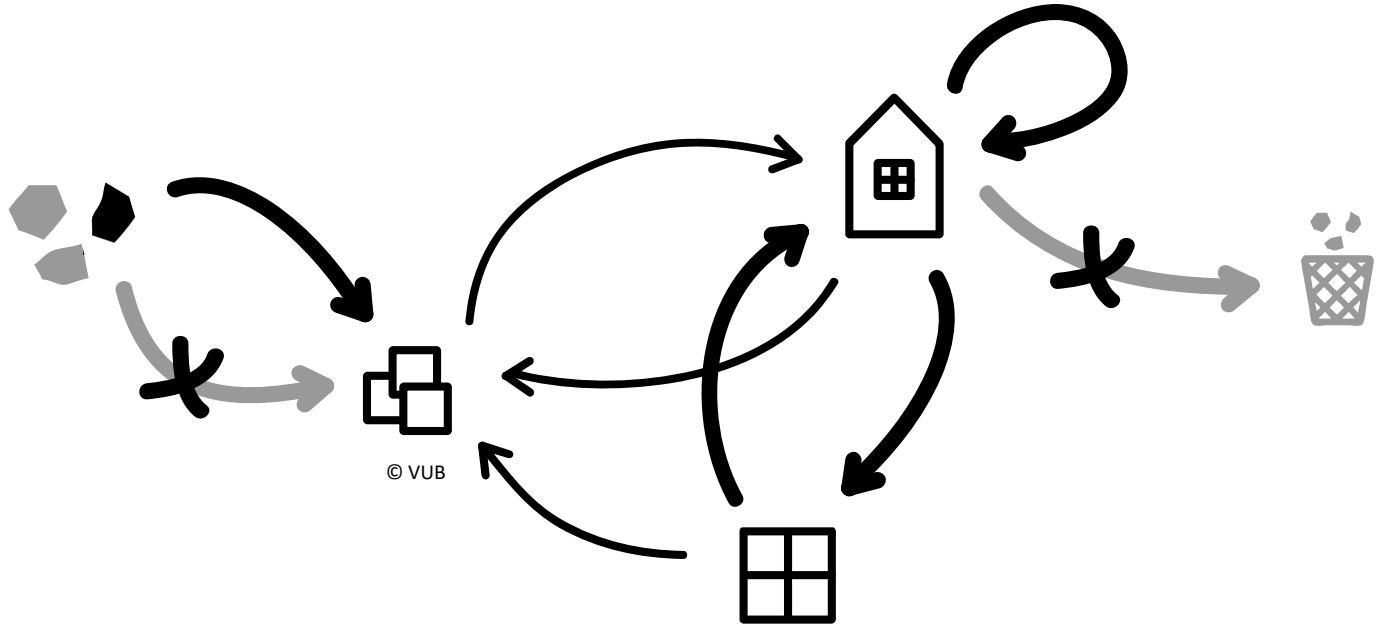


Project BUUR (2016) Railway station neighborhood Roeselare

HOWEVER …

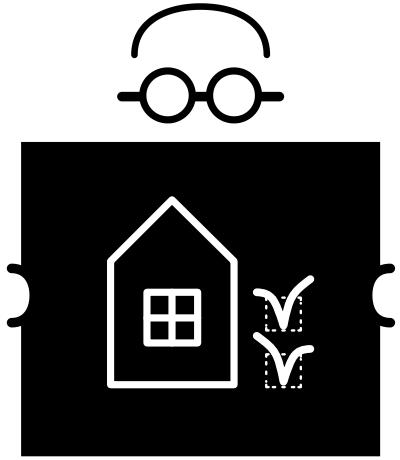
Systemic challenges requiring further discussions and reforms.

If the economy changes …

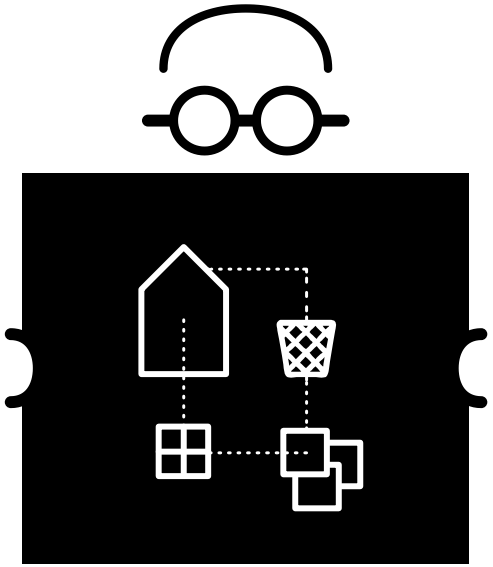


material product <> component <> building waste

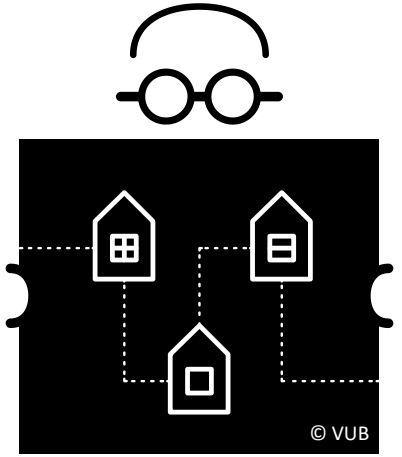
… must the designer's business change too?



design + **process**

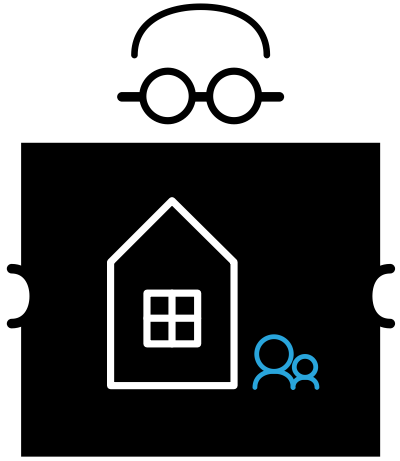


design + **plan**

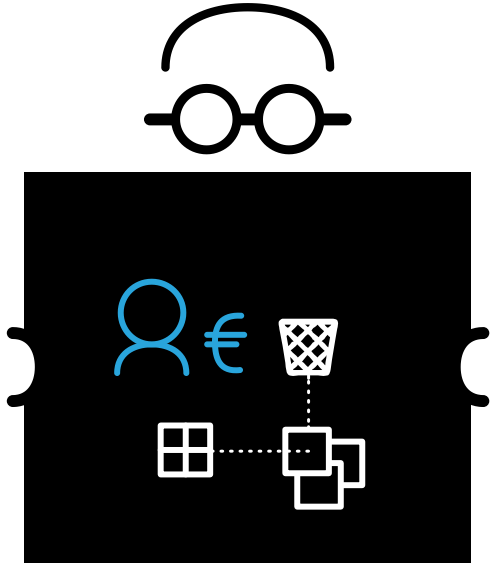


design + **redesign**

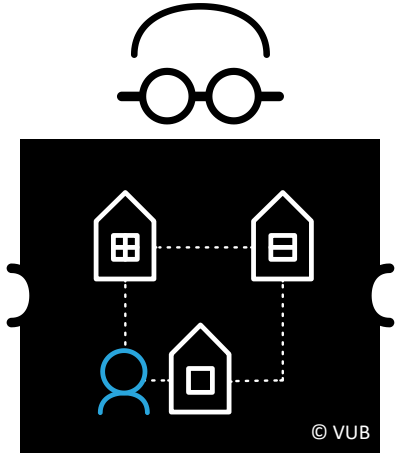
… who will be the designer's client?



the **user**



the material **owner**



the building **manager**


VUB
ARCHITECTURAL ENGINEERING
LE BATI BRUXELLOIS SOURCE DE NOUVEAUX MATERIAUX
Doing and learning
together

Building a Circular Economy

Circular Design Qualities

Reused — Use building parts and components already present on site or reclaimed elsewhere

Recycled — Look for building components made of low-value by-products or waste materials

Renewed — Use materials that are replenished continuously by responsible agriculture and forestry

Compostable — Choose materials that can be degraded into natural substances biologically

Safe and Healthy — Use components that do not harm the environment or humans during their use, reuse or recycling

Pure — Prefer components that consist of a single material instead of a blend

Durable — Use components that resist the wear and tear of use and reuse

Simple — Go for low-tech, legible solutions rather than complicated ones

Design building components that can be grabbed, moved and handled easily

Integrate components so they can be reached and recovered without

Make it possible to undo connections without damage to the components they join

Independent — Assemble components so they are structurally, functionally and geometrically separated

Introduce diversity rather than a one-fit-all solution

Location and Site — Recognise and develop the qualities of a place responsibly

buildings and building components.

rt of the project.

1. Approaches

To reduce the consumption of virgin, non-renewable resources, reclaimed building components can be used again, repaired, remanufactured or recycled.

Designers and clients can support a circular building practice in different ways. On the one hand, it is possible to optimise the capacity of every building to accommodate the evolving demands and needs of its users effectively, increasing its utility, extending its service life and thus maximising its value over time. On the other hand, it is possible to optimise the resource efficient management of all building-related material flows, avoiding the depletion of natural resources and the production of waste and thus minimising buildings' environmental impact.

Design for Longevity
In a circular design and construction practice, one can avoid new construction and review and revalue, upgrade and refurbish what already exists. Several architectural qualities keep a building's value up over time, facilitating maintenance and repair, while enabling current and future service life extensions. They include strategic qualities, for example the asset's location, but also spatial qualities such as a multi-purpose lay-out.

Design for Disassembly and Deconstruction
Complementary, to close material flows, components and materials must be reclaimed without damage to maintain their value, facilitate their processing and minimise waste. Therefore, various technical design qualities are key factors. They relate to design choices about, for example, the durability of components, their independent assembly and the reversibility of their connection.

7

Design for Reuse
To reduce the consumption of virgin, non-renewable resources, reclaimed building components and materials can be used again, repaired, remanufactured or recycled. Building components and materials should for example be safe and healthy to reuse or pure to recycle.

Aside the environmental savings of closed material loops and the economic benefit of enduring asset value, the design qualities that are collected in this booklet offer other advantages and opportunities too. In literature these benefits are often presented as an added value of a 'circular' building, although they are not necessarily related to closed material loops. That does however not mean these advantages are not valuable. Think for example of facilitated inspection, maintenance and small repairs of easily adaptable structures, or imagine the reduced hindrance and nuisance during their refurbishment.

The value hill for building a circular economy (interpreted after Achterberg, E., Hinfelaar, J. & Bocken, N.)

8

42

43

Building a Circular Economy

Buildings,
a Dynamic Environment

www.vub.be/arch/circulardesign

VUB ARCHITECTURAL ENGINEERING

LE BATI BRUXELLOIS SOURCE DE NOUVEAUX MATERIAUX

Circular building design

Opportunity, or yet another constraint?

VUB Architectural Engineering
Prof. dr. ir. arch. Waldo Galle, waldo.galle@vub.be
Researcher and policy advisor sustainability transitions, Vrije Universiteit Brussel

This research was made possible thanks to the Financial support of the European Regional Development Fund (ERDF) and the Brussels-Capital Region for the research project Le Bâti Bruxellois : Source de nouveaux Matériaux (BBSM). We thank all designers, experts and policy makers for their participation in this research. Gratitude goes to Project partners UCLouvain, Rotor, and Belgian Building Research Institute.

Download the project deliverables at
www.bbsm.brussels - www.vub.be/arch/circulardesign

La Région et l'Europe investissent dans votre avenir !
Het Gewest en Europa investeren in uw toekomst!
RÉGION DE BRUXELLES-CAPITALE
BRUSSELS HOOFDSTEDELIJK GEWEST
Union Européenne
Fonds Européen de Développement Régional
Europese Unie
Europees Fonds voor Regionale Ontwikkeling