

Circulair Building economy

“Work in progress”
Execution program

Naar een
circulaire
bouweconomie

Prof.ir. Elphi Nelissen
Chairwoman Transitionteam CBE
Member of the Taskforce Bouwagenda

TU Eindhoven
Signify 5 Feb. 2020



Framework for the circular economy program

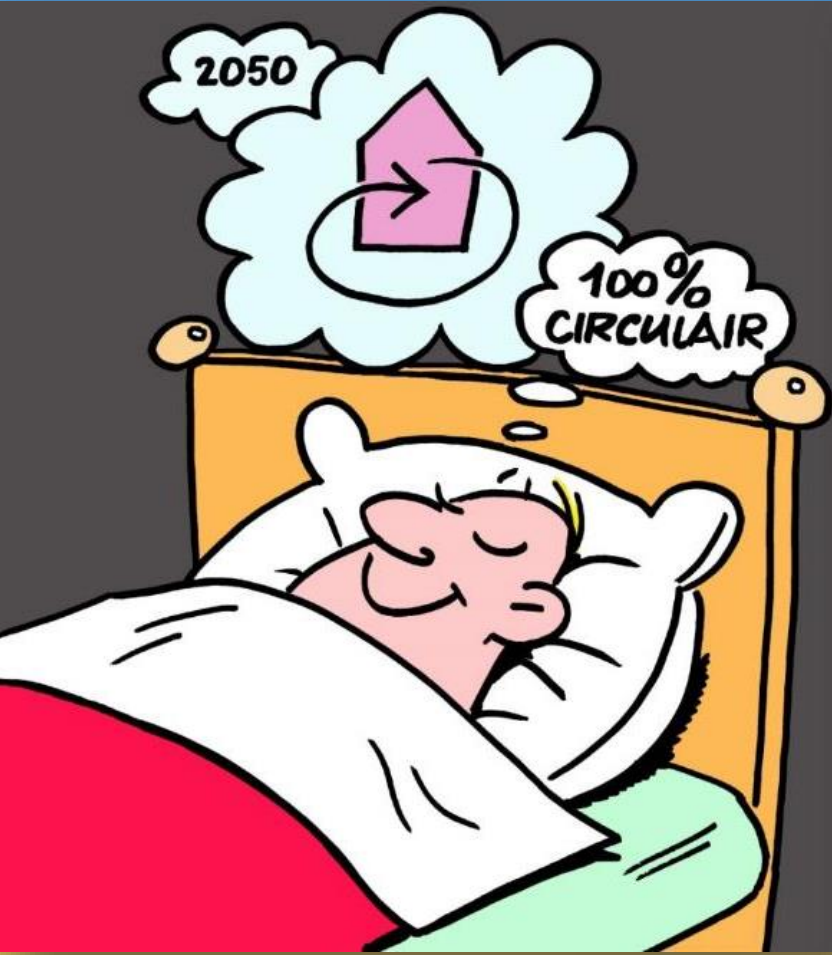


5 Agendas and a monitoring program

The Building sector: one of the five pillars in the Government-wide program "The Netherlands Circular in 2050".



Ambition: Complete Circular Building Economy in 2050



The Building sector: one of the five pillars in the Government-wide program "The Netherlands Circular in 2050".

Responsible for:

50% of the raw materials consumption

40% of energy consumption

30% of water consumption

35% of CO2 emissions

Ambition in 2050:

100% circular building economy

The definition

The Circular Building Economy means the build, use and reuse of buildings, areas and infrastructure, without:

- to exhaust natural resources unnecessarily,
- to pollute the environment and
- to affect ecosystems,

in a way that is economically sound and contributes to human and animal welfare.

Here and there, now and later.

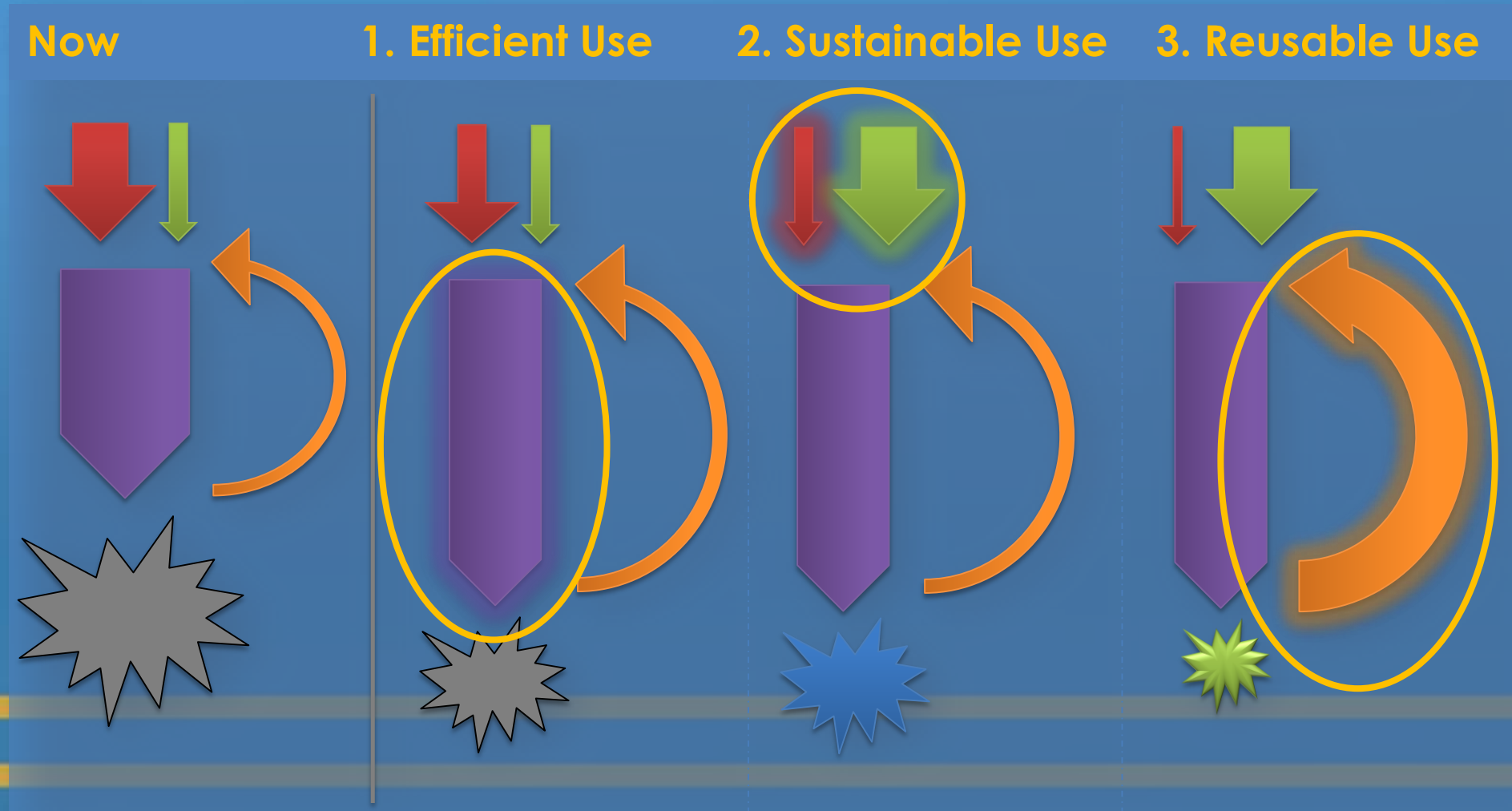
def·i·ni·tion

The teacher gave

of the new word

of an image (

3 steps strategy



3 examples at TU/e

1. Bridge with less concrete because of 3D printing



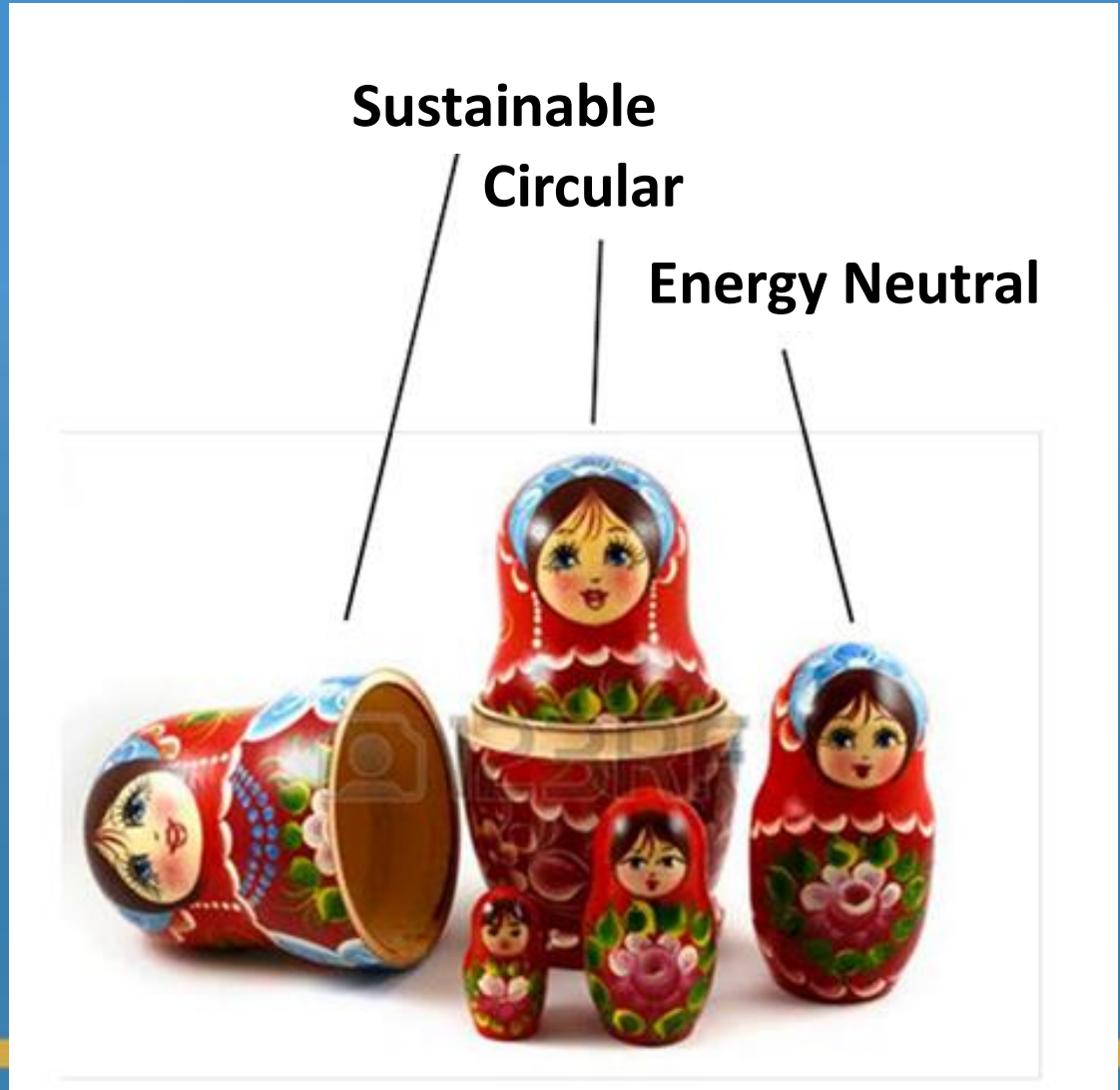
2. Pedestrian bridge made of Bio-composite materials



3. Upgrade of TU/e Atlas Building



Three related topics



2018 - 2023

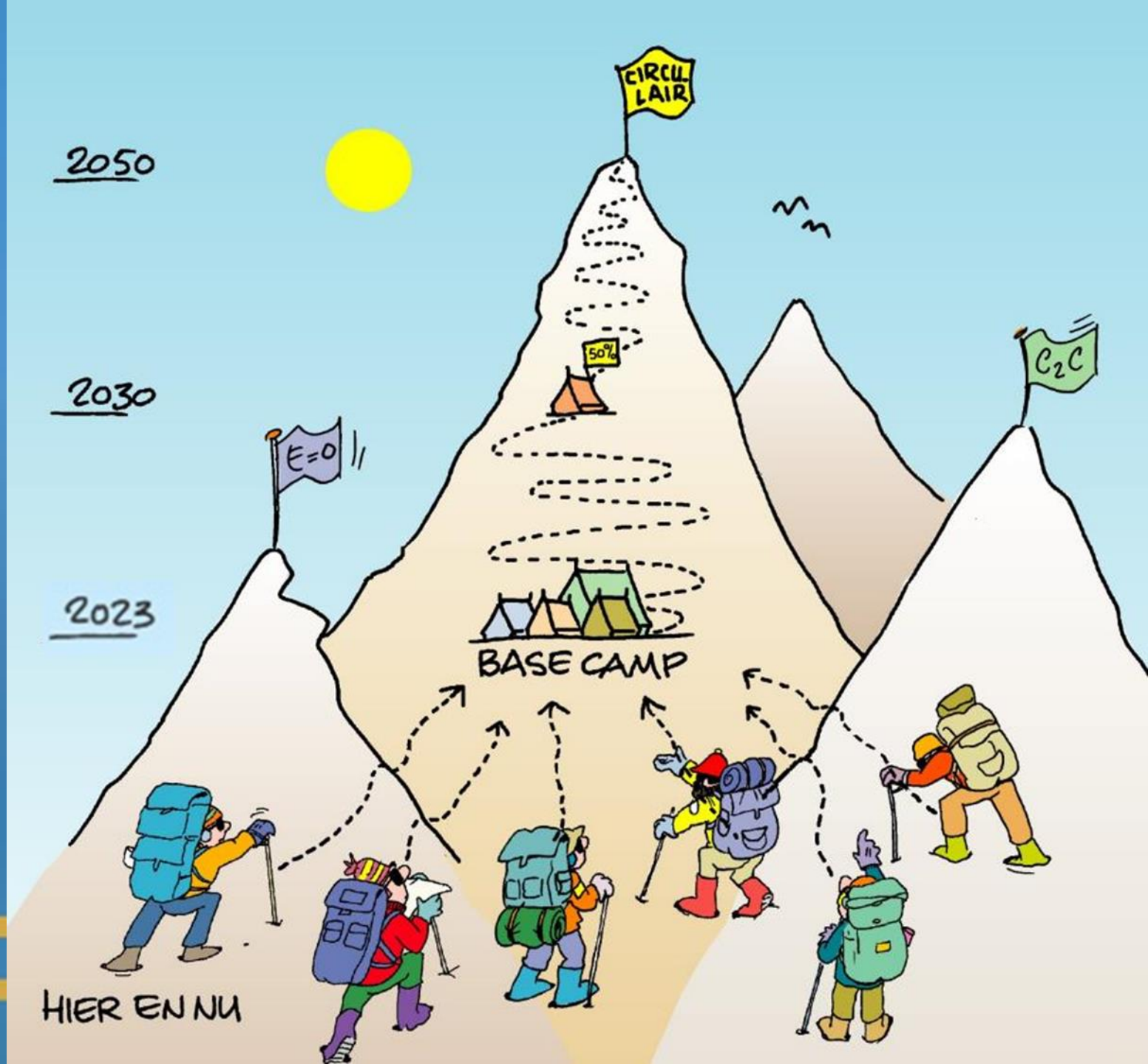
Set up base camp

2030

Halfway the top

2050

NL Circular achieved



Four priorities

1. Development of demand, supply and market
2. How to measure circularity in concrete terms?
3. Policies, laws and regulations that do not pinch, do stimulate
4. Creating knowledge and awareness

Solutions for this are essential for the base camp



Belangrijkste Acties

All government procurement circular in 2030

In the run-up to this, all government inquiries will be circular in 2023.

Approach reduction CO₂ emissions in construction

50% less CO₂ consumption in construction in 2030 and 100% reduction in 2050.

Decision in 2020 on mandatory materials passport

By 2020 at the latest, we will decide on a system that provides insight into materials and raw materials, for example with a materials passport.

Subsidy for circular business and revenue models

Temporary, financial support for circular business and revenue models.

Continued development of uniform measurement method for circularity

We explore the added value of a uniform, unambiguous measurement methodology in projects and pilots.

Processing circularity in government building standards

The government is starting a program that will conduct further research into this and initiate experiments.

International positioning and cooperation

The Netherlands is working with neighboring countries on a North-West European circular construction economy.

Building circularly as an integral part of education in 2023

In 2023 attention will be paid to circular construction at all levels and directions of education.

Establishing a circular knowledge institute

The guiding principles here are "learning to evolve" and "network-driven action".

Some results until now.....

Environmental Performance of Buildings



- Environmental Performance of Buildings (MPG) mandatory.
- MPG indicates the environmental impact
- houses and offices > 100 m².
- January 1, 2018, a maximum of 1.0 applies.

More circularity

additional indicators for high-quality reuse and recycling

Stricter rules

step by step stricter requirement until 2030, starting in 2021, and halve by 2030 at the latest

Wider scope to other types of buildings

Buildings such as education, healthcare, sports, shops, catering and industrial halls and for renovation and transformation

Circular knowledge institute - Bouw Techniek en Innovatiecentrum



An initiative from the Construction Agenda

Ministeries van EZK, BZK en IenW,
TNO, 4 TU.Bouw, Vereniging Hogescholen,
NLIingenieurs, UNETO-VNI en Bouwend
Nederland

A Program Line:
Circulair Building economy



The temporary court in Amsterdam.

- The work of the court can continue during the development.
- Interim character does not affect representativeness and quality.
- Prevention of waste and maximizing the residual value.
- The building is adaptable and allows possibilities for different use.
- At the end it can be completely disassembled and reused elsewhere.



Apartments Stadstuin Overtoom Amsterdam.

- Reuse of 98% of the demolition material, 30% in Stadstuin Overtoom.
- Demolition and new construction according to the Co-Green concept.
- They have to dismantle a building step by step.
- Old bricks are partly processed in new ones bricks, concrete is reused for the construction and sand-lime brick went back to the factory.
- Chain collaboration is one of the objectives. Clear agreements with suppliers for a guarantee on quality when re-used of old materials.



First circular viaduct in the Netherlands.

- A viaduct that can be fully disassemble and reuse.
- The circular viaduct can be recovered undamaged, in parts or up to the raw material level.
- Modular construction like lego.
- The work can be disassembled without waste and can be made in a new construction.



Circl, a pavilion in Amsterdam, by ABN AMRO - Bank.

- A building designed and constructed according to sustainable and circular principles.
- Circl has been created to be energy efficient and easy to disassemble.
- Many of the things used have already had a previous life.
- Other raw materials can be put to new uses in the future.
- The wood used in its construction to the aluminium on its outer walls



Completely circular renovated office in Duiven

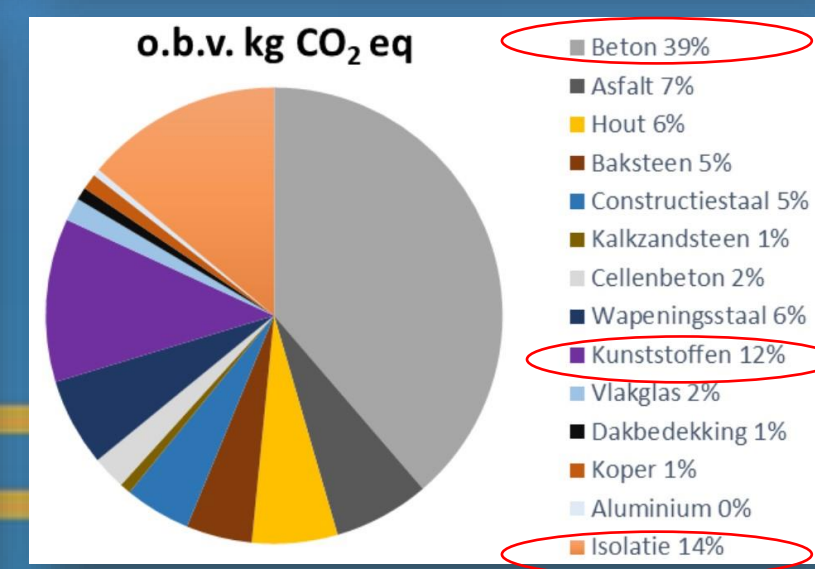
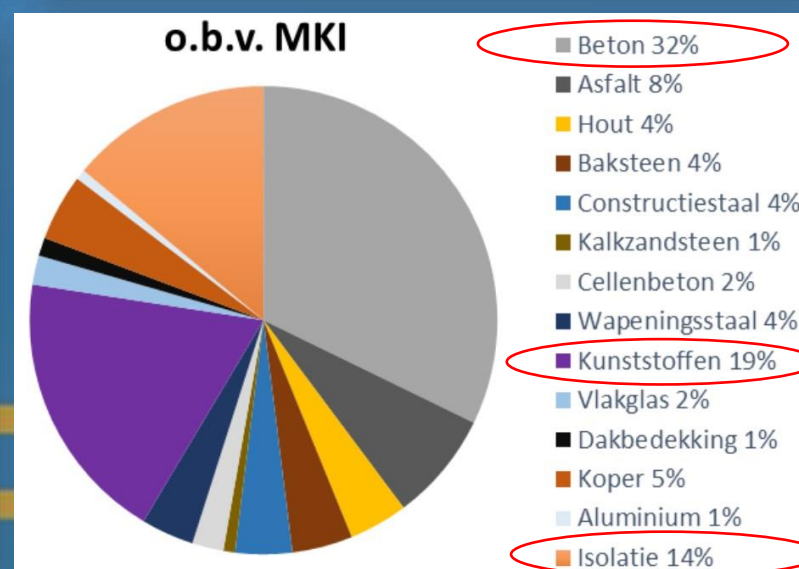
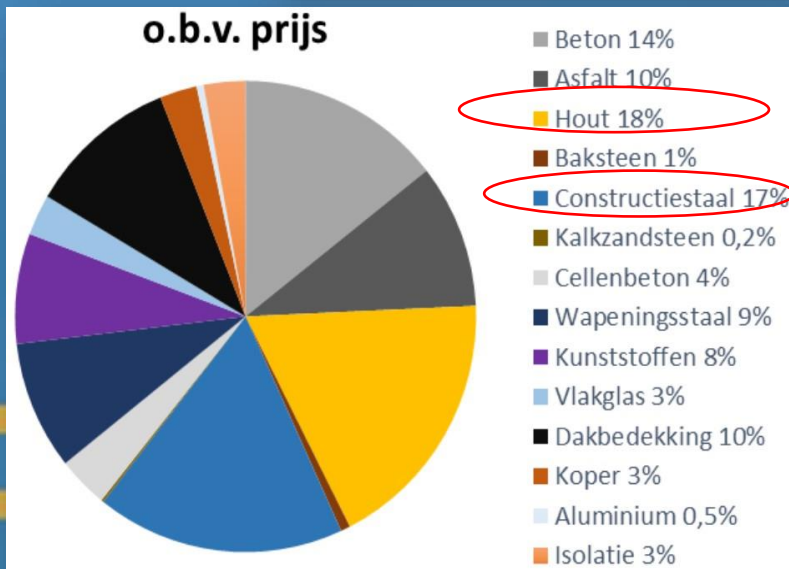
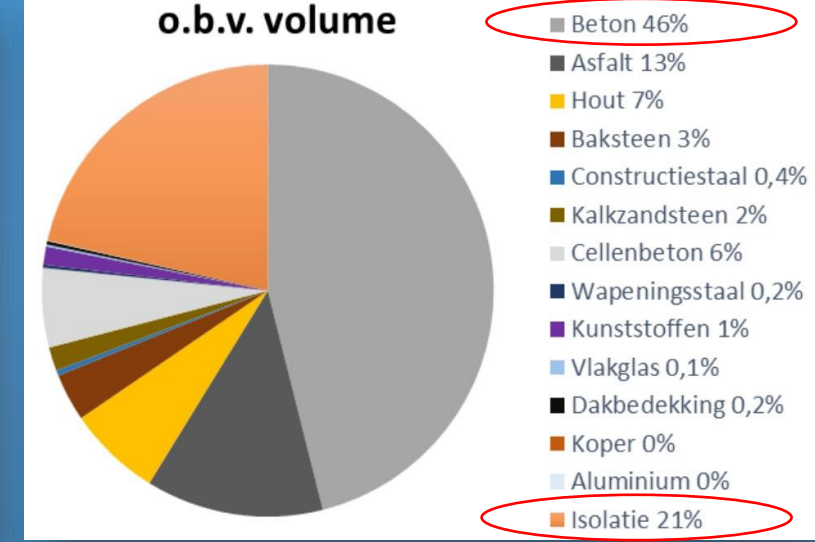
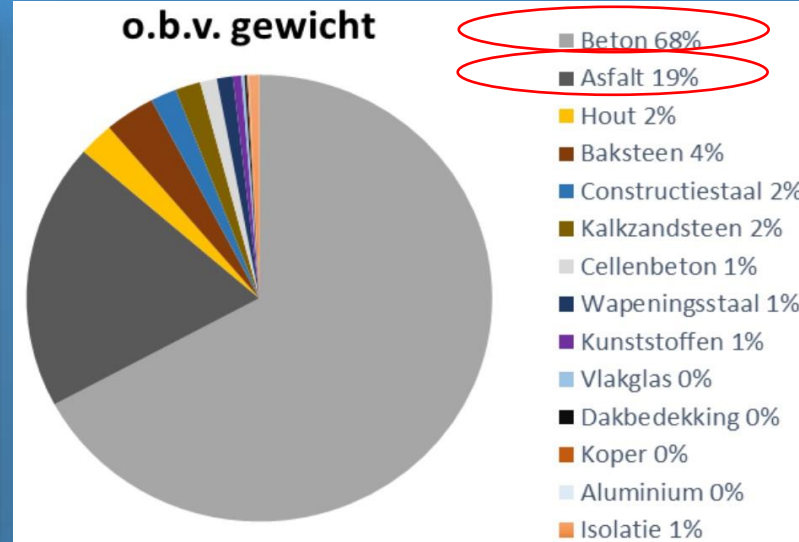
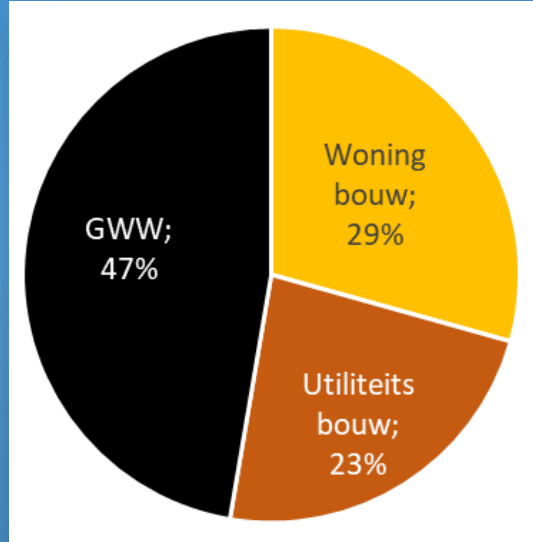
- The building is energy-positive and
- more than 80% of the materials present have been reused.
- The rubble of the old concrete wall is finely ground into granules for the concrete floor
- Wood for the new inner wall consists of own waste wood.
- sustainable insulation of recycled cotton, which were made of used workwear from mechanics

Research and publications



- Handreiking Losmaakbaarheid - PIANOo & Rijkswaterstaat
- Onderzoek en Rapport 'Doelgroepenonderzoek Kenniscentra Circulair Bouwen' - USP
- Lexicon 'Circulair Bouwen' - Platform CB'23
- Framework 'Circulair Bouwen' - Platform CB'23
- Leidraad 'Paspoorten voor de bouw' - Platform CB'23
- Leidraad 'Kernmethode voor het meten van circulariteit in de bouw' - Platform CB'23
- Onderzoek en Rapport 'Meetmethode voor Losmaakbaarheid' - Alba Concepts
- Onderzoek en Rapport 'Potentie van biobased materialen in de bouw' - NIBE
- Onderzoek en Rapport Verkenning 'Materialenpaspoort voor gebouwen' - Jonge Honden
- Onderzoek en Rapport 'Inventariserend onderzoek naar een uniforme meetmethode voor circulair bouwen' - Jonge Honden
- Brochure 'Aan de slag met circulaire woningbouw - Vuistregels voor ontwerp en uitvoering' - Lente Akkoord
- Voorbeeldenboek met 30 inspirerende circulaire producten en diensten - W/E adviseurs.
- Onderzoek en Rapport 'Milieubelasting van materiaalstromen in de woning- en utiliteitsbouw; nulmeting' - EIB, Metabolic en SGS Search
- Uitwerking R-Ladder met 10 stappen, tot een circulaire strategie.

Materialflow in the Netherlands



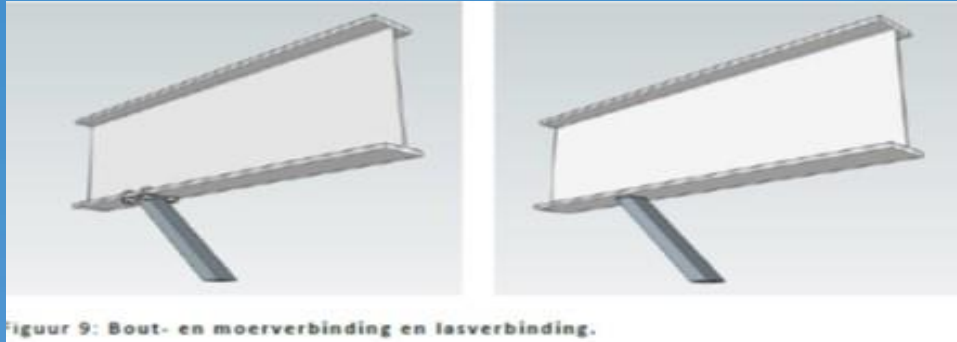
2. comparison between traditional and biobased materials

Potentie van hernieuwbare grondstoffen - biobased materialen

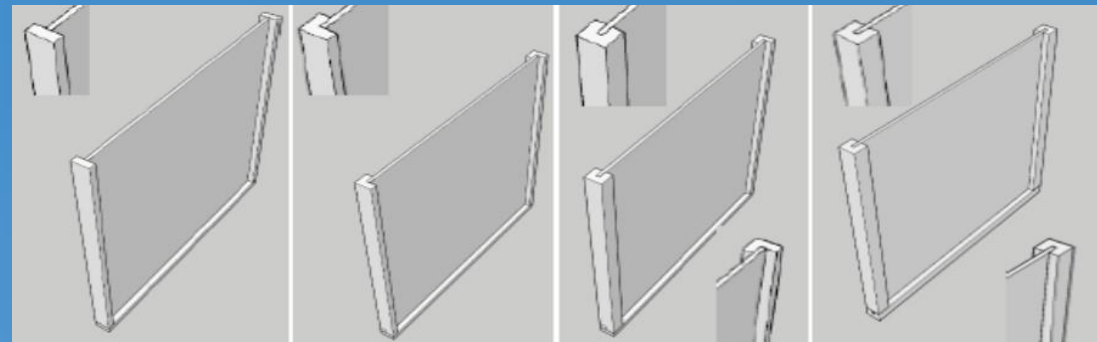
CASE STUDY	REFERENTIE			BIOBASED		
	<i>MPG</i>	<i>CO₂</i>	<i>w% BB</i>	<i>MPG</i>	<i>CO₂</i>	<i>w% BB</i>
Hoekwoning	0,70	6,43	1,2%	0,56	3,86	67%
Appartement	0,60	5,39	0,5%	0,52	3,80	50%
Kantoor	0,64	5,09	0,0%	0,50	2,54	45%
Bedrijfsgebouw	0,54	5,64	0,1%	0,45	3,28	11%

Tabel 4: Resultaat referentie en biobased berekeningen. MPG in MKI/m² BVO per jaar, kg CO₂ eq./m² BVO per jaar en % biobased op basis van totaalgewicht.

2. Detachability

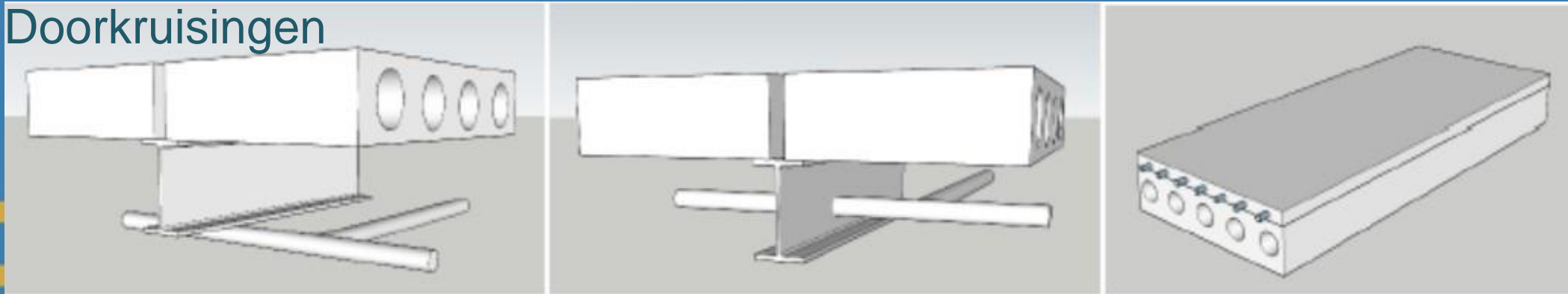


Figuur 9: Bout- en moerverbinding en lasverbinding.



Toegankelijkheid verbinding	Gewicht
Vrij toegankelijk	1,00
Toegankelijkheid met extra handelingen die geen schade veroorzaken	0,80
Toegankelijkheid met extra handelingen met herstelbare schade	0,40
Niet toegankelijk – onherstelbare schade aan objecten	0,10

Doorkruisingen



CIRCULAIRE PRODUCTEN & DIENSTEN

Inspirerende voorbeelden voor de bouw



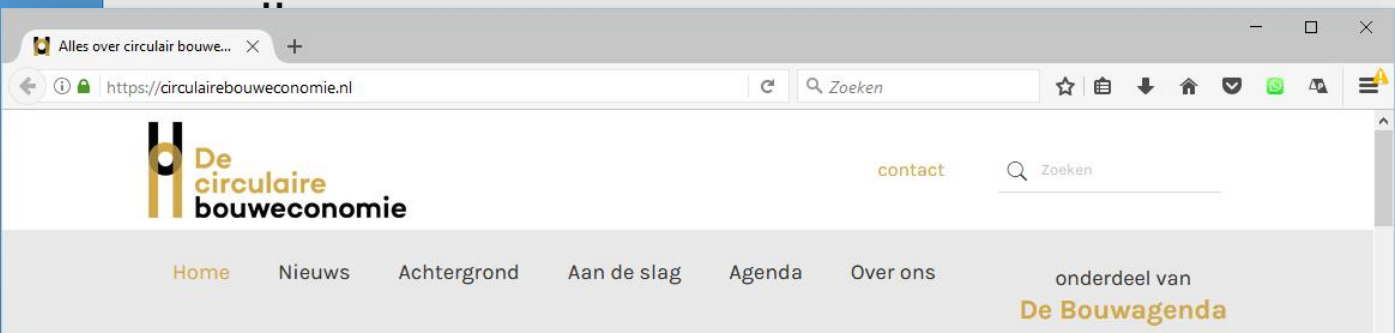
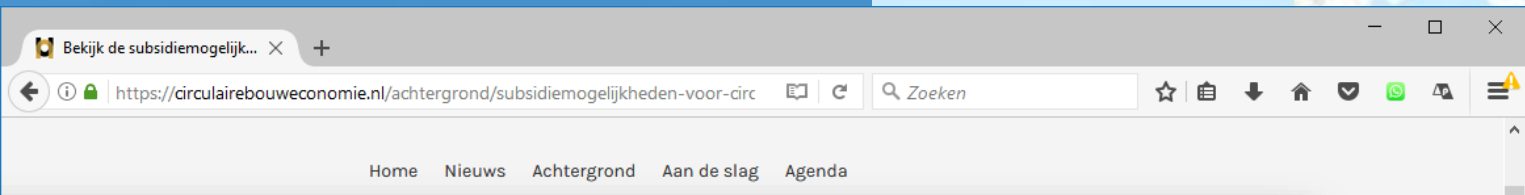
26

27

28

29

CirculaireBouwEconomie.nl



Questions



Thank you

