

Lenteakkoord 2.0

Platformbijeenkomst
02-11-23

Installatie-arm bouwen

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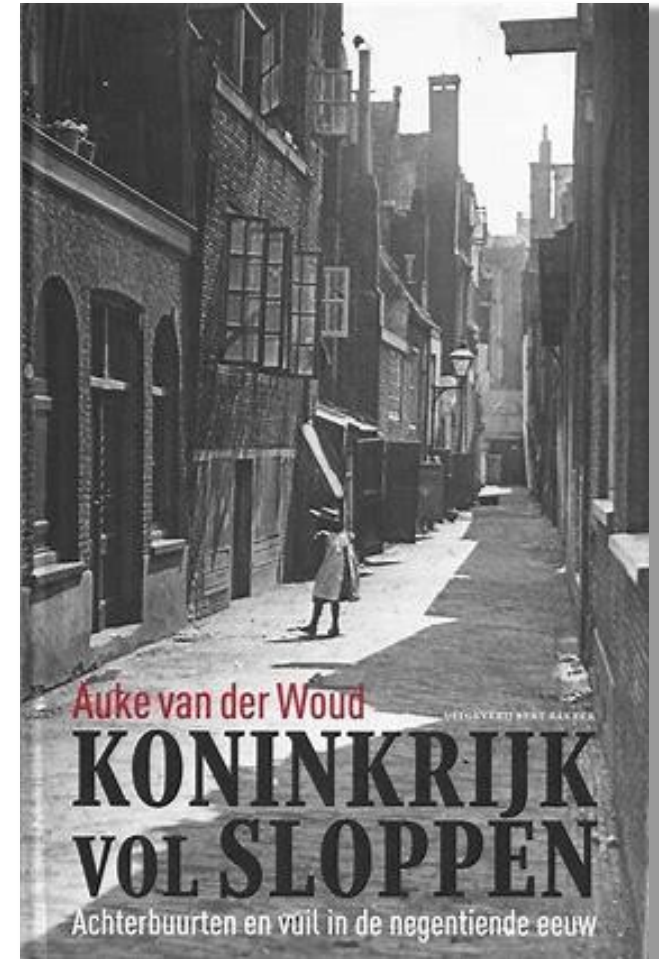
Installatie-arm bouwen
> dat gaat 'm niet worden...

Installatie-arm betekent?

- Ventileren alleen met te openen ramen?
- Alleen verwarming in de woonkamer?
- Warmte-opwekking met houtkachel?
- Alleen daglicht, geen kunstlicht?
- Geen PV panelen?
- Geen warmtepompen?
- Geen balansventilatie, geen...?

En de **energietransitie** dan?

En hoe zit het met comfort en Gezondheid?



**OK, installatie-armer bouwen
> is dat dan wel wat?**

Voorbeeld oververhitting &



Alternatieve opties:

- Omgeving aanpakken (meer groen, meer water)
- Gevel verbeteren (zonwering toevoegen, zonwerend glas)
- Bouwmassa beter gebruiken (nachtventilatie)
- Luchtsnelheid manipuleren (plafond ventilator)
- Microklimatisering (koeling om nek, in stoel etc)
-



Voorbeeld anti-oververhitting ontwerpprincipie

Natuurlijk als het kan, mechanisch als het moet ('building physics first!')



(photo's: Christian Richters & Esther Claussen; architects: Hamzah/Yeang & Mecanoo)

Gesprek zou m.i. met name moeten gaan over milieu-impact van installaties verminderen; dus over circulariteit en installaties...

Praktijkvoorbeeld installaties & levensduur...



Typisch voorbeeld van:

Linear Economy



TAKE



MAKE

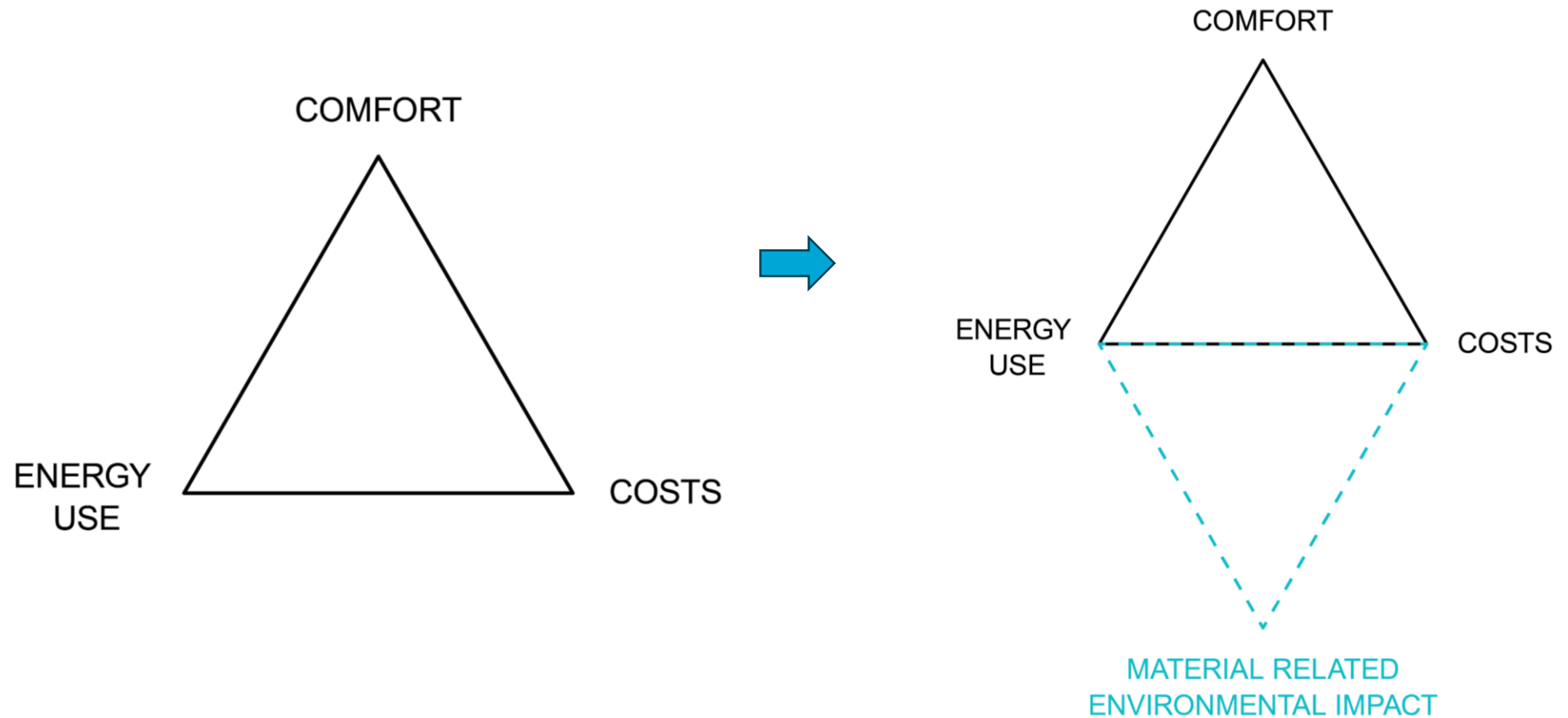


WASTE



REPEAT

Standaard vs ideale benadering installatie-ontwerp



Voorbeeld TU Delft onderzoek

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Full length article

Urban mining and buildings: A review of possibilities and limitations 

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BIM (Building Information Modelling)

ABSTRACT

In recent years there has been growing interest in urban mining in buildings from various environmental and economic perspectives. Materials hidden in buildings are attractive alternatives to raw ones and building activities are responsible for a large share of urban waste in many societies. The paper presents an analysis of possibilities for urban mining in Amsterdam, initially focused on metals in residential buildings. Both global literature and local analysis suggest that performance in resource recovery from buildings is already as high as it can get. However, estimation of material content in buildings and of waste processing rates is far from reliable, accurate and precise enough to support such claims or identify possibilities for further improvement, including localization of resources in buildings and connections to building activities, in particular renovation.

1. Introduction

The paper presents the findings of a study on the feasibility of urban mining (UM), initially focused on metals in residential buildings in the city of Amsterdam. It addresses the availability of valuable resources in the built environment as well as the possibilities for their recovery, including the current performance in construction and demolition waste (C&DW) processing. The focus on metals was motivated by cur-

the recent societal emphasis on circularity, UM connects to the processes of AECO and the information produced and managed by AECO, in particular in the operation stage (up to and including demolition), i.e. with respect to the existing building stock.

The study comprised three main parts:

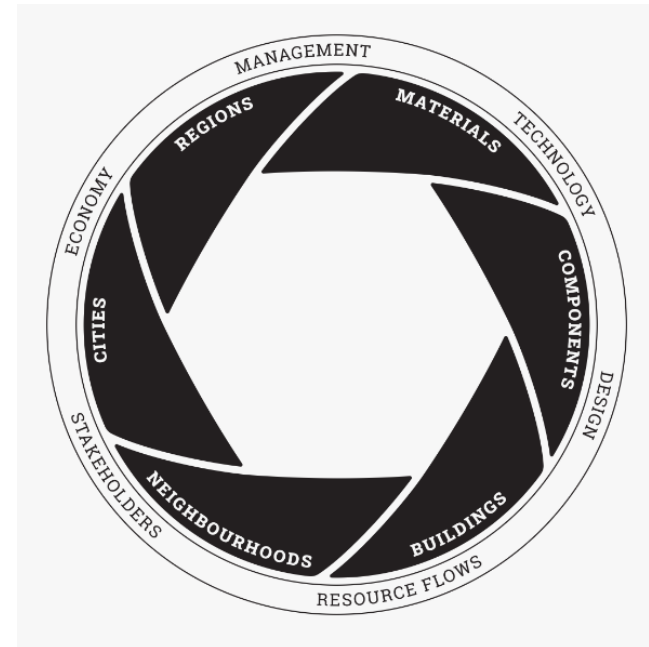
- 1 Exploratory literature review of the global state of the art with respect to the estimation of metal content in residential buildings

Circular built environment hub TU Delft

- Circular Built Environment Hub website TU Delft:

"The Circular Built Environment (CBE) is a system designed for closing resource loops at different spatial-temporal levels by transitioning cultural, environmental, economic & social values towards a sustainable way of living (thus enabling society to live within the planetary boundaries)"

- Scales to Aspects model (Tillmann Klein et al.):



Gebouwinstallaties, materialen en circulariteit

The big 7 (?):

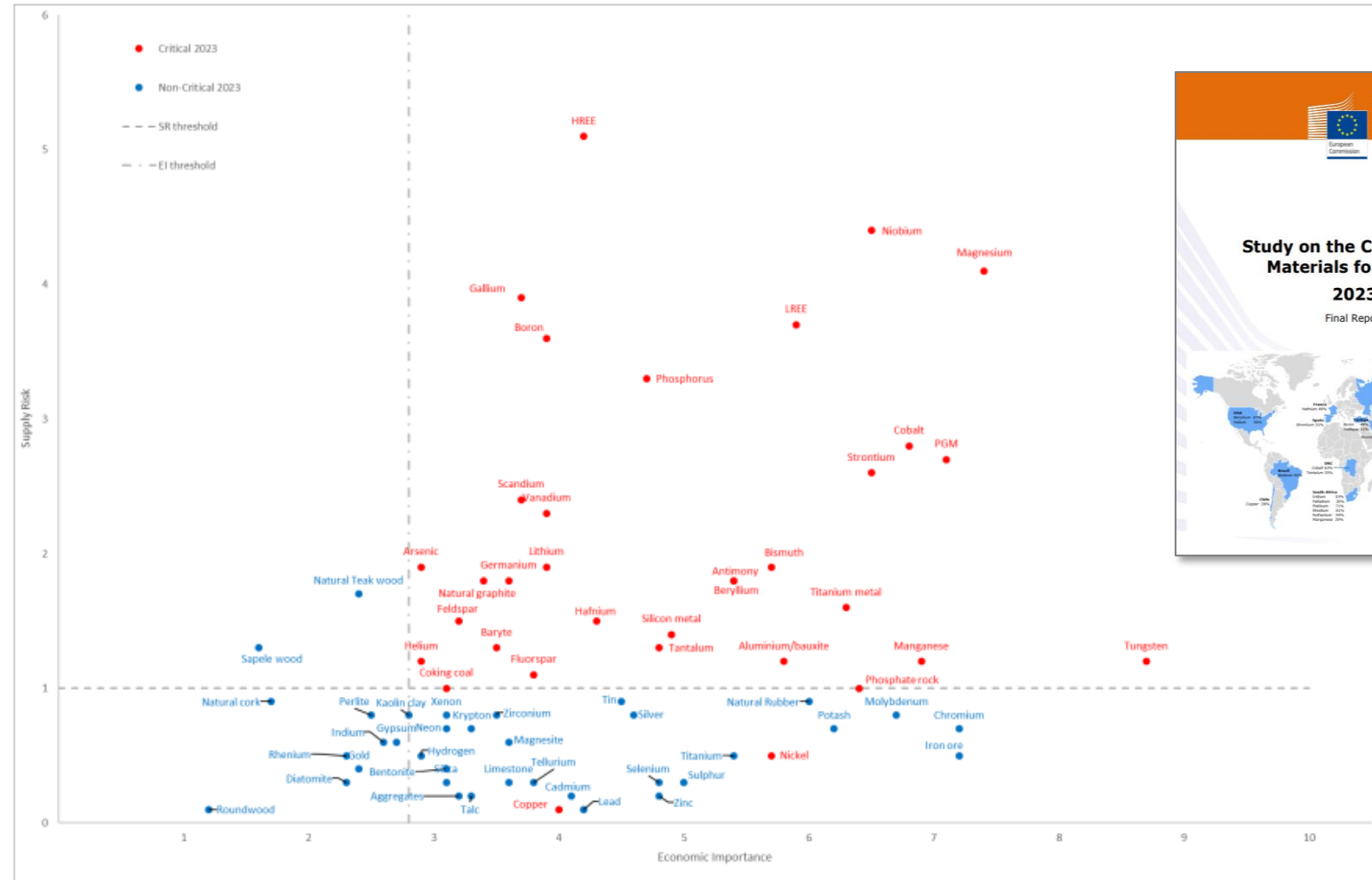
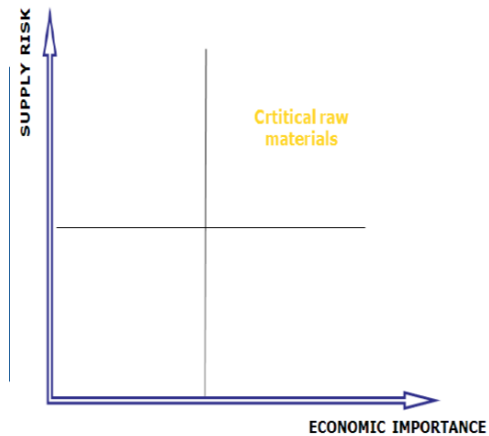
- Staal
- Zink
- **Koper**
- **Aluminium**
- Chroom
- **Nikkel**
- ICT metalen* (zilver, goud, **palladium**, ...)

* *t.b.v. gebouw-automatisering, monitoring etc*



Kritieke grondstoffen volgens EU

Figure A: Results of the 2023 EU criticality assessment⁵



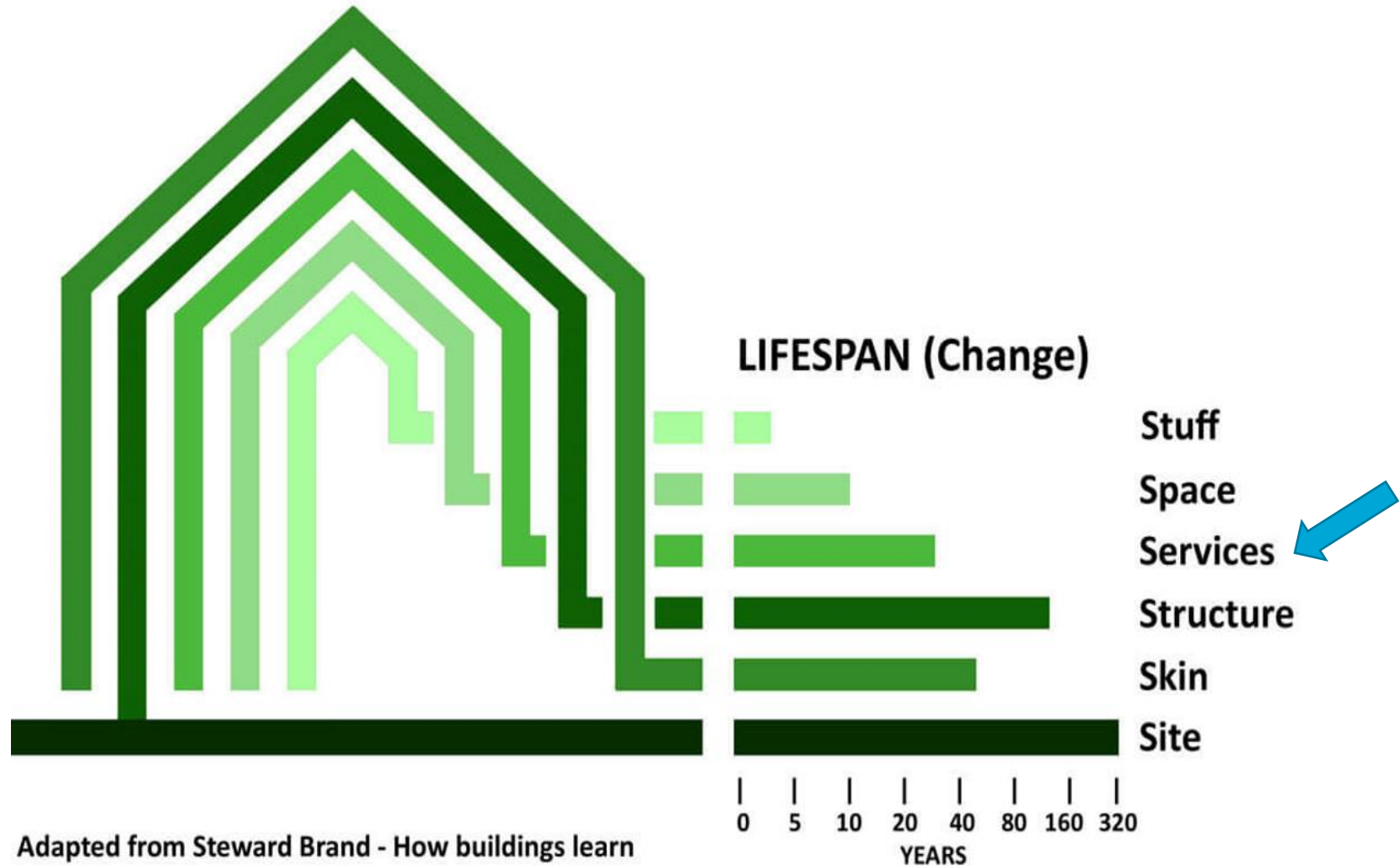
Levensduur installatiecomponenten vs. rest



Source: Croxford et al / UCL, 2018

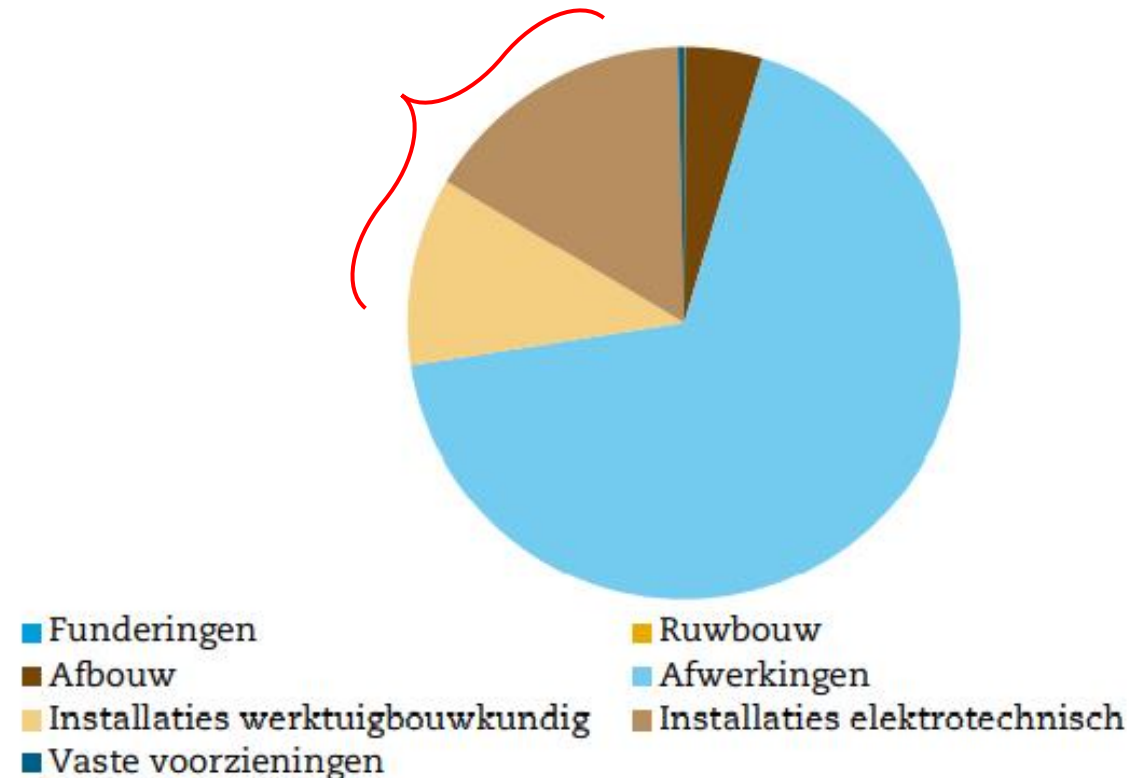
Figure 3. Average lifespans of components within an office building. Source: Sturgis Associates LLP (2009)

Kansen & uitdagingen irt levensduur installaties



Milieu-impact installaties (vb. renovaties)

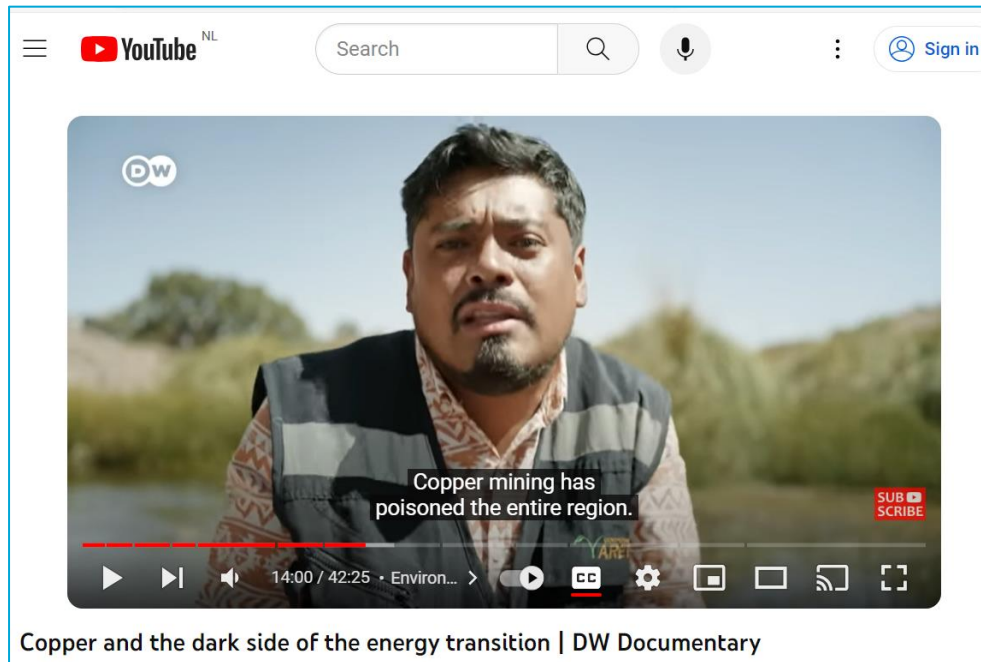
- Relatieve bijdrage w- en e-installaties (gemiddeld) bij renovaties: > 25%



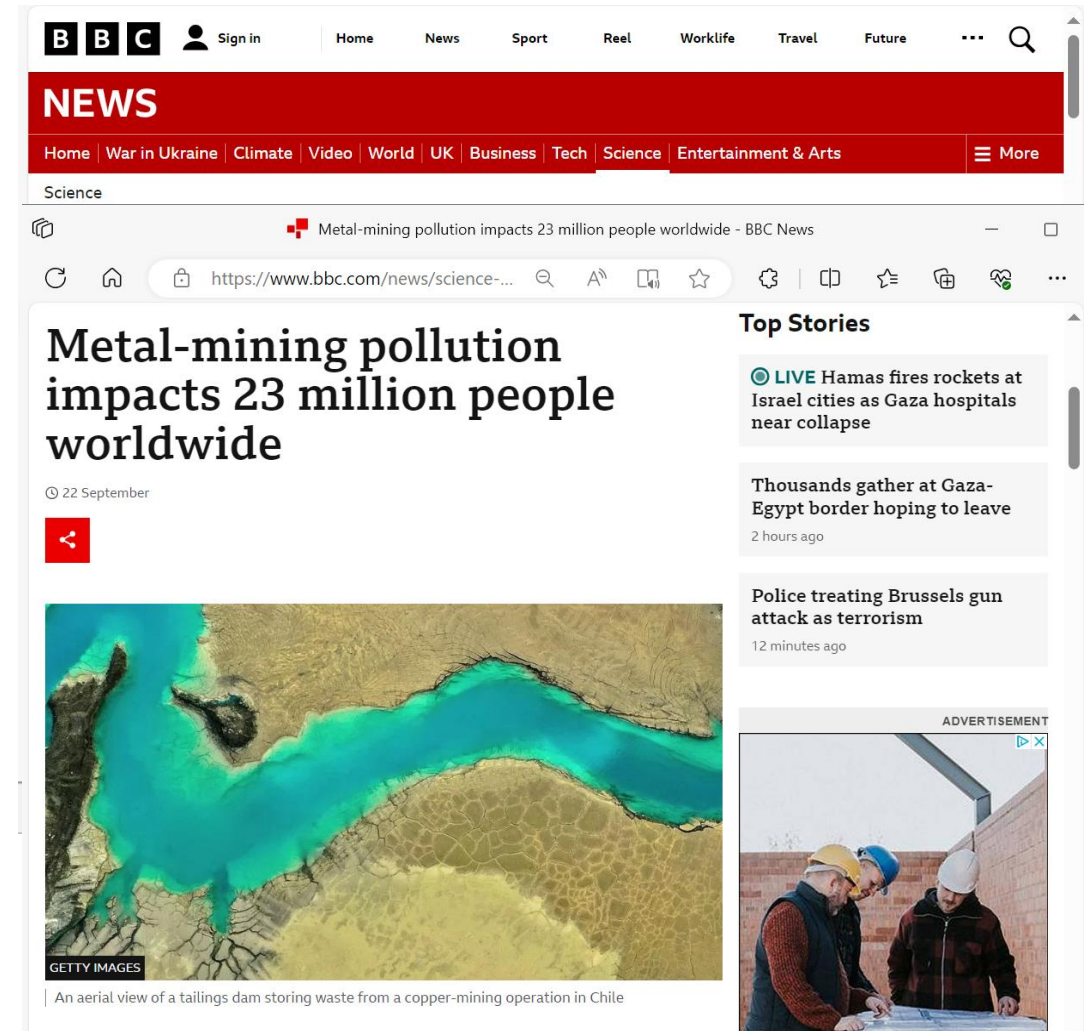
Milieu-impact categorieën (volgens NEN-EN 15804)

Milieu-impactcategorie	Indicator	Eenheid
Klimaatverandering - totaal	GWP-totaal	kg CO2-eq.
Klimaatverandering – fossiel	GWP-fossiel	kg CO2-eq.
Klimaatverandering – biogeen	GWP-biogeen	kg CO2-eq.
Klimaatverandering - landgebruik en verandering in landgebruik	GWP-luluc	kg CO2-eq.
Ozonlaagaantasting	ODP	kg CFC11-eq.
Verzuring	AP	mol H+-eq.
Vermesting zoetwater	EP-zoetwater	Kg P-eq.
Vermesting zeewater	EP-zeewater	kg N-eq.
Vermesting land	EP-land	mol N-eq.
Smogvorming	POCP	kg NMVOC-eq.
Uitputting van abiotische grondstoffen mineralen en metalen	ADP-mineralen&metalen	kg Sb-eq.
Uitputting van abiotische grondstoffen fossiele brandstoffen	ADP-fossiel	MJ, net cal. val.
Watergebruik	WDP	m3 world eq. deprived
Fijnstof emissie	Ziekte door PM	Ziekte-incidentie
Ioniserende straling	Humane blootstelling	kBq U235-eq.
Ecotoxiciteit (zoetwater)	CTU ecosysteem	CTUe
Humane toxiciteit, carcinogeen	CTU humaan	CTUh
Humane toxiciteit, non-carcinogeen	CTU humaan	CTUh
Landgebruik gerelateerde impact / bodemkwaliteit	Bodemkwaliteitsindex	Dimensieloos

Verdere issues met metaal-mijnbouw....



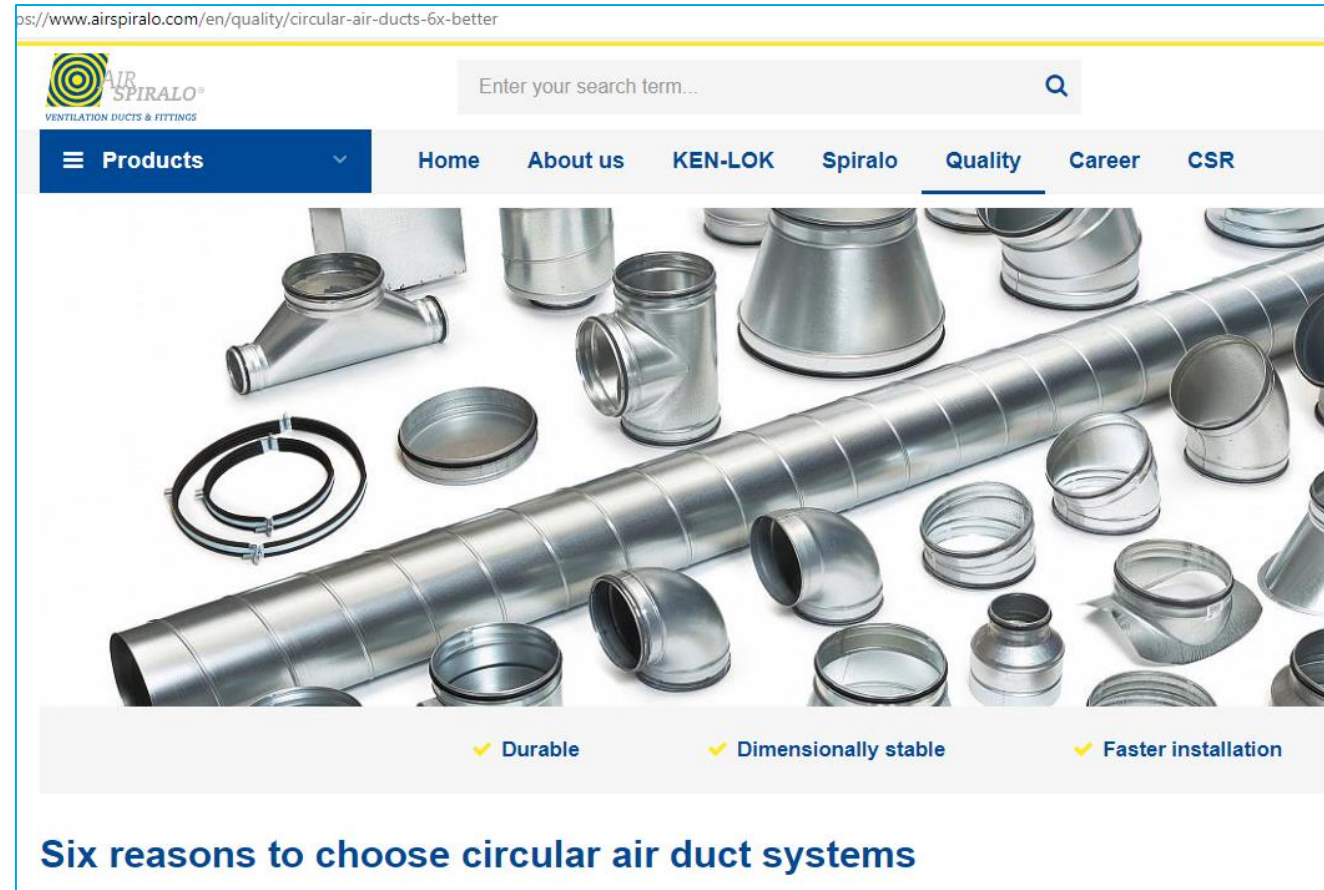
The image shows a YouTube video player interface. The video is titled "Copper and the dark side of the energy transition | DW Documentary". The video content shows a man in a dark vest over a patterned shirt, looking serious. A subtitle reads "Copper mining has poisoned the entire region." The video player includes standard controls like play, pause, and volume, and a "SUBSCRIBE" button in the bottom right corner.



The image is a screenshot of a BBC News website article. The main headline is "Metal-mining pollution impacts 23 million people worldwide", dated 22 September. Below the headline is a satellite-style map showing a large area of land in shades of cyan and green, representing the impact of pollution. The caption below the map reads: "An aerial view of a tailings dam storing waste from a copper-mining operation in Chile". To the right of the main article, there is a "Top Stories" section with three items: "LIVE Hamas fires rockets at Israel cities as Gaza hospitals near collapse", "Thousands gather at Gaza-Egypt border hoping to leave", and "Police treating Brussels gun attack as terrorism". At the bottom right, there is an advertisement for a construction site with workers in hard hats.

Status quo installatie sector?

Google maar eens op 'circular ventilation systems':



The screenshot shows the website for Air Spiralo, a company specializing in ventilation ducts and fittings. The page is titled "Six reasons to choose circular air duct systems" and features a navigation menu with options like Home, About us, KEN-LOK, Spiralo, Quality, Career, and CSR. The main content area displays various circular air duct components, including long sections of duct, elbows, tees, and flanges. Below the image, three key benefits are highlighted: "Durable", "Dimensionally stable", and "Faster installation".

ps://www.airspiralo.com/en/quality/circular-air-ducts-6x-better

AIR SPIRALO
VENTILATION DUCTS & FITTINGS

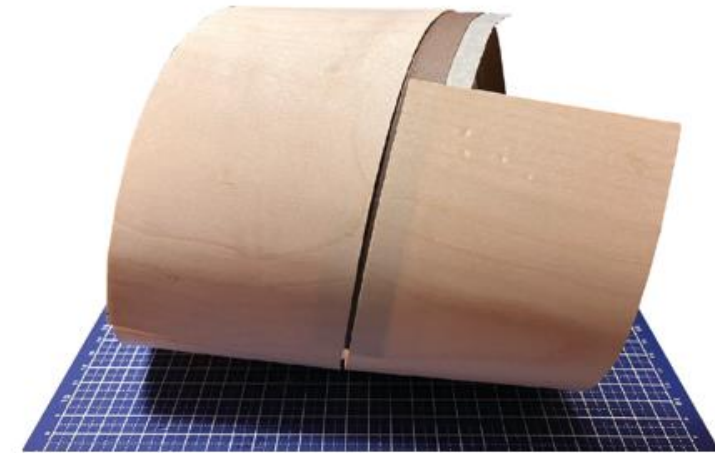
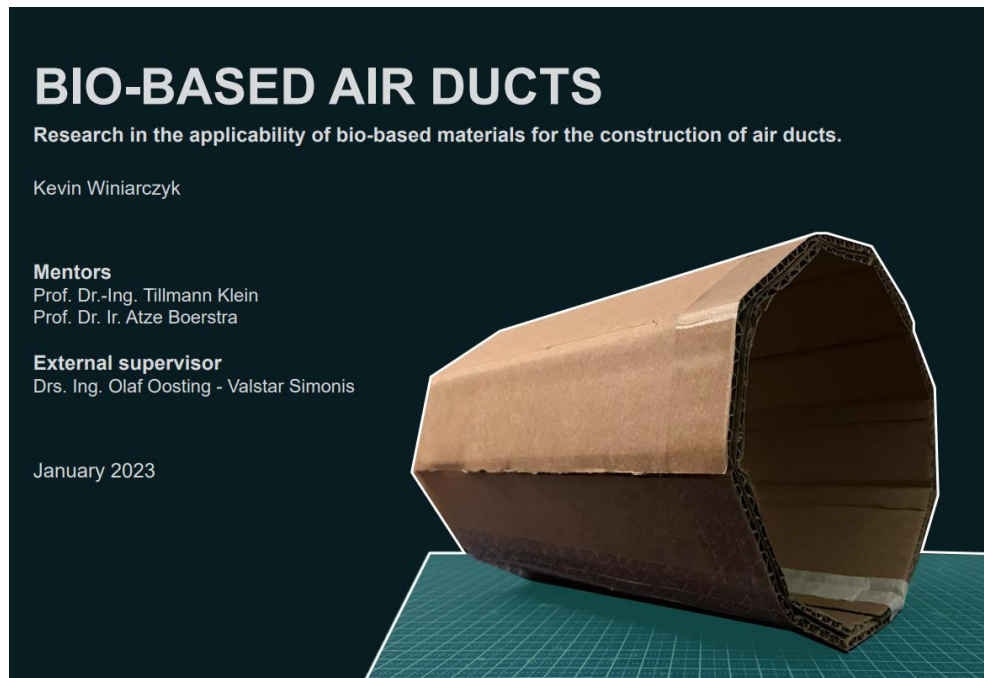
Enter your search term...

Products Home About us KEN-LOK Spiralo **Quality** Career CSR

✓ Durable ✓ Dimensionally stable ✓ Faster installation

Six reasons to choose circular air duct systems

Bio-based air ducts project TUD Master student

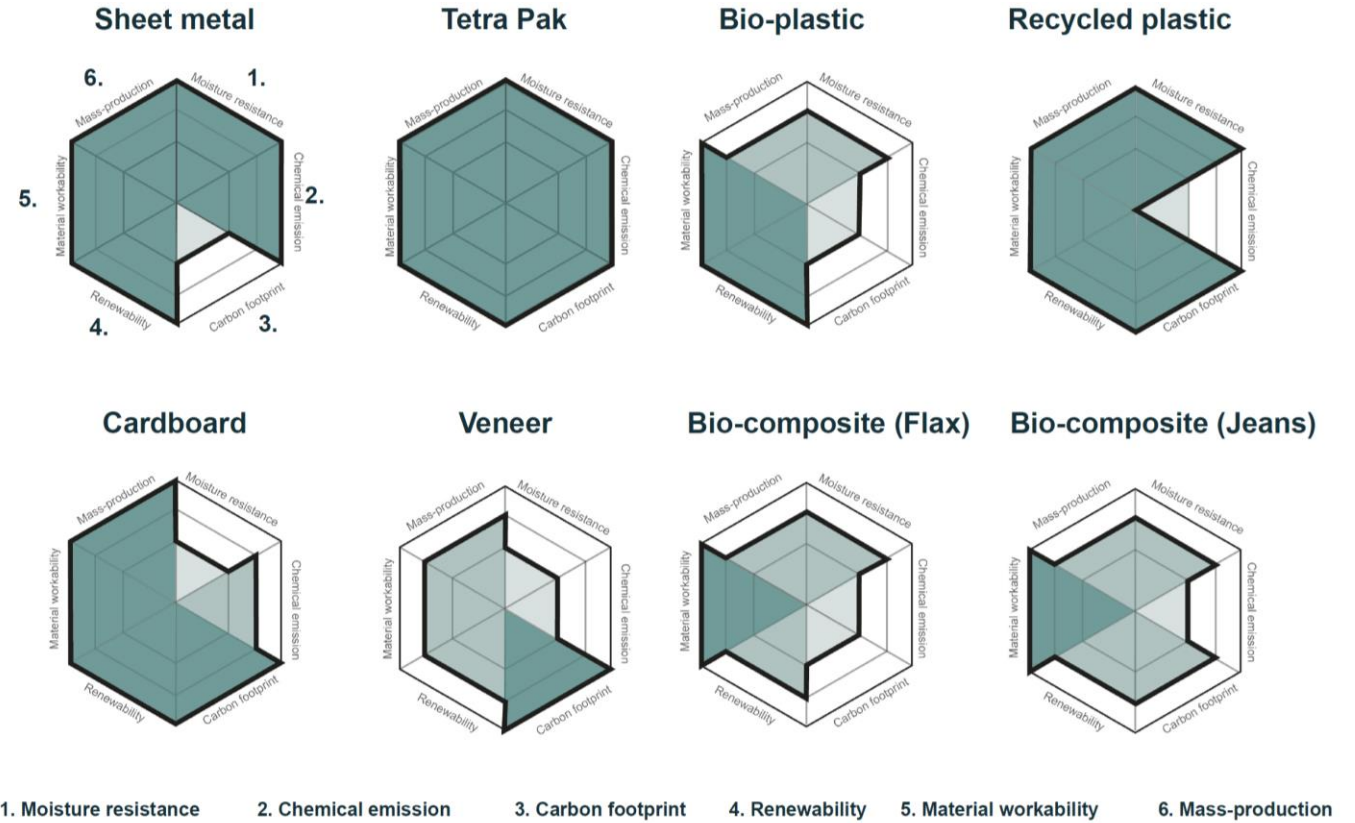
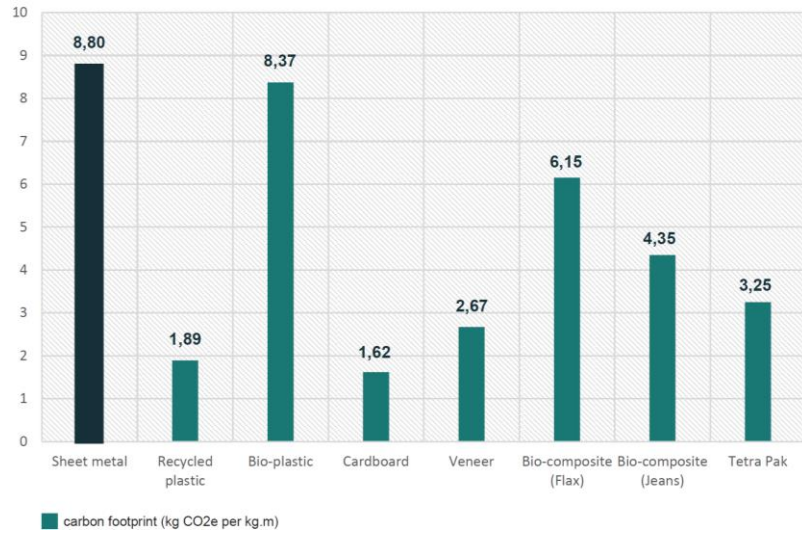


Veneer



Bio-Composite

Analysis

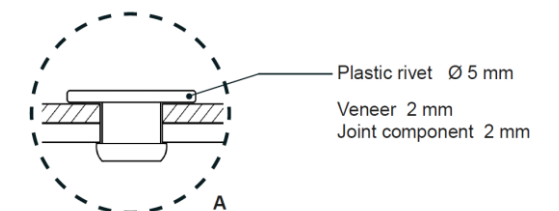
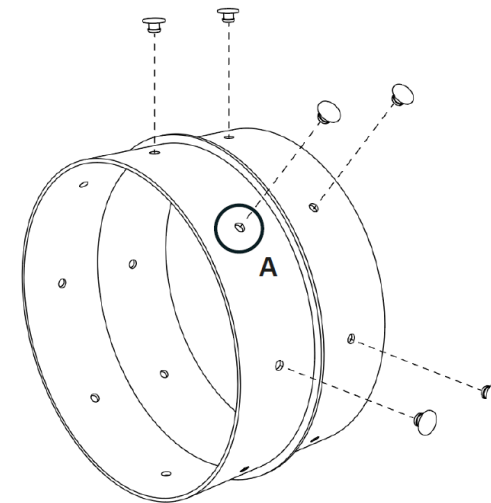


Final recommendation Tetra Pack & Recycled plastics



**Sheets of Tetra Pak - 95% bio-based
Recycled plastic**

Joints: recycled plastics



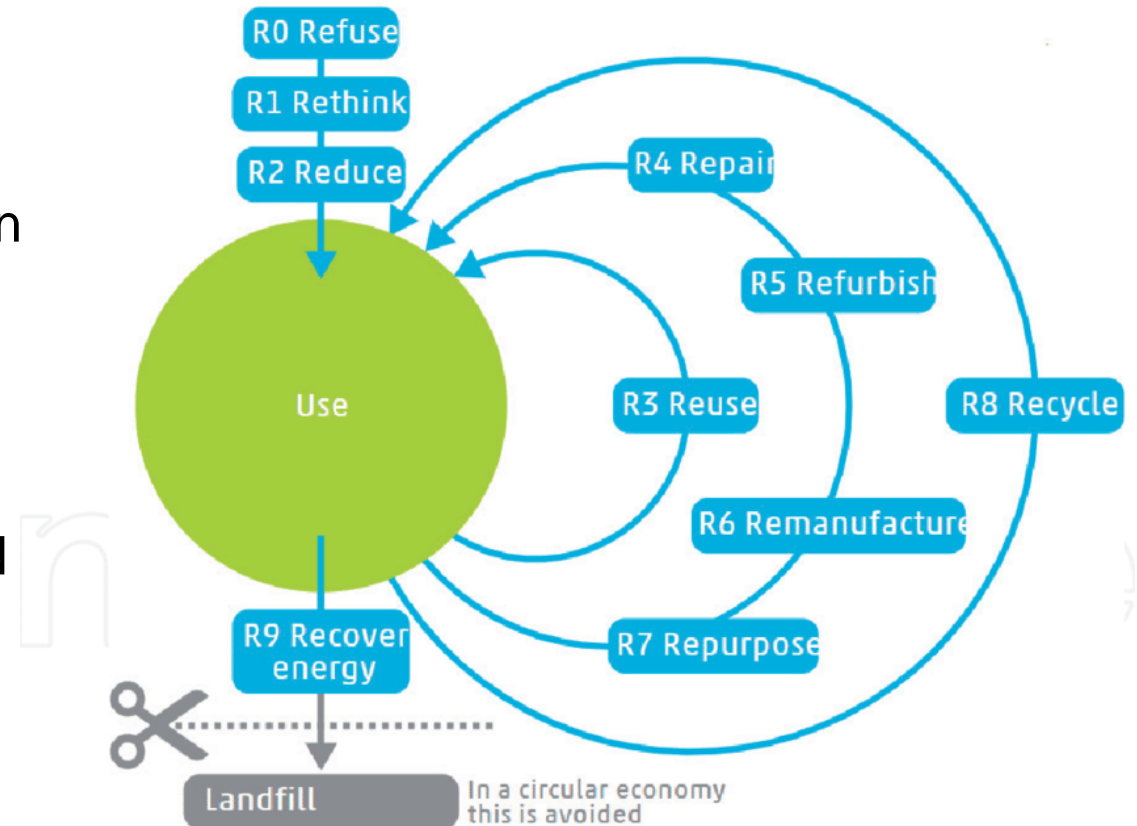
Circulaire installatie-(her)ontwerp- strategieën



Voorbeelden:

1. Installatie-arter bouwrenoveren
2. Hergebruik aanwezige inst. componenten
3. Reconditioneren bestaande elementen
4. Biobased material waar mogelijk
5. Detailleren op repareer/losmaakbaarheid
6. Gebruik van xx% gerecycled metaal
7.

Circular economy / R-ladder



Ter afsluiting

- omslag in het (installatie)denken is nodig
- o.a. omdat we (deels) in de kritieke materialen hoek zitten
- systemische aanpak is daarbij nodig
- soms kan het idd installatie-arter (rethink!)

