



Rijksvastgoedbedrijf
*Ministerie van Binnenlandse Zaken en
Koninkrijksrelaties*

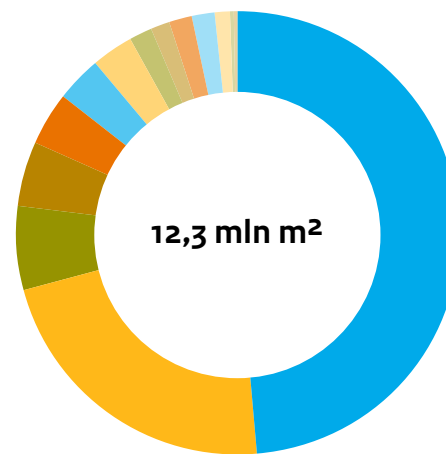
Circular construction is the future

the CGREA moves ahead

TU Delft
Fokke van Dijk
21-06-2018



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Koninkrijksrelaties



Defensie inrichtingen (kazernes, (munitie)opslagplaatsen etc.)	49%
Kantoren	19%
Gerechtsgebouwen	6%
Penitentiaire inrichtingen	9%
Paleizen en Hoge Colleges van Staat	3%
Musea	3%
Nationale Politie (is het oude deel KLPD)	1%
Archieven	1%
Laboratoria	1%
Internationaal	1%
Overig	7%



1. Policy goals

Circular construction

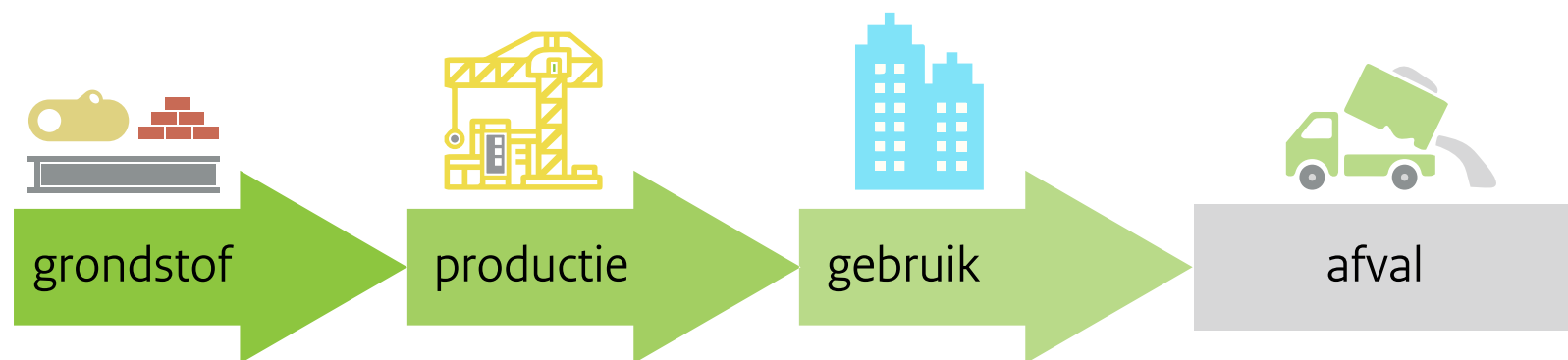
addresses the development, use and reuse of buildings, terrains and infrastructure without unnecessary exhaustion of natural resources, without polluting the living environment and without depleting biodiversity and ecosystems

The goal is to build in an economically viable way while contributing to the wellbeing of mankind and the world as a whole. **Everywhere and forever.**



1. Policy goals

Current process of resource depletion

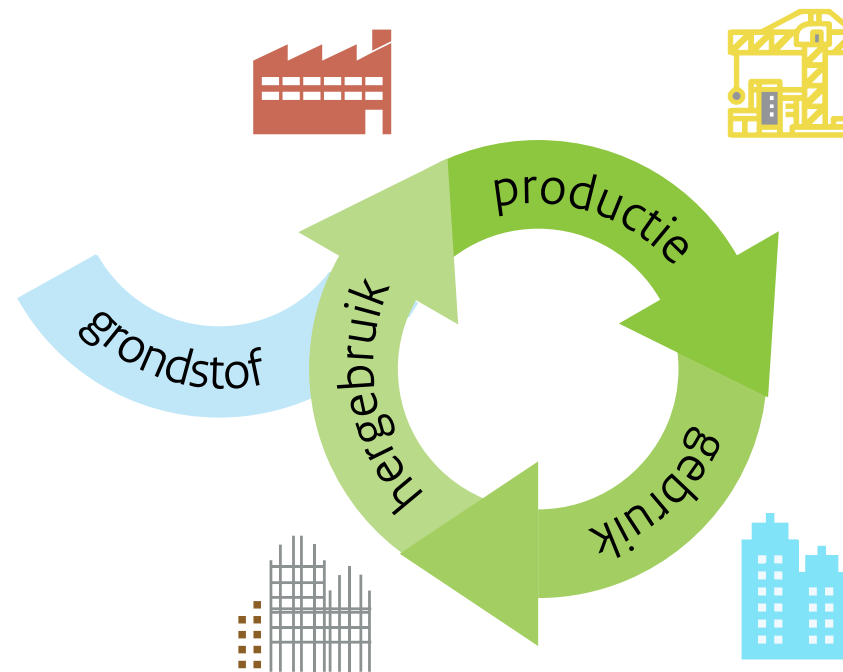


*Current construction practice is based upon: **take - make - waste***



1. Policy goals

New closed circular resource cycle

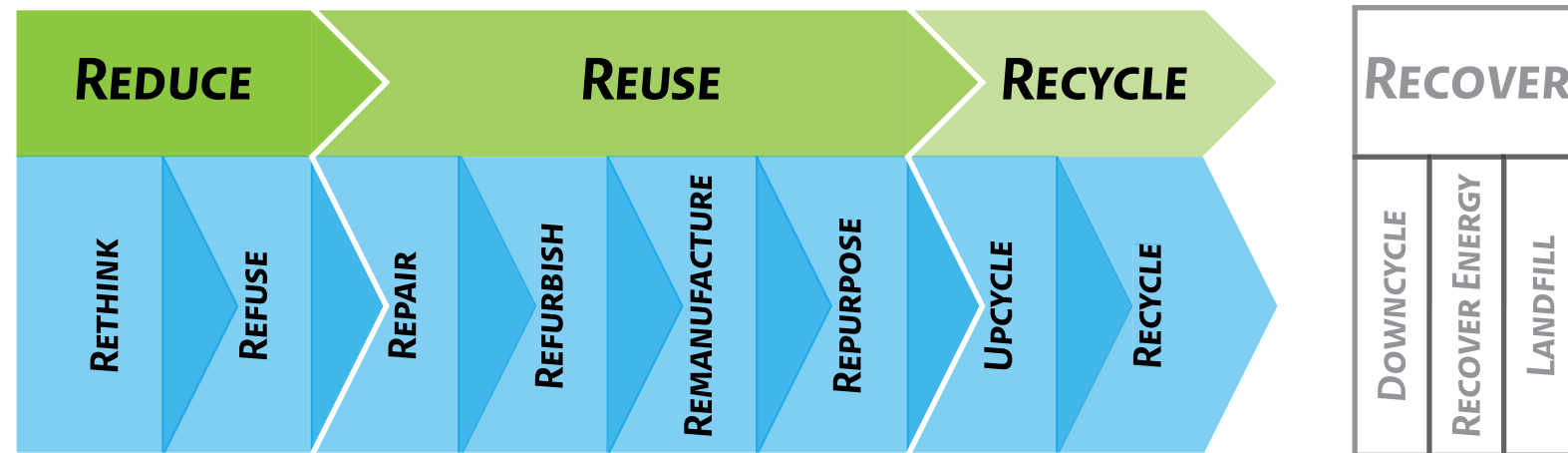


Nederland Circulair, a closed cycle of resource utilisation



1. Policy goals

Circular building



The trias ecologica, material strategy: Reduse - Reuse - Recycle



Refuse/rethink: Rijnstraat 8 (2017)

- *efficient: now housing not 1 but 3 ministries*
- *new interior, installations and refurbishment*
- *improved floorplans with higher efficiency*
- *compliant with current standards and demands*
- *lower energy consumption*

The goal of the CGREA is to reduce the total surface of office floors for the central government with 33 % - about 1.00.000 m²





Repair: B30 (2017)

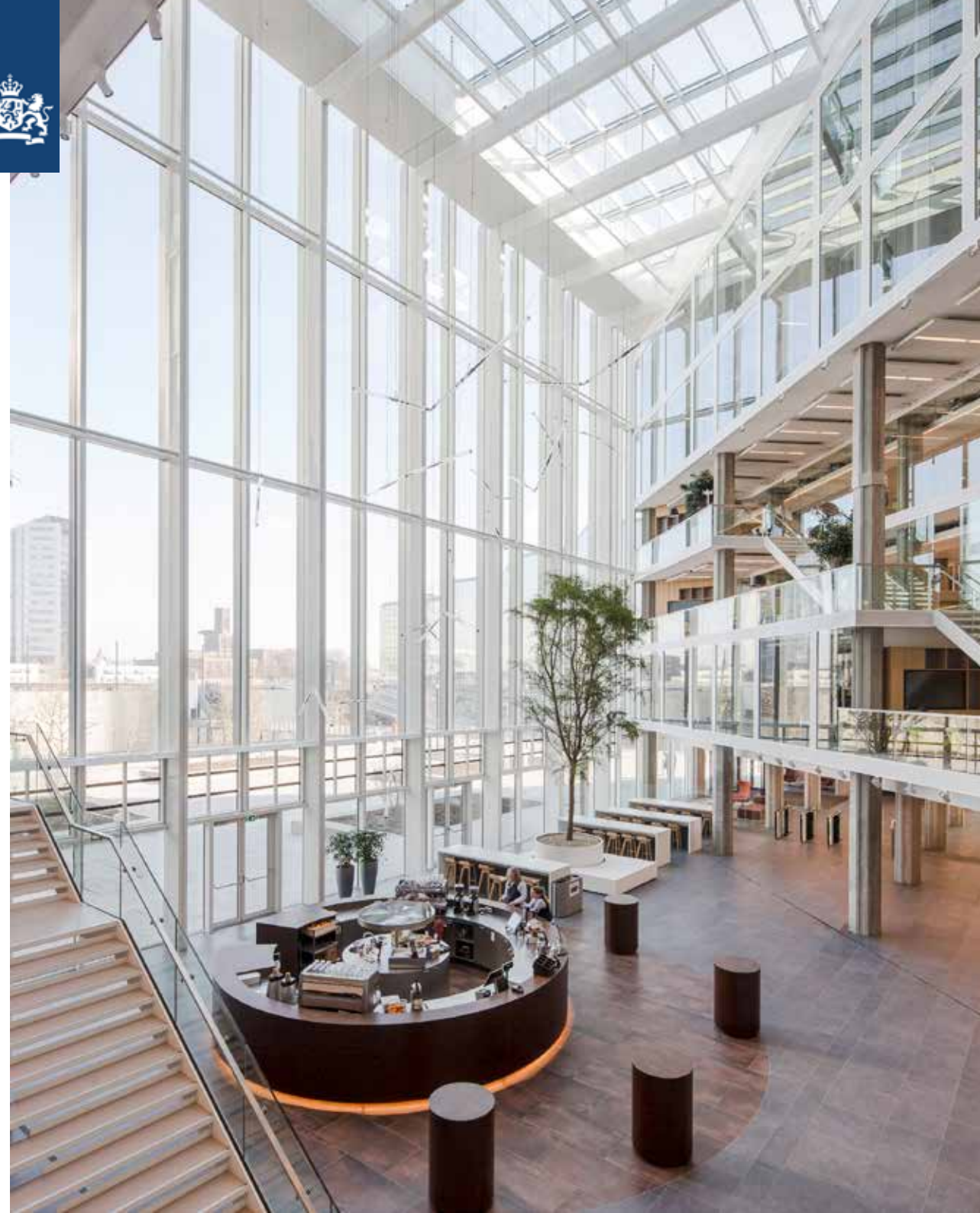
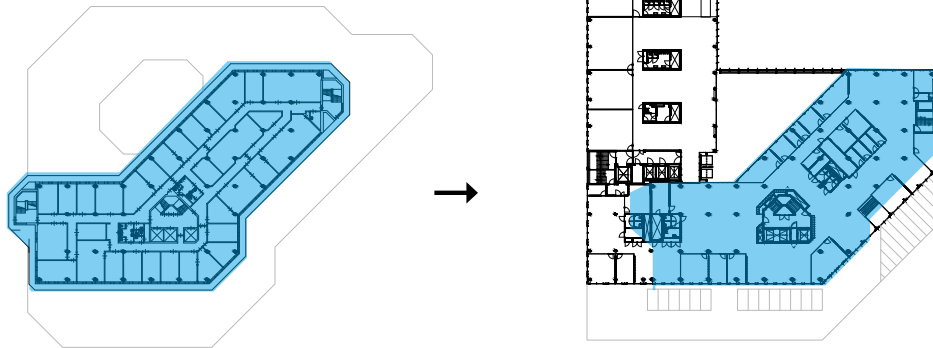
- over 100 years of usage
- different upgrades and repairs (1994, 2014)
- preservation of its monumental value
- compliant with current standards and demands





Reuse: De Knoop Utrecht (2018)

- *redevelopment of old office and extension*
- *existing office building construction reused*





Repurpose: De Knoop pavilion (2018)

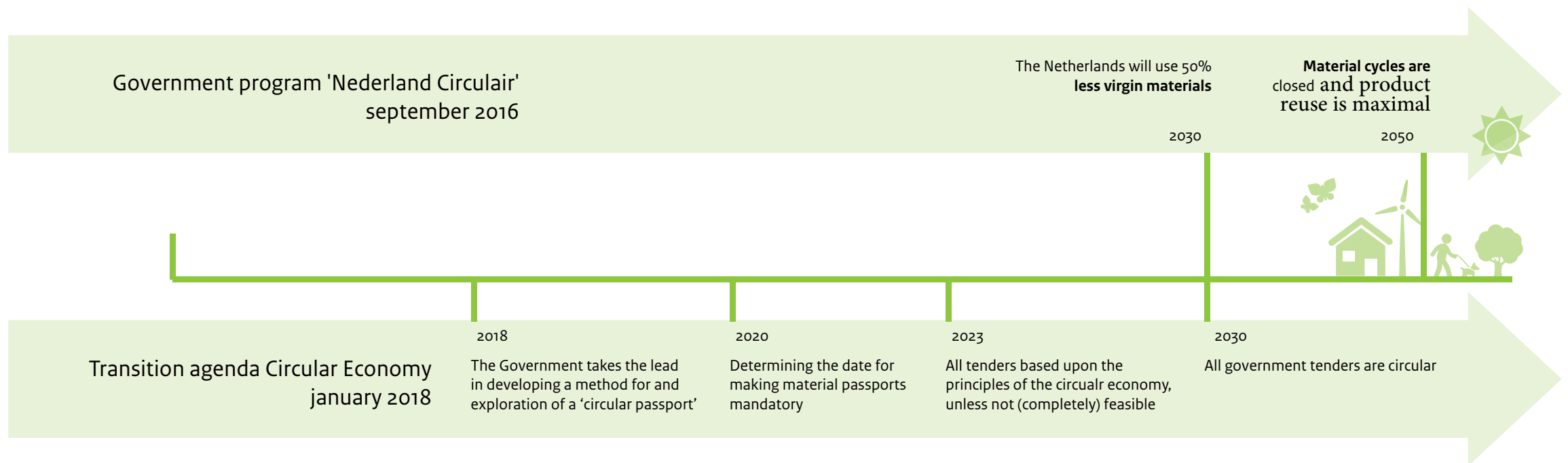
- *new building with a temporary purpose*
- *circular construction method*
- *repurpose of existing building materials*





1. Policy goals

Policy goals

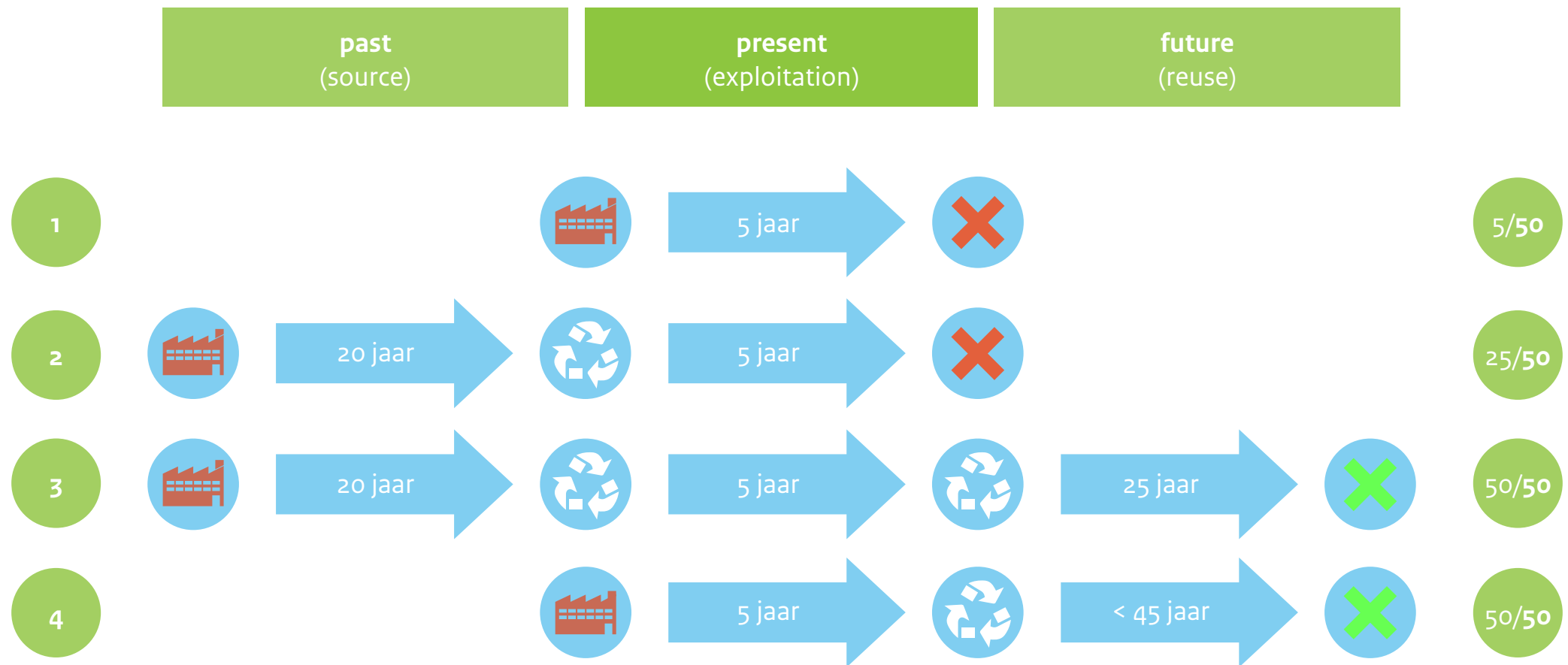


The Government stimulates the circular economy as a 'launching customer'



2. Practical approach

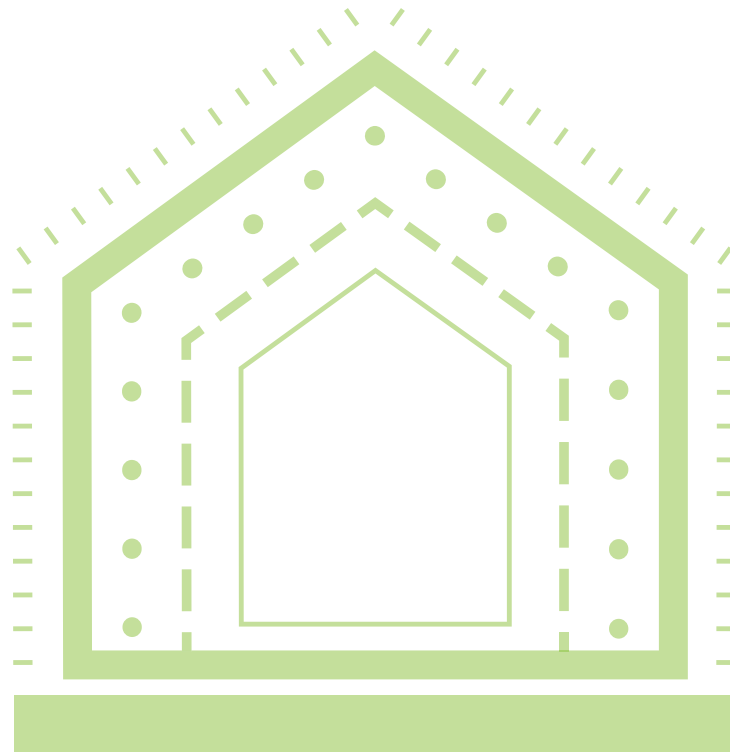
Life cycle approach to building materials





2. Practical approach

Life cycle approach to building materials



Shearing layers of change
*because of the different rates
of change of its components, a
building is always tearing itself
apart. - Stewart Brands*

- ||||| skin
- structure
- ... services
- - - space plan
- stuff
- site



2. Practical approach

development of building materials
documentation system in BIM



Tijdelijke rechtbank Amsterdam

- *temporary building to support the development of the new courthouse*
- *only 5 years of usage*
- *design based on demountability and reuse on other site*
- *contractor remains the owner of the building*





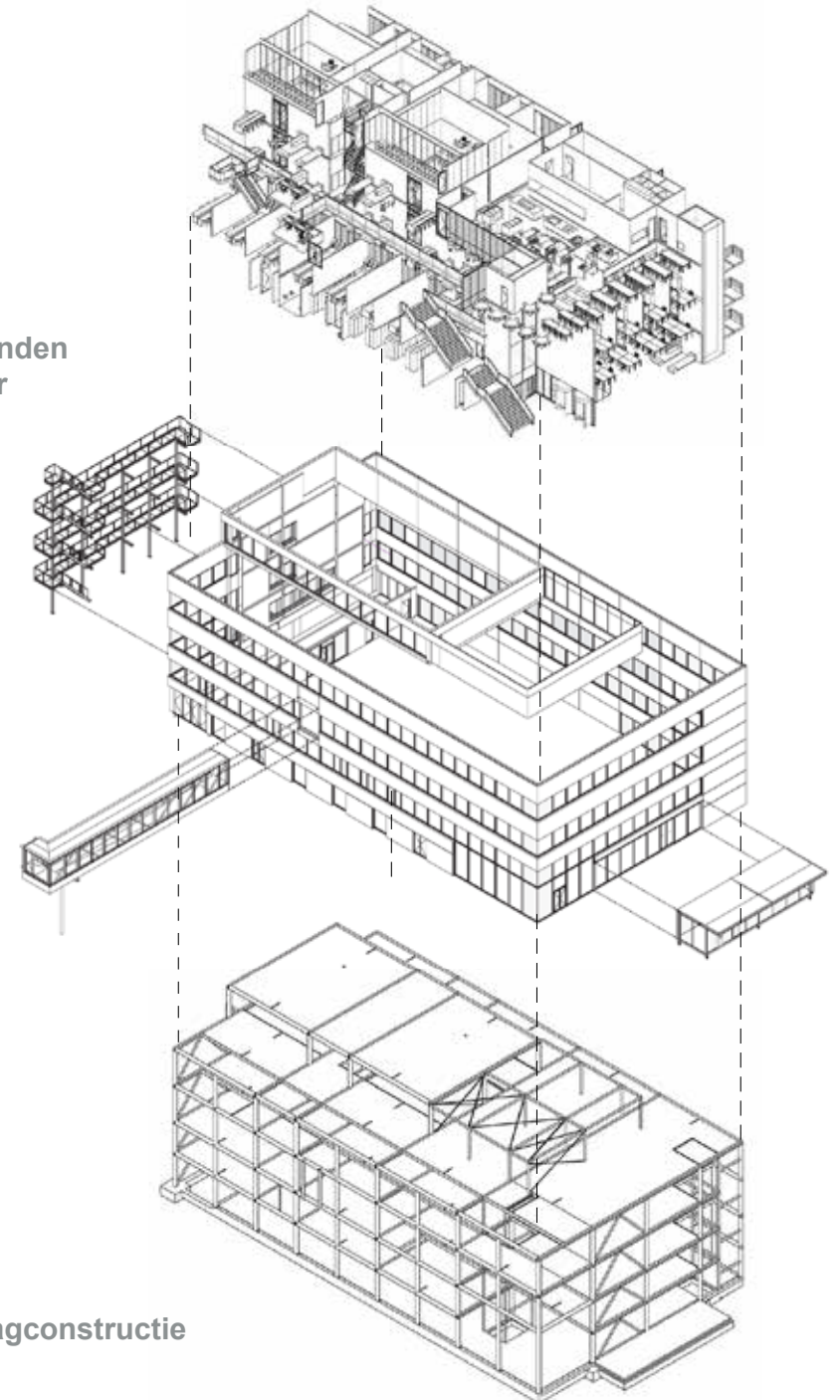
Ontwerp

- *The building is constructed as a building kit*
- *Every layer can have its own independent life cycle*
- *Detailing creates an easy demountable building and reusable building elements*

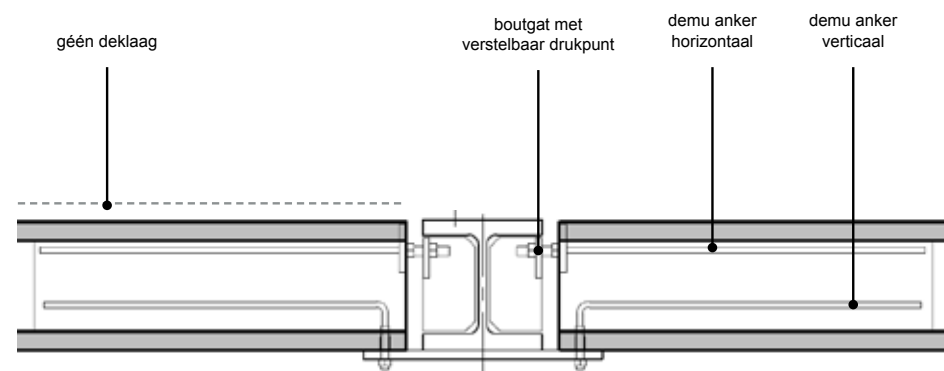
binnenwanden
& interieur

gevels

hoofddraagconstructie

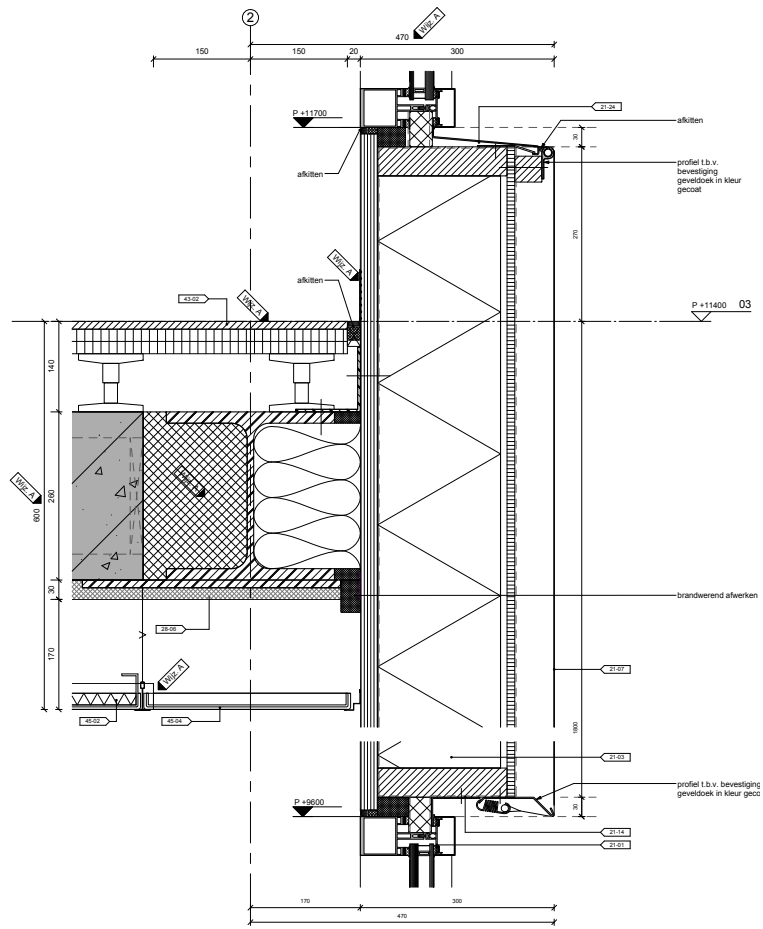


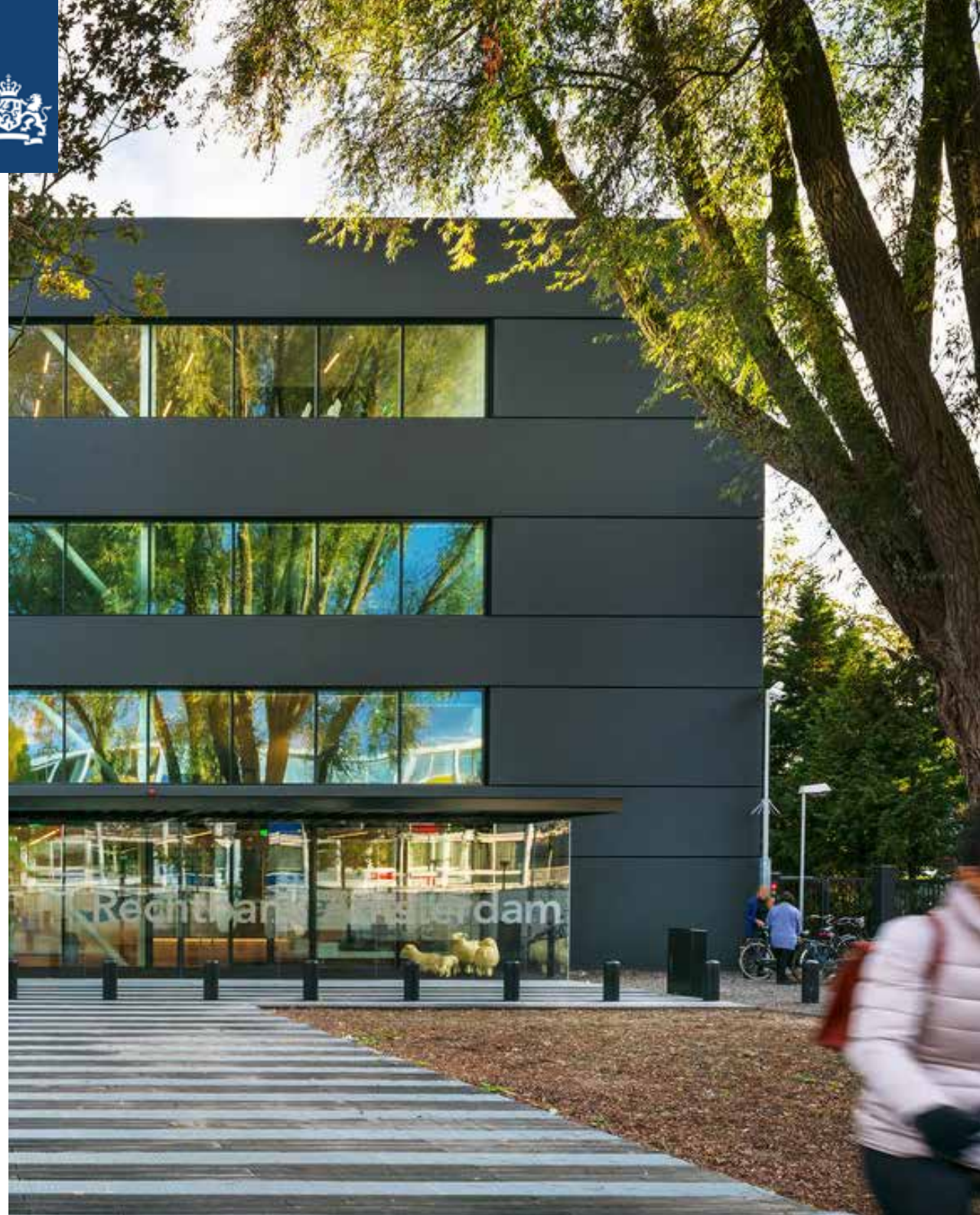
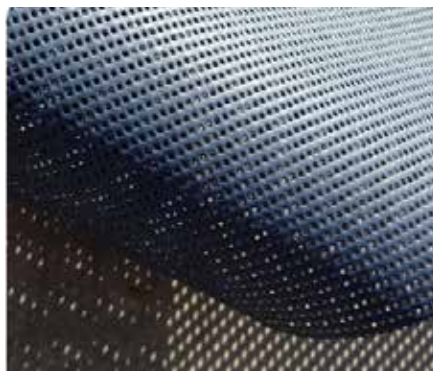
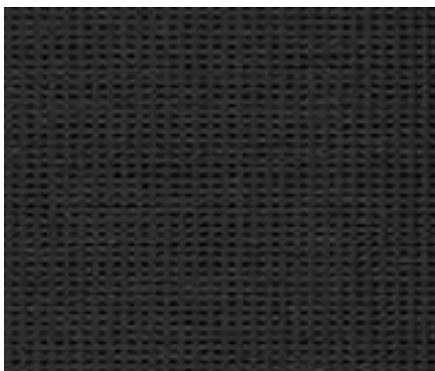






AL556







Pavilion de Knoop

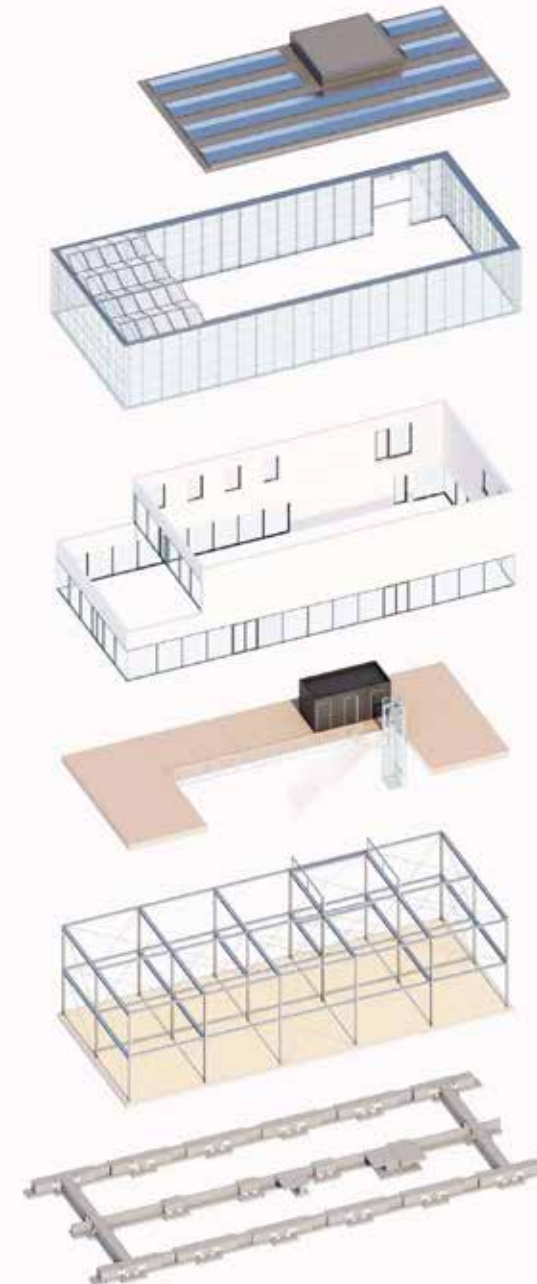
- *new building with an expected short life span*
- *Constructed with recycled building elements from the former Itgen de Knoop office on site and reusable construction elements from the glasshouse industry*
- *The design is made to measure the available building materials*





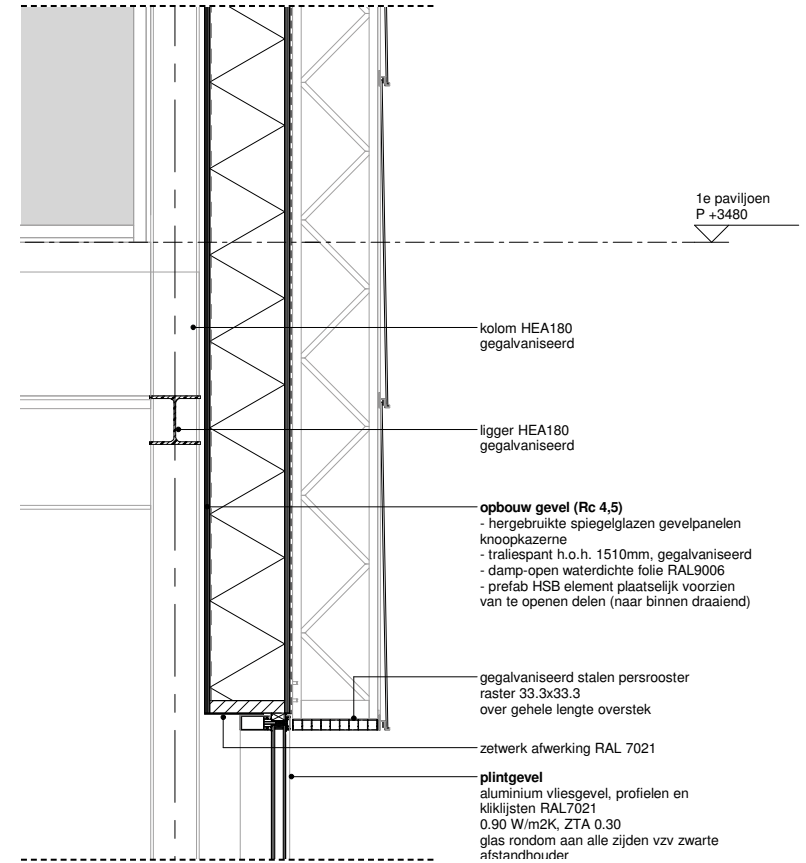
Ontwerp

- Designed as a demountable building kit
- every layer is demountable and reusable
- Reuse of as much harvested materials as possible
- Use of circular products
- refusal of unnecessary materials (no poles, no ground floor)













3. Challenges

Analysis of challenges:

- *Designing a demountable building is easy*
- *A challenge is the lack of available recycled materials*
- *A proper circular supply chain economy in building products is not available*
- *The structure of a building has great reuse potential*
- *For facade elements technological innovation and modified regulations make reuse harder*
- *Reuse is expensive because it is labour intensive, new products from an optimised production process are cheaper*



3. Challenges

Ambitions:

- *Make demountability mandatory*
- *invest in materials that are 'worth' harvesting*
- *Build with harvested products*
- *stimulate a supply chain for harvested / recycled products*
- *make harvestable products easy to find*



Galileo Reference centre

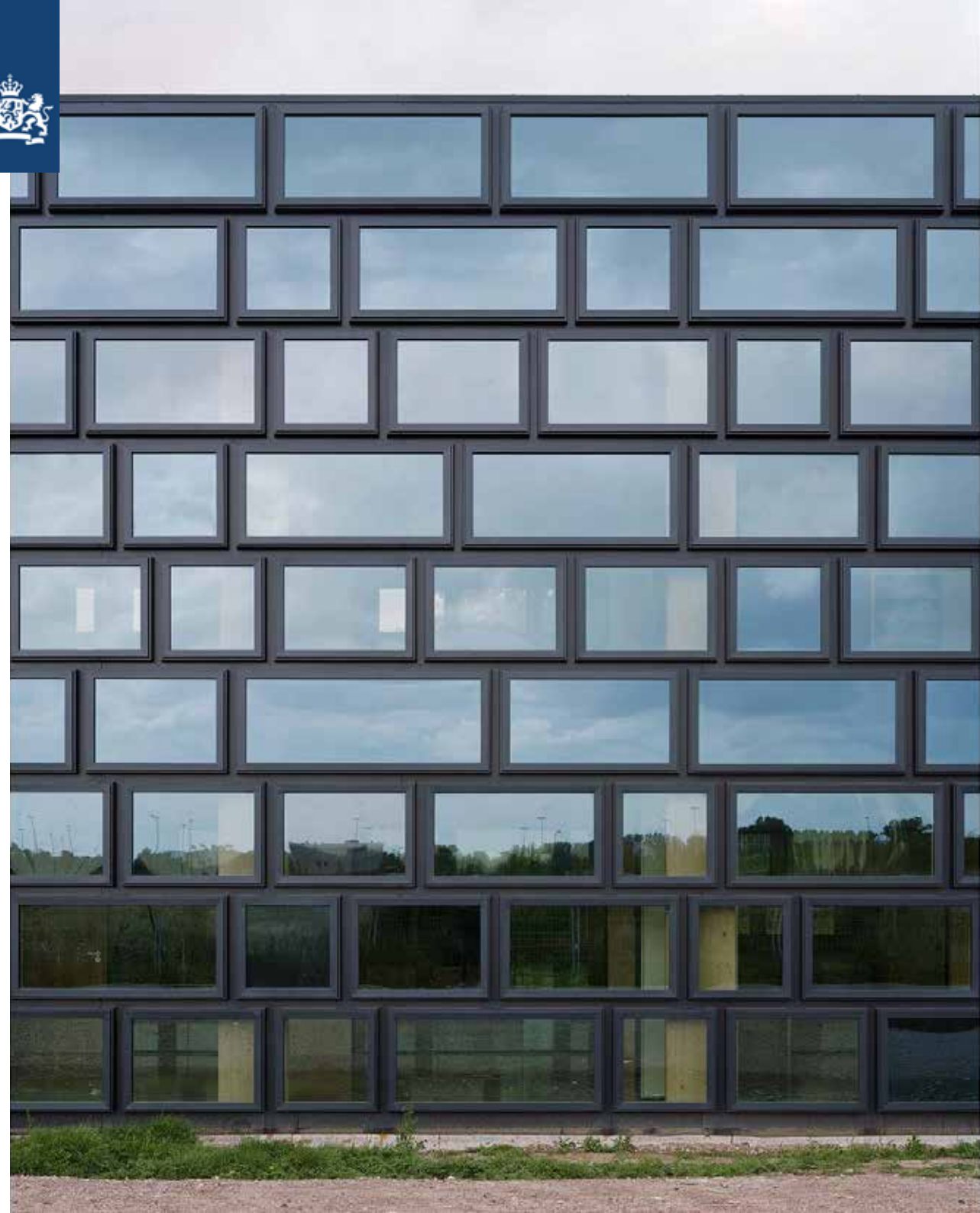
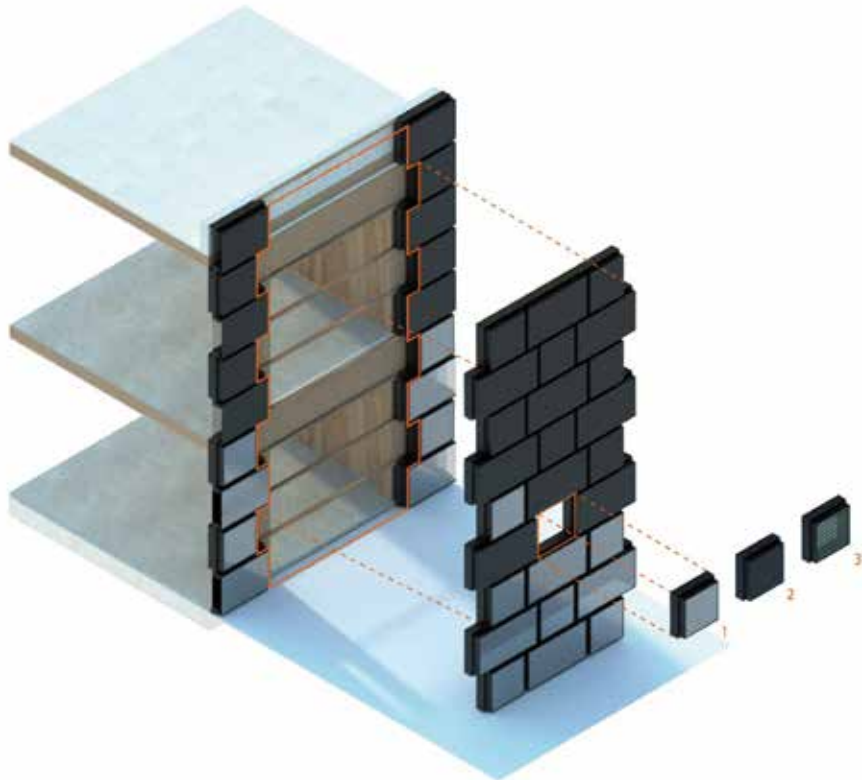
- *New building*
- *development of a digital material passport*





Facade

- *Wooden construction, floors and facade*
- *Lightweight: foundation on sand*
- *Standardised facade*
- *Demountable detailing*
- *Catalog of used materials*





material passport Galileo

BLDNG360

GEBOUWEN

BEDRIJVEN

DIENTEN

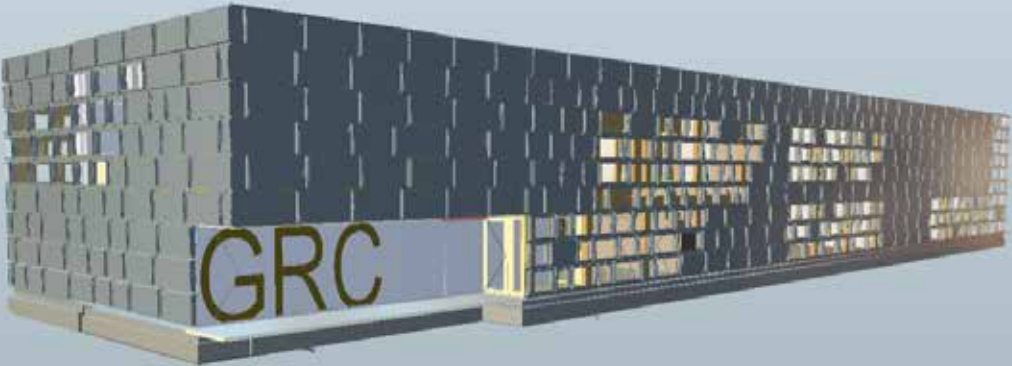
APPS

NL | EN

Zoeken

CIRCULAR CLOUD

BA



algemeen

onderdelen

informatie

incidenten

Circular Cloud

Filter

onderdelen

All	Lines	14
Assembly Code	Floors	1
Fire Rating	Structural Framing	23
Manufacturer	Walls	1



material passport Galileo

BLDNG360

GEBOUWEN

BEDRIJVEN

DIENSTEN

APPS

NL | EN

Zoeken

CIRCULAR CLOUD

BA

Model

Rockfon Knox A24 inleg

Manufacturer

Rockfon

Type Comments

wit gekleurd

URL

Description

Plafondpaneel

Assembly Description

plafondafwerkingen; verlaagd, systeem plafond

Assembly Code

45.12

Type Mark

type: 1

algemeen

onderdelen

informatie

incidenten

Circular Cloud

Filter

onderdelen

All

Assembly Code

Fire Rating

Manufacturer

Material

Level

Structural

Room

RF-Technologies Nederland

Rockfon

SCHULL

Saint-Gobain

Schuurmans Albouwsystemen

Schüco

Semicoglas

30

10

9

500

102

327

29

Compound Ceiling [1493221]

Compound Ceiling [1493353]

Compound Ceiling [1493389]

Compound Ceiling [1493426]

Compound Ceiling [1493480]

Compound Ceiling [1493619]

Compound Ceiling [1493655]

Compound Ceiling [1493690]



4. Recommendations



Use available materials and products



Create the conditions for usage in future cycles



use renewable resources



Create the conditions for a long building lifespan



minimalise environmental impact of usage





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