

# **PROJECT MANAGEMENT IN CIRCULAR BUILDING PROJECTS**

*Developing a management framework supporting the re-use  
of components*

P5 presentation  
Lotte Meijers  
July 3 2020



## Een gebouw is geen wegwerpproduct

zaterdag 7 september 2019

De bouw is de meest vervuilende industrie. Daar komt bij dat we gebouwen gewoon slopen als we ze niet langer nodig hebben, het zijn wegwerpproducten. Jonge doctor Marc van den Berg pleit ervoor dat we gebouwen ook gaan zien als grondstof en dus gaan werken aan een alternatief: circulair bouwen.

< Terug

Geschreven op : 10 apr 2020

## Bouw cruciale schakel in circulaire economie

### Haalbare en schaalbare oplossingen gevraagd

*Tekst Hans Hajée, Foto's Bert Rietberg/J.P. Van Eesteren*

**Circulariteit is een veelbesproken thema. "Toch bestaat nog vaak onduidelijkheid over de exacte betekenis," zegt Irene ten Dam, Domeinmanager Groen bij de Economic Board Utrecht (EBU). Circulariteit gaat veel verder dan recyclen. "Het begint ermee, zo min mogelijk nieuwe materialen te gebruiken. Dat moet het uitgangspunt zijn bij het ontwerp. Mocht een product of gebouw overbodig zijn dan krijgt het idealiter een volgend leven in geheel of gedeeltelijk dezelfde vorm. Lukt dat niet dan moeten losse onderdelen en materialen eenvoudig herbruikbaar zijn. Ook hierbij speelt het ontwerp een belangrijke rol. Denk aan de toepassing van droge verbindingen zoals schroeven. Pas als hergebruik van materialen onmogelijk blijkt, is recyclen aan de orde."**

Sources: NPORadio1 (2019), Bendsdorp (2019) & Hajee (2020)

Opinie Duurzaamheid

## De stikstofcrisis toont aan: we moeten sneller circulair gaan bouwen



De bouw mag dan stilliggen door de stikstofcrisis, de bedrijfstak is ook mede schuldig. Snelle vernieuwing is nodig, zegt architect en bestuurslid Vereniging Integrale Bio-Logische Architectuur Joop Bendsdorp.

Joop Bendsdorp 31 oktober 2019, 13:15

## Succesvolle toepassing donorskelet brengt circulaire economie voor gebouwen stap dichterbij



Meerdere gebouwen kregen afgelopen jaren een 'donorskelet'. Dat betekent dat delen van een tweedehands constructie opnieuw worden toegepast. Een opvallende ontwikkeling in de transitie naar een circulaire economie.

05-03-2020 12:27 | DC

## Einde aan wegwerpmentaliteit: 'Unieke manier circulair bouwen in Enschede'

**ENSCHEDÉ** - In Stroinkslanden is deze week gestart met de sloop en de vervangende nieuwbouw van zeven huurwoningen. Veel bestaande materialen worden hergebruikt. „Een uniek voorbeeld van circulair bouwen”, zegt projectleider **Stef Oude Sanderink**.

Bert Hellegers 07-05-20, 10:34

Sources: Lachmeijer (2020), Hellegers (2020) & Cirkelstad (2020)



## Oproep: Circulair Bouwen: hergebruik van bouwelementen

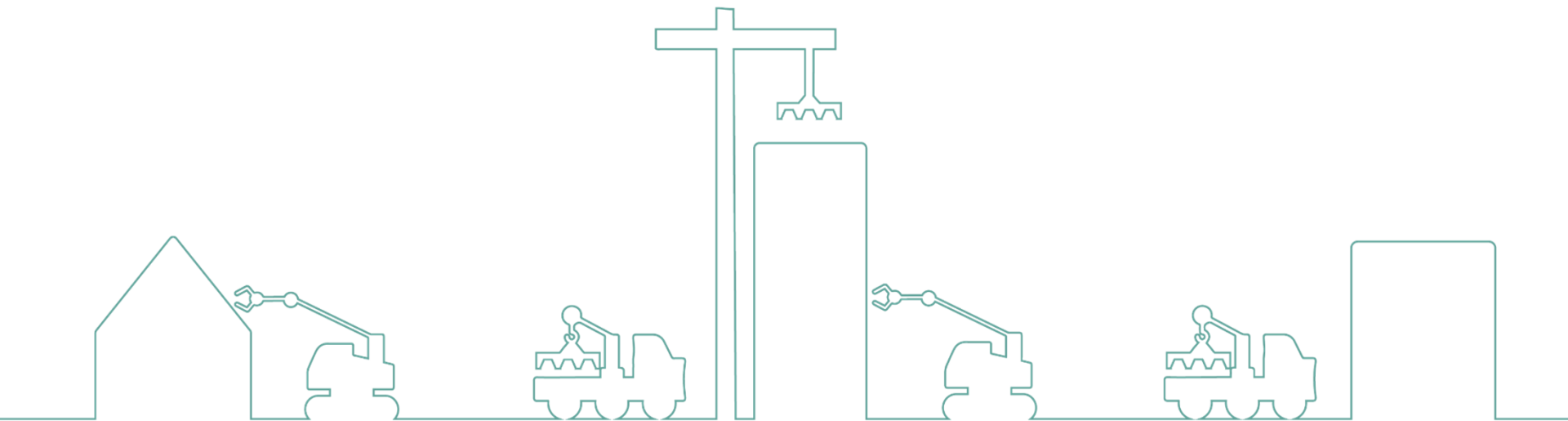
Heeft u ervaring met het hoogwaardig hergebruik van bouwelementen? Bent u bijvoorbeeld een toezichthouder, opdrachtgever of sloopbedrijf en werkt u aan een circulaire bouwsector? Dan zijn wij naar u opzoek!

→ [Meer info en meedoen](#)

# CONTENT

- Introduction
- Research methods
- Findings
- Conclusions & recommendations
- Discussion

# INTRODUCTION



# CIRCULAR ECONOMY

“A **circular economy** is an industrial system that is **restorative or regenerative** by intention and design. It replaces the ‘**end-of-life**’ concept with **restoration**, shifts towards the use of **renewable energy**, **eliminates** the use of **toxic chemicals**, which impair reuse, and aims for the **elimination of waste** through the superior design of materials, products, systems, and, within this, business models”

(Ellen MacArthur Foundation, 2013)

Intro

Methods

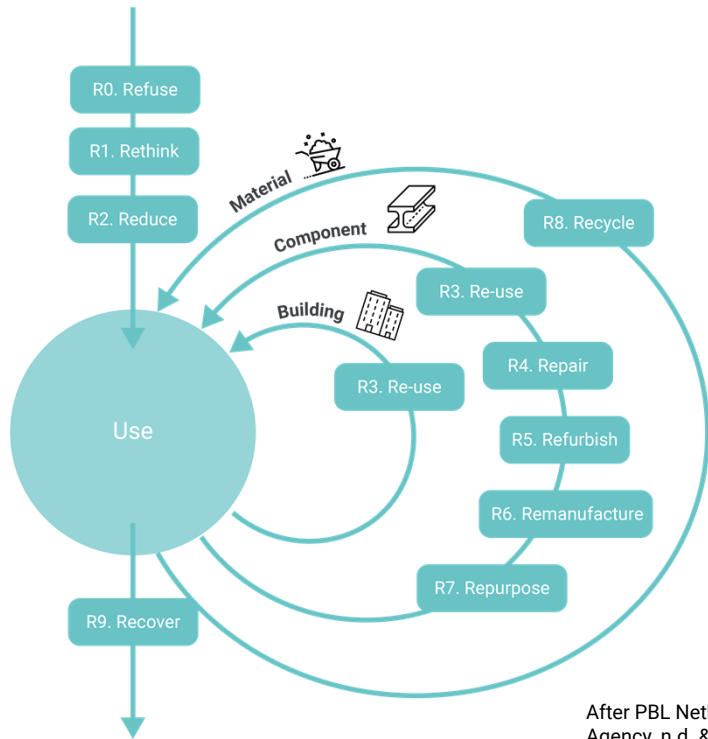
Findings

Conclusion

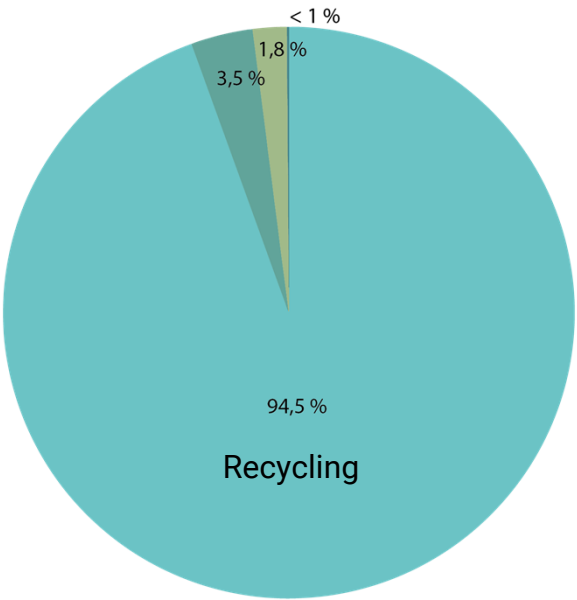
Discussion

# CIRCULARITY BUILDING SECTOR

- Intro
- Methods
- Findings
- Conclusion
- Discussion



### Construction & demolition waste NL

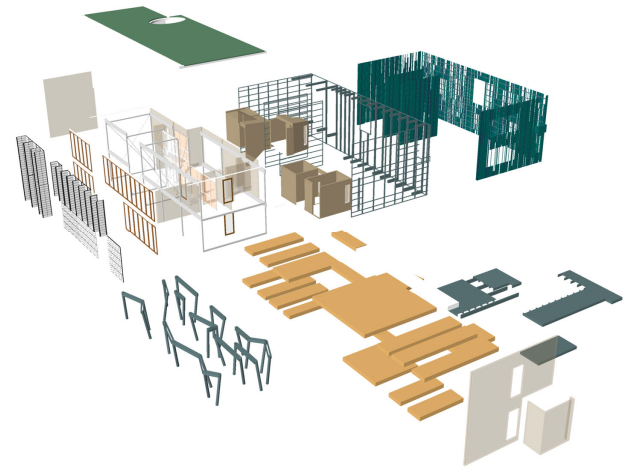


After PBL Netherlands Environmental Assessment Agency, n.d. & Van Haagen, 2018

After Rijkswaterstaat, n.d.

# RE-USE OF BUILDING COMPONENTS

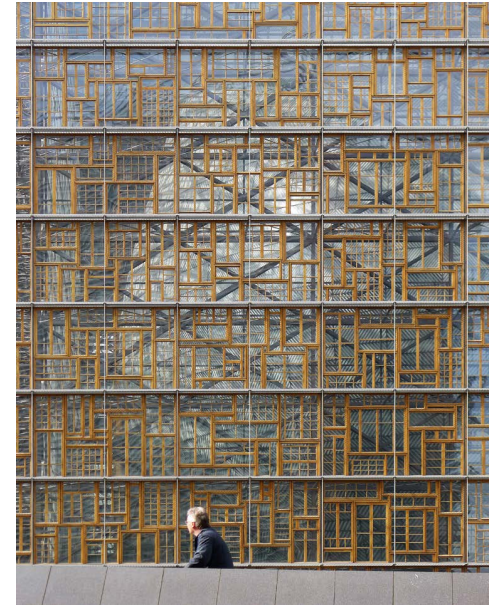
- Design for Disassembly
  - Integrates waste prevention in the design
- Building with re-used building components
  - Re-uses component upfront



Design for disassembly (source: KieranTimberlake, 2008)

# RE-USE OF BUILDING COMPONENTS

- Design for Disassembly
  - Integrates waste prevention in the design
- Building with re-used building components
  - Re-uses component upfront



Re-used window frames Europa Gebouw (source: Thierry Henrard, 2017)

# PROBLEM STATEMENT

The **construction industry** is one of the biggest consumers of raw materials, energy and water. As there is high pressure on the earth's capacities, the construction sector is identified to be in need of improvement and should **reduce its resource intensity**. The concept of the **circular economy** is seen as a potential answer to this.

However, there is still **limited knowledge** on how to bring the concept of the circular economy into practice, including the **(project) management** of a circular building.

The **re-use of reclaimed components** is mentioned to be one way to address circularity in the building sector, however, this is still **not a mainstream practice**.

# RESEARCH QUESTIONS

*In what way can the **briefing**, the **project organization**, and **selection of the project team**, contribute to **re-using building components**?*

## **Re-using building components and circularity**

- 1. What is the re-use of building components?*
- 2. How do circular (re-use) building projects differ from linear projects?*
- 3. What are the project management barriers/constraints for re-using building components (a) and how could they be resolved (b)?*
- 4. What is the role of project management in the initiation phase of circular building projects?*

# RESEARCH QUESTIONS

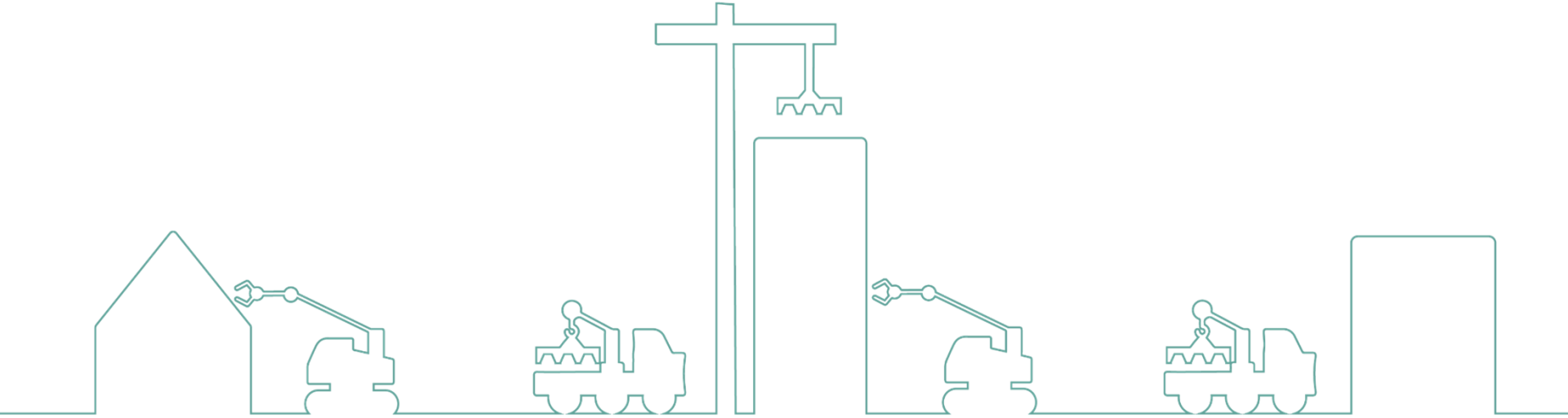
*In what way can the **briefing**, the **project organization**, and **selection of the project team**, contribute to **re-using building components**?*

## **Briefing, project organization & selection of the project team**

*5. What are standard practices concerning the briefing, the project organization, and the selection of the project team?*

*6. How are the briefing, the project organization, and the selection of the project team carried out in re-use projects, and does this contribute to re-using building components?*

# RESEARCH METHODS



# RESEARCH DESIGN

PHASE 1

PRODUCT



Literature study  
PHASE 2

Conceptual framework



Interviews

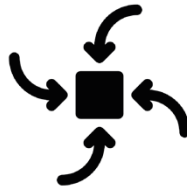
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Case study

Data analysis

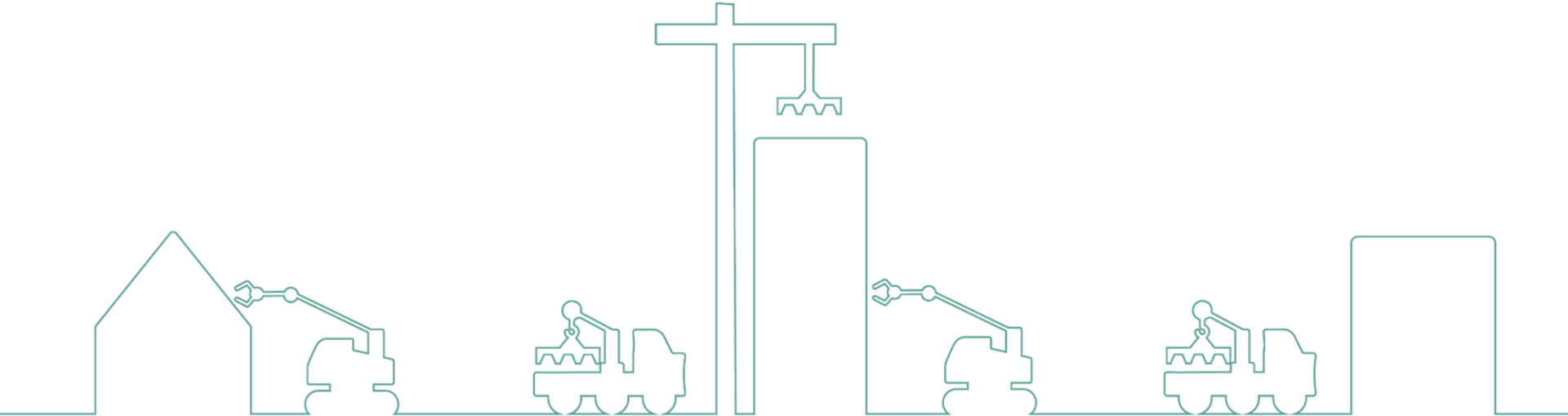
PHASE 3



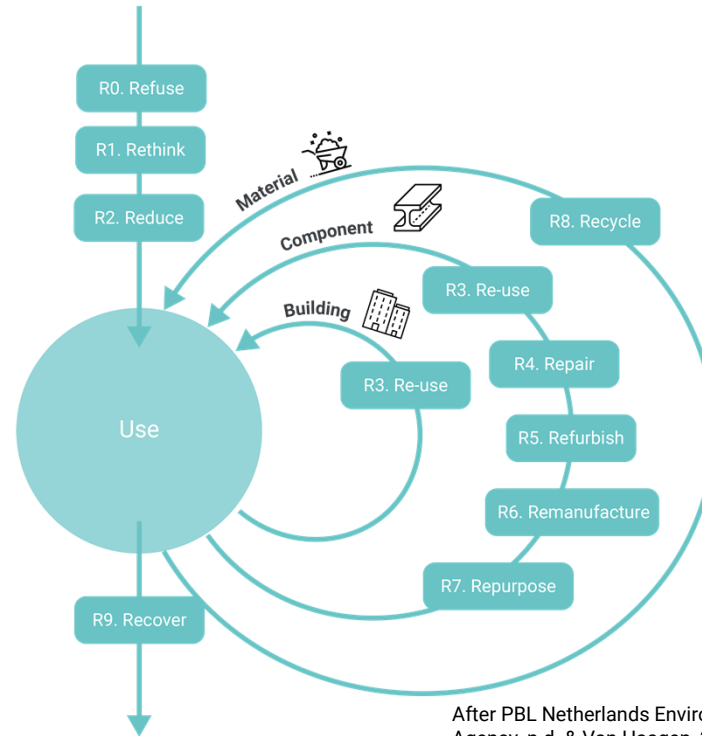
Synthesis

Project management  
framework

# FINDINGS



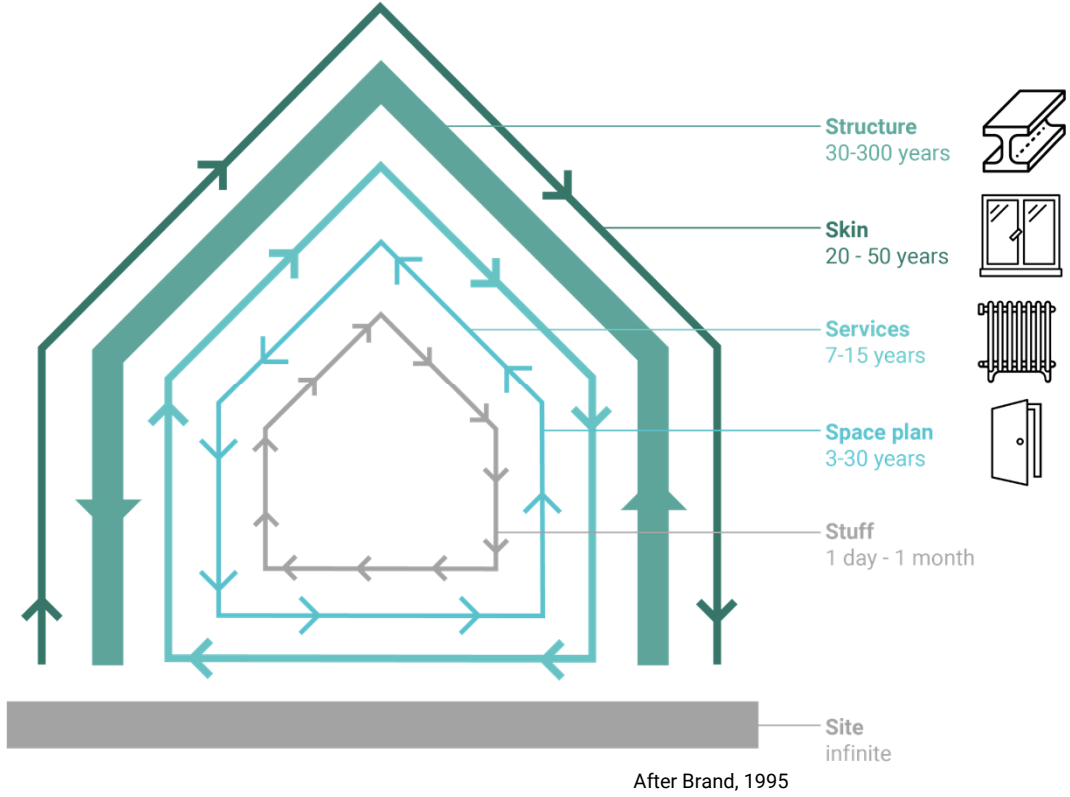
# RE-USE OF BUILDING COMPONENTS



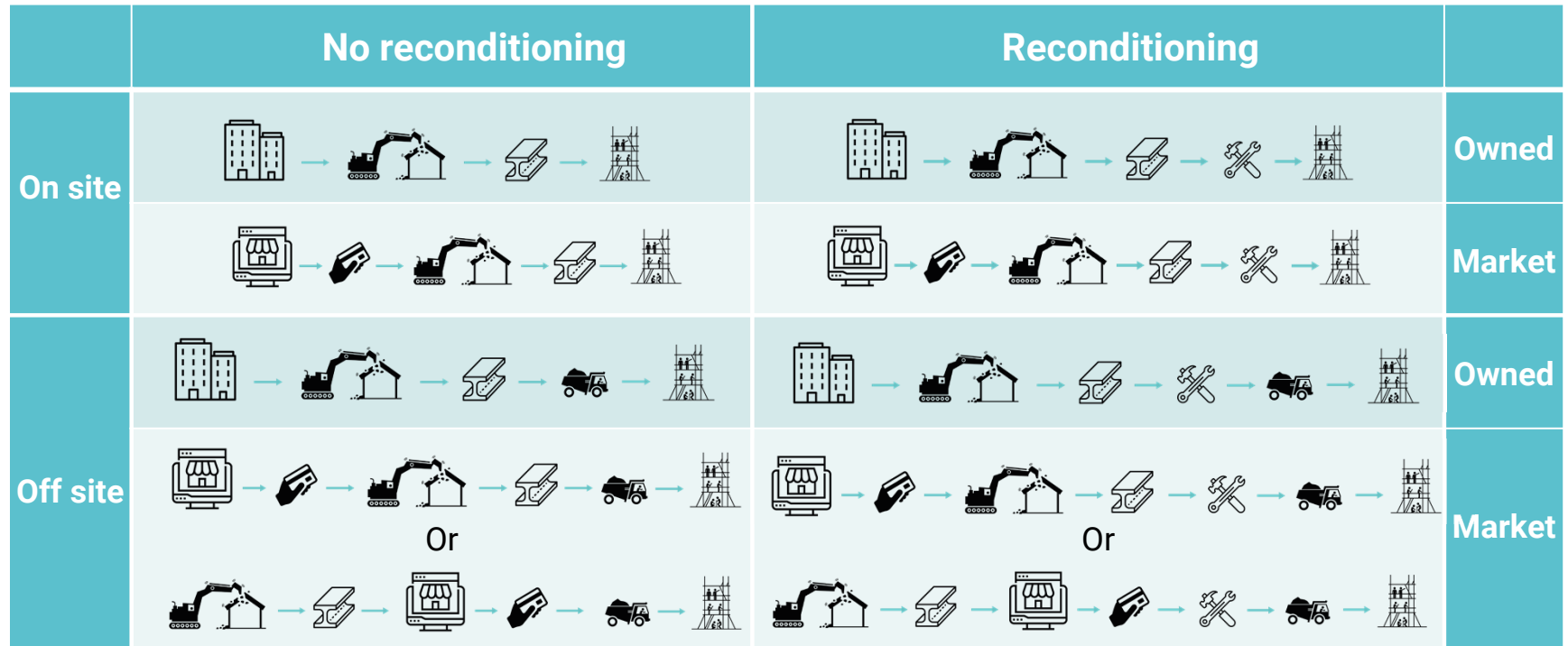
After PBL Netherlands Environmental Assessment Agency, n.d. & Van Haagen, 2018

# RE-USE OF BUILDING COMPONENTS

- Intro
- Methods
- Findings
- Conclusion
- Discussion

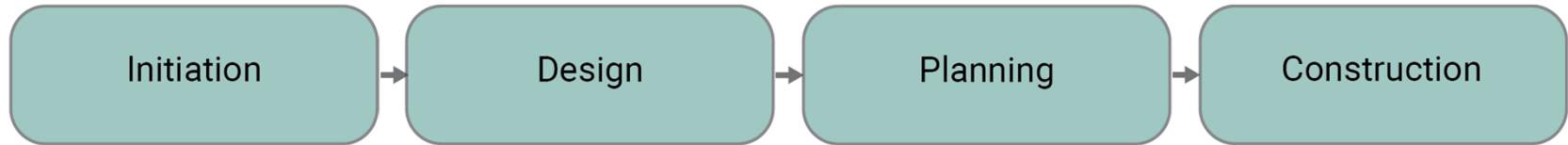


# RE-USE OF BUILDING COMPONENTS



# PROJECT PHASES

## - Phases building project



## - Management initiation phase

- Project sponsor
- Project management consultant

# PROJECT MANAGEMENT INITIATION PHASE

- Briefing
  - Matching needs and resources with objectives and mission
- Project organization
  - Facilitate coordination and implementation
- Selection of the project team
  - Coalition of firms that realizes project mission

Intro

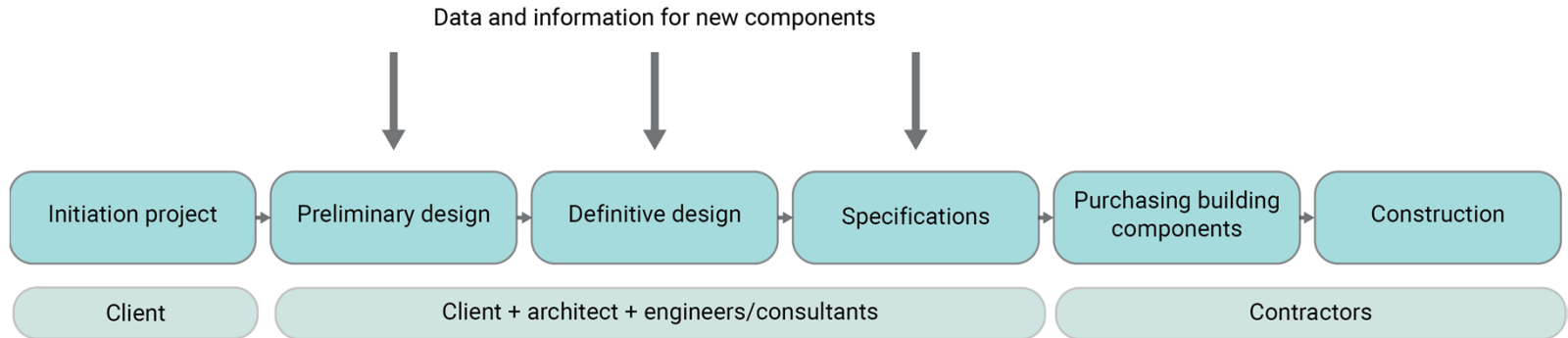
Methods

Findings

Conclusion

Discussion

# LINEAR BUILDING PROJECTS



After Kozminska (2019) & Addis (2006)

# RE-USE BUILDING PROJECTS

*“The building design community needs to review and adapt conventional practices to increase demand for, and effectively integrate, reclaimed materials and components.”*  
*(Gorgolewski, 2019)*

Intro

Methods

Findings

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# BRIEFING

- **Dynamic briefing**
  - Uncertainty re-use market
  - Complete scope
- **Initiation re-use vision**
  - Guidance and development goals
- **Clear re-use targets**
  - Depending on type and availability
- **Maintenance**
  - Avoiding falling back on traditional approach



*“Als je het juist concreet maakt dan weten ze ook waar ze naar toe moeten werken.”*

# PROJECT ORGANIZATION

- **New project delivery approach**
  - Start with inventory
  - Design, engineering, and planning in parallel
- **Extension initiation phase**
  - Vision, targets and inventory
- **Adjusted supply chain**
- **Cyclic phasing**
  - Uncertainty
  - Decision moments

*“Ja dat is gewoon, wat is er beschikbaar? Op het moment dat je iets beschikbaar hebt dan ga je kijken hoe je je detaillering en hoe je je ontwerp daar op aflegt, dus daar mee volgt het ontwerp veel meer de materialen die je hebt.”*

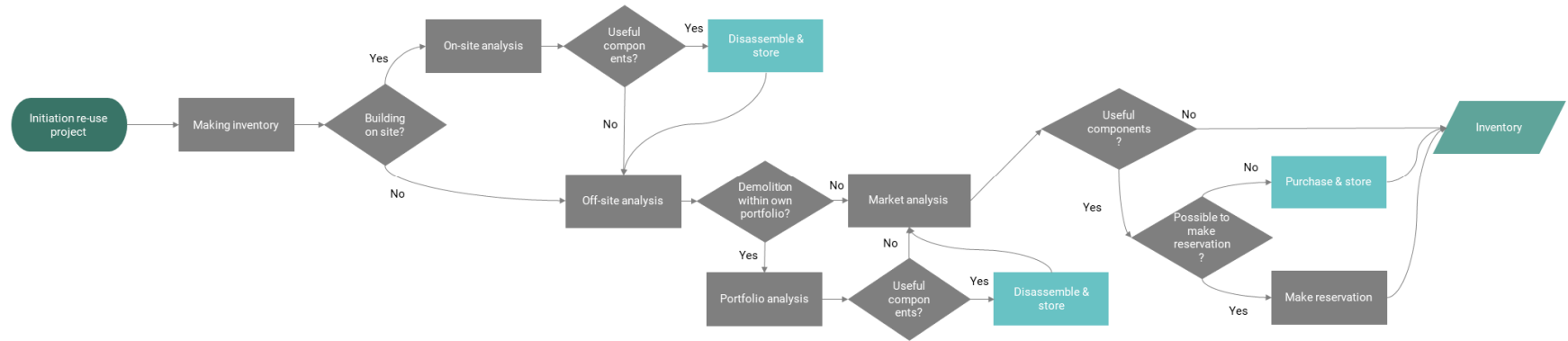
# SELECTION OF THE PROJECT TEAM

- **Interdisciplinary project team**
  - Integral decisions and streamlining information
  - Collaboration re-use experts
- **Early involvement**
- **Collaboration & shared vision**
  - Good relationship, trust & shared responsibilities
- **Motivation**
  - Project champion

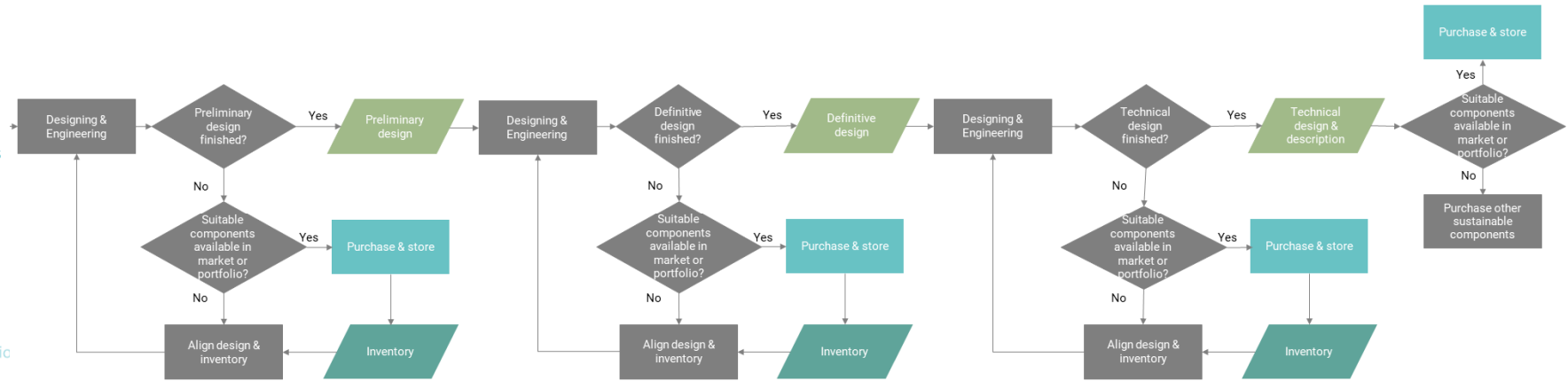
*“Mensen moeten er bijna letterlijk voor leven inderdaad, anders ga je toch snel ja die traditionele kant in.”*



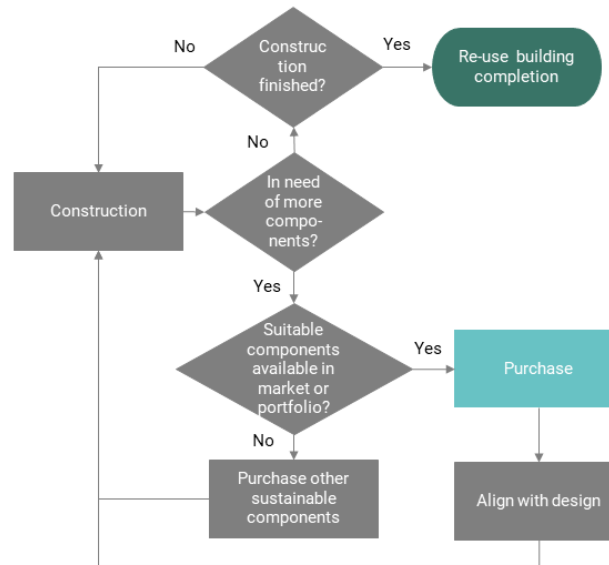
# INITIATION PHASE



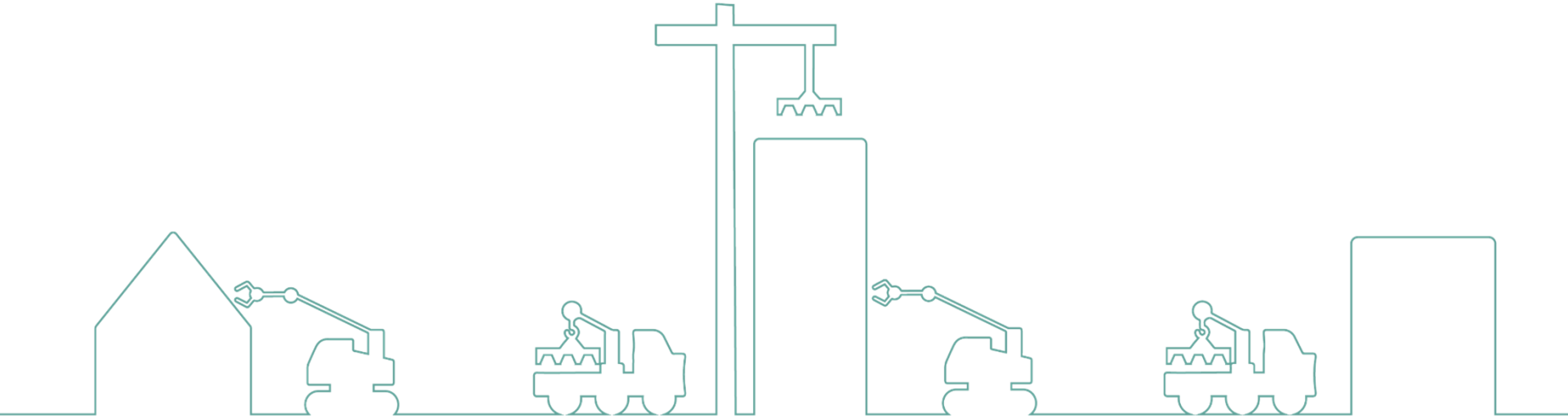
# DESIGN & PLANNING PHASE



# RE-USE PROCESS



# CONCLUSIONS & RECOMMENDATIONS






# CONCLUSION

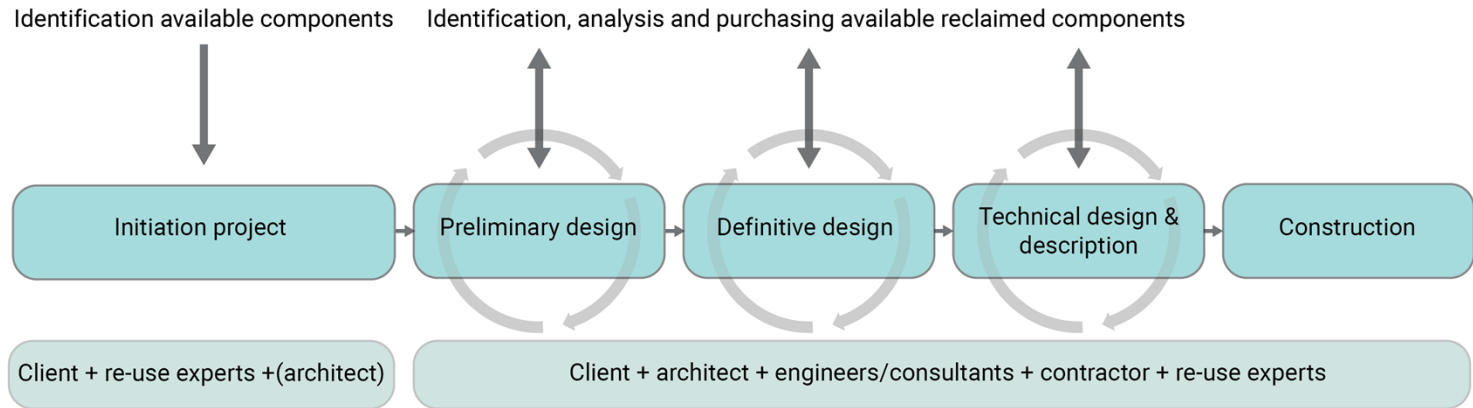
*In what way can the **briefing**, the **project organization**, and **selection of the project team**, contribute to **re-using building components**?*

- Uniting and guiding the team throughout the (decision making) process
- Facilitating the integration of reclaimed components
- Establishing a team that supports re-use and enables for integration of activities

# PROJECT MANAGEMENT FRAMEWORK

Briefing	Project organization	Project team selection
<ul style="list-style-type: none"> <li>- Define re-use ambition during initiation phase</li> <li>- Define clear and realistic re-use goals</li> <li>- Maintain re-use ambition and goals throughout the process</li> </ul> 	<ul style="list-style-type: none"> <li>- Expand the initiation phase</li> <li>- Start with the identification, analysis, and ordering of components and repeat this iteratively</li> <li>- Integrate activities</li> <li>- Design an iterative process including milestones</li> </ul> 	<ul style="list-style-type: none"> <li>- Create an interdisciplinary project team with shared responsibilities</li> <li>- Select a team based on experience and willingness regarding re-use</li> <li>- Include project champions</li> </ul> 

# RE-USE PROCESS



# MANAGING RE-USE PROJECTS

Intro

Methods

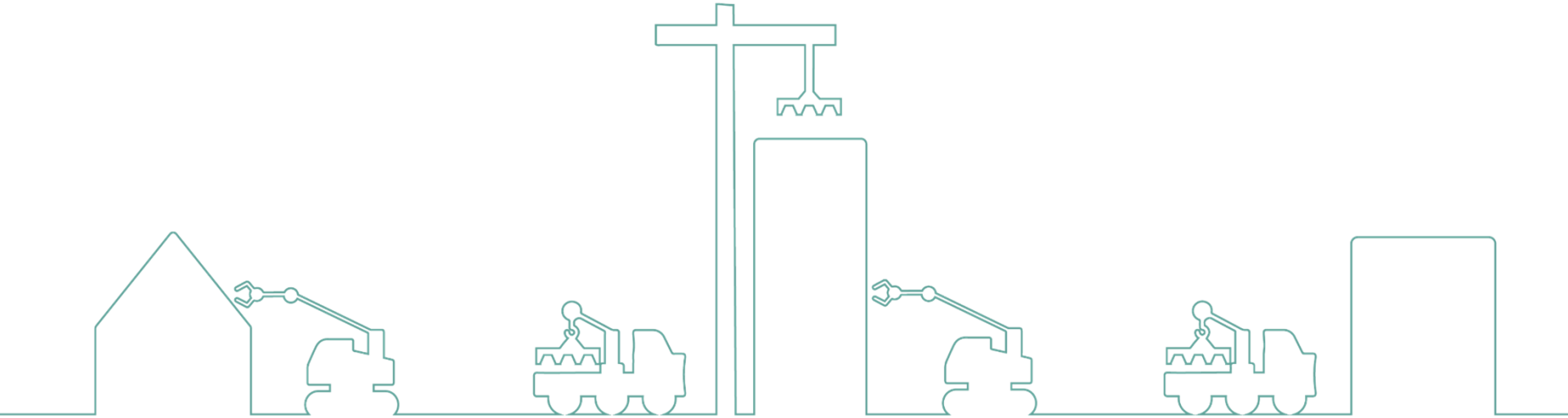
- Early stage of innovation
  - Investing in further development & front end loading
  - Need for flexibility
- Process integration
  - Means to stimulate innovations
- Important role of client & project management

Findings

Conclusion

Discussion

# DISCUSSION



# KEY FINDING

- Impact early inclusion components
  - Precondition for design
  - Early conduction planning and engineering activities
  - Involvement re-use actors
  - Early purchasing of components

Intro

Methods

Findings

Conclusion

Discussion

# RESEARCH IMPLICATIONS

Intro

Methods

- Restrictions re-use
  - Not built to be disassembled
  - Not less expensive
  - Standards and regulations

Findings

- Optimistic developments
  - Platform matching reclaimed components
  - Building component brokers
  - Support interviewees

Conclusion

- Need to invest time and energy
  - Strong guidance clients and regulations

Discussion

# LIMITATIONS & FURTHER RESEARCH

- Literature
  - Very limited literature on the re-use topic
- Empirical study
  - Limited individuals have been interviewed
  - Only two Dutch cases
- Further research
  - Establishment re-use market
  - Financial/business plan
  - Regulatory standards
  - Contractual relationships

Intro

Methods

Findings

Conclusion

Discussion

# BROADER CONTEXT

- Need for a wider mind shift
  - Pioneers & promotion
- Over time focus in re-use projects will change
  - Less need for early investment & motivation
  - Growing role of suppliers
- Hand in hand with design for disassembly

Intro

Methods

Findings

Conclusion

Discussion

# QUESTIONS?

