Glass Performance Days 2025

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GLASS PERFORMANCE DAYS 2025

IKEA Valladolid: Reusing an interior all-glass façade

CARLES-HUG BITLLOCH / BELLAPART

Bellapart

More than 80 years providing **beautiful**, **sustainable** and **safe** building solutions

“ We are capable of designing and building any imaginable structure.

Bellapart. **Building Beyond Standards** since 1939

Bellapart Group

Barcelona
London
Paris
Miami

70 employees

10 nationalities

Introduction

Reusing a façade

IKEA Valladolid

+ Located in central-northern Spain
    - Shares a building with a mall

Introduction

Reusing a façade

IKEA Valladolid

+ Located in central-northern Spain
  - Shares a building with a mall
+ Major refurbishment in 2022-23
  - Change of uses in the mall
+ An all-glass façade became obsolete
  - For location, not materials
+ A third of its glass elements were reused
  - New façade as relocation

Object of study

The original façade (2011)

Façade description

+ Designed and built by Bellapart
  - Original idea by Arup
+ 40m long, 10.6m tall
+ 40 panels (10.10 HS 1.52SG)
  - 4000x2600mm
+ 9 glass fins (10.10.10.10 FT/HS 1.52SG)
  - L shaped
  - 550 wide 10.6m long
  - Done in four sections
  - Metallic inserts

Object of study

The original façade (2011)

Changes during service time

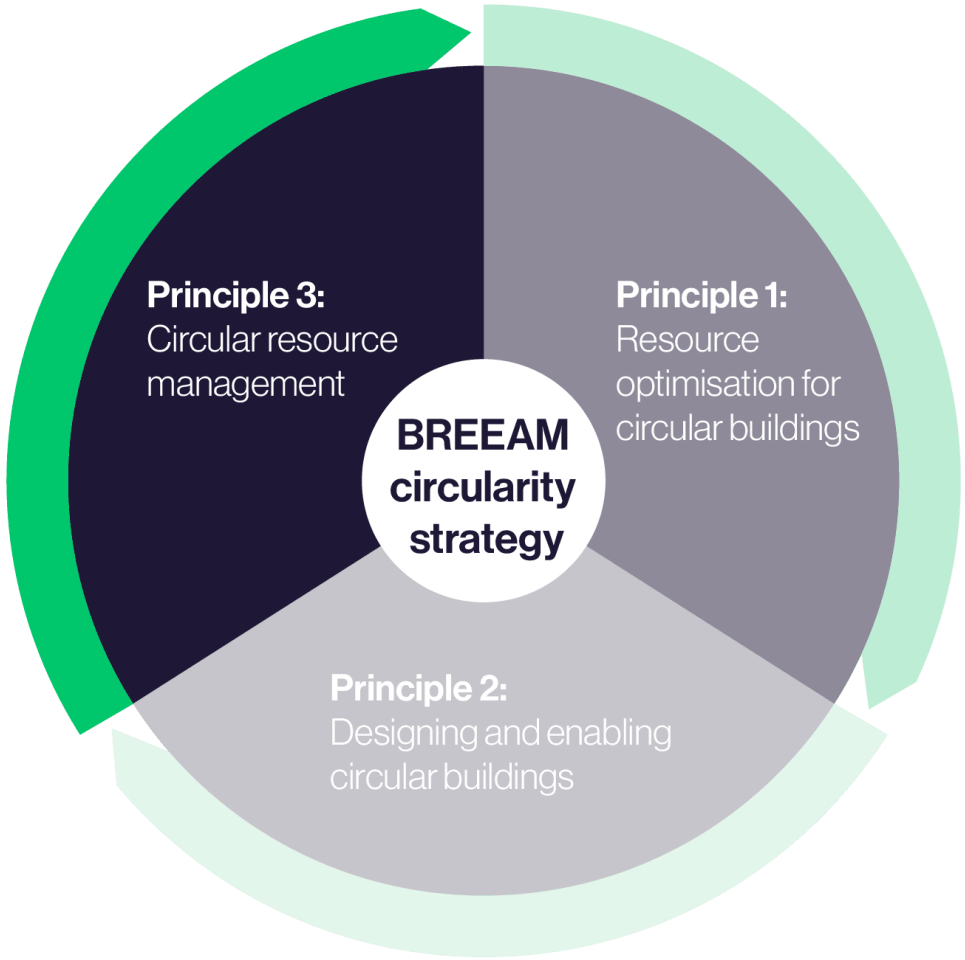
+ Four panels were retired
+ A door opening was performed
+ Rest of the façade was kept as is (refuse)
    - Including the fin in the middle

Object of study

The new façade (2023)

Sustainability as a design constraint

+ Major refurbishment in 2023
  - Kept as is no longer an option
+ Client sustainability strategy
  - BREEAM certificates
  - Mall (excellent)
  - Store (very good)
+ Client acceptance of old glass
  - No guarantee extension required
  - Ageing marks as part of the process
  - Only visual inspection for structural damage (see further slide)
+ New façade as a relocation of the original
  - Dimensions and design constrained



Object of study

The new façade (2023)

Façade description

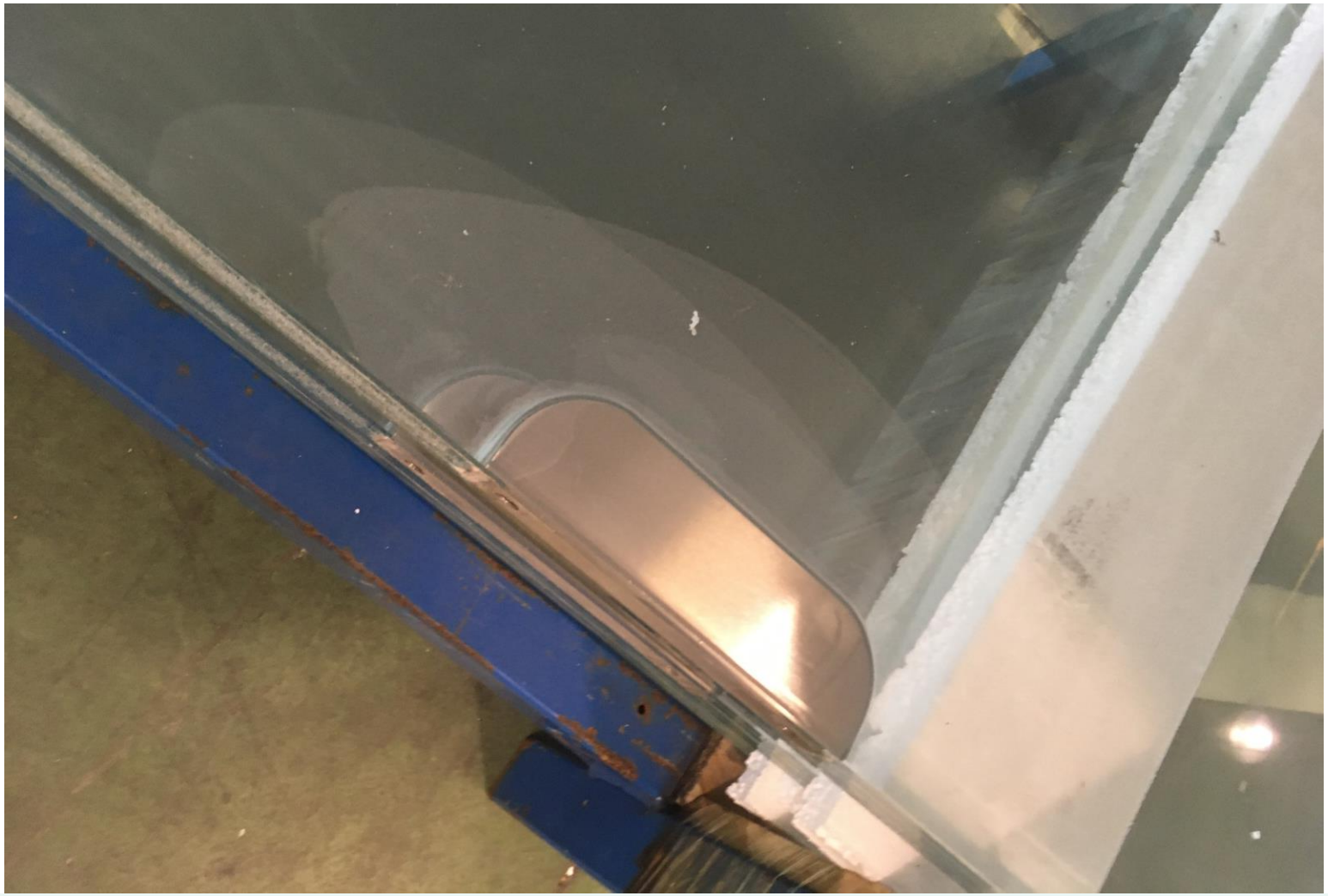
+ Designed as a partial relocation
+ 20m long, 10.6m tall
    - Half of the original
+ 16 reused panels (10.10 HS 1.52SG)
    - 4000x2600mm
+ 2 new panels (10.10 HS 1.52SG)
    - 4000x2600mm
+ 3 new glass fins (10.10.10 HS 1.52SG)
    - 200 wide 5.5m long
+ 1 fin (10.10.10.10 FT/HS 1.52SG)
    - Meant to be partially salvaged

Object of study

The new façade (2023)

Metallic inserts and delamination

+ Initial thick inserts made of stainless steel
  - Should be titanium (physical properties)
+ Delamination was localised
  - Became apparent after transport (715km)
+ Fins were discarded for security issues
  - Two sections were remade
+ New fins with mechanical fixations



Object of study

The new façade (2023)

General state of the glass panels

+ No mechanical tests were performed
    - No guarantee extension was demanded
+ Only visual inspection was made
    - Inspection in Bellapart (715km road trip)
+ Only best looking panels were selected
    - Only half were to be salvaged
+ Some aging marks are apparent
    - Client accepted them

GWP assessment

GWP quantification

Quantified modules

+ Building as a hole: B5 Refurbishment
  - According to EN 15978
  - Does not give enough detail

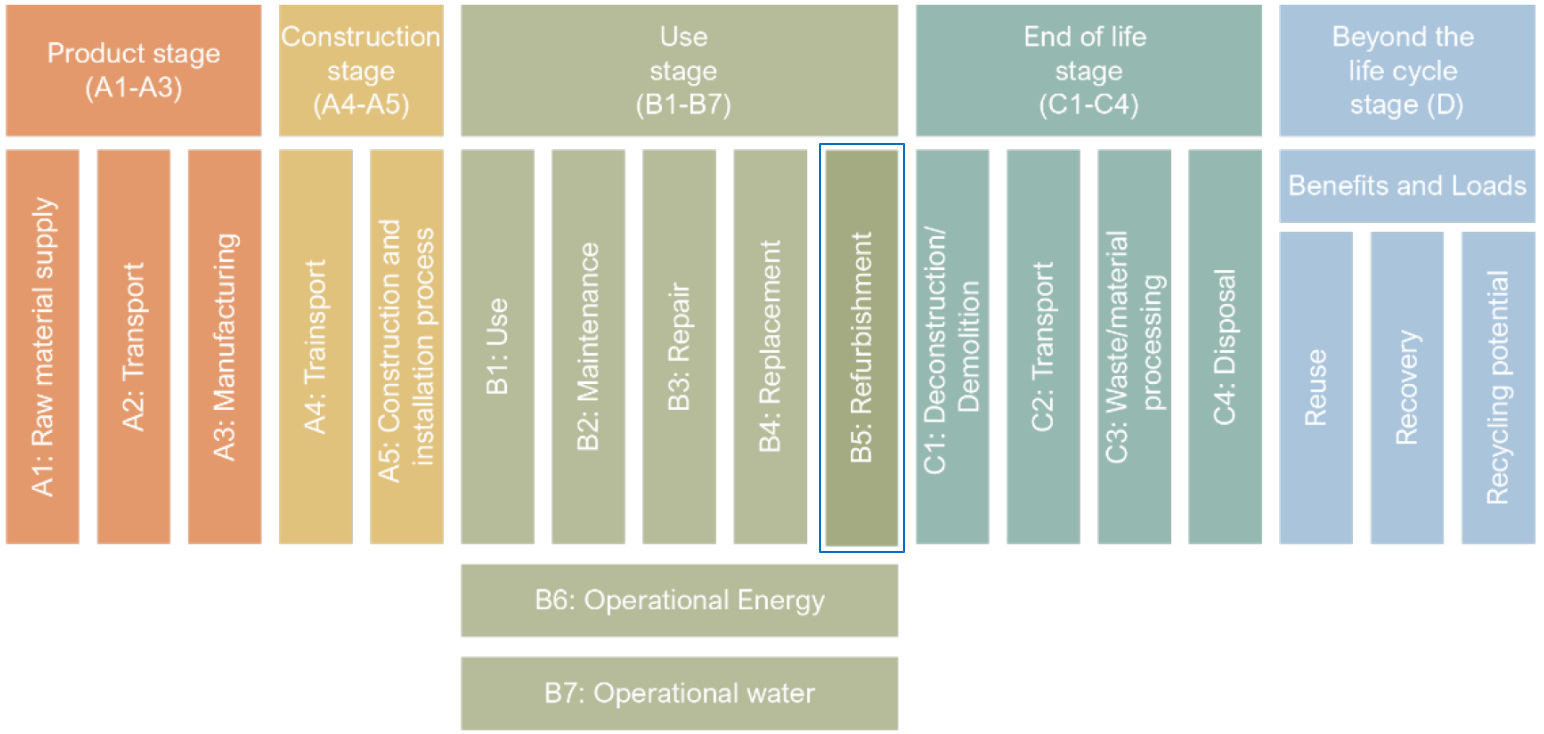


Figure from: Teeuwen, R., Schipper, R., Cupać, J., Jansen, H., & Louter, C. (2024). Circularity of Existing Aluminium Unitised Curtain Wall Façades. Challenging Glass Conference Proceedings, 9.

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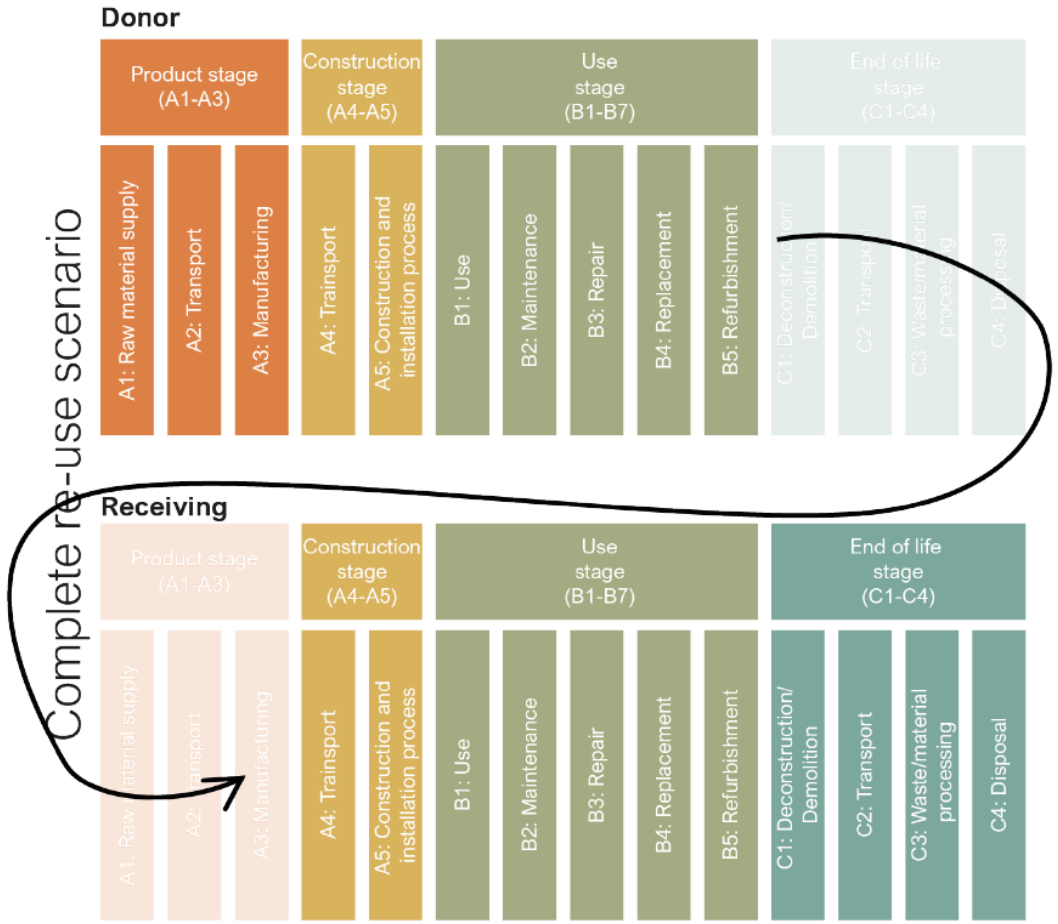

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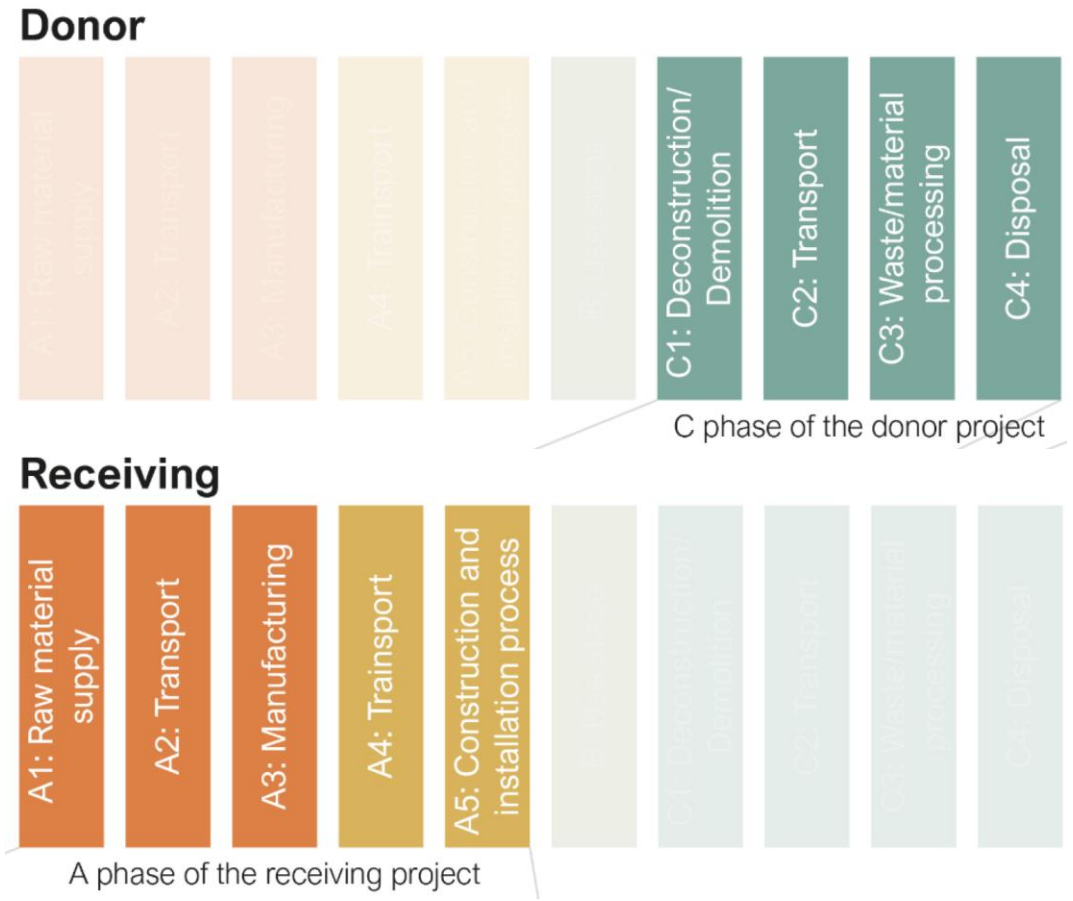
  - Two different buildings: Stages C and A



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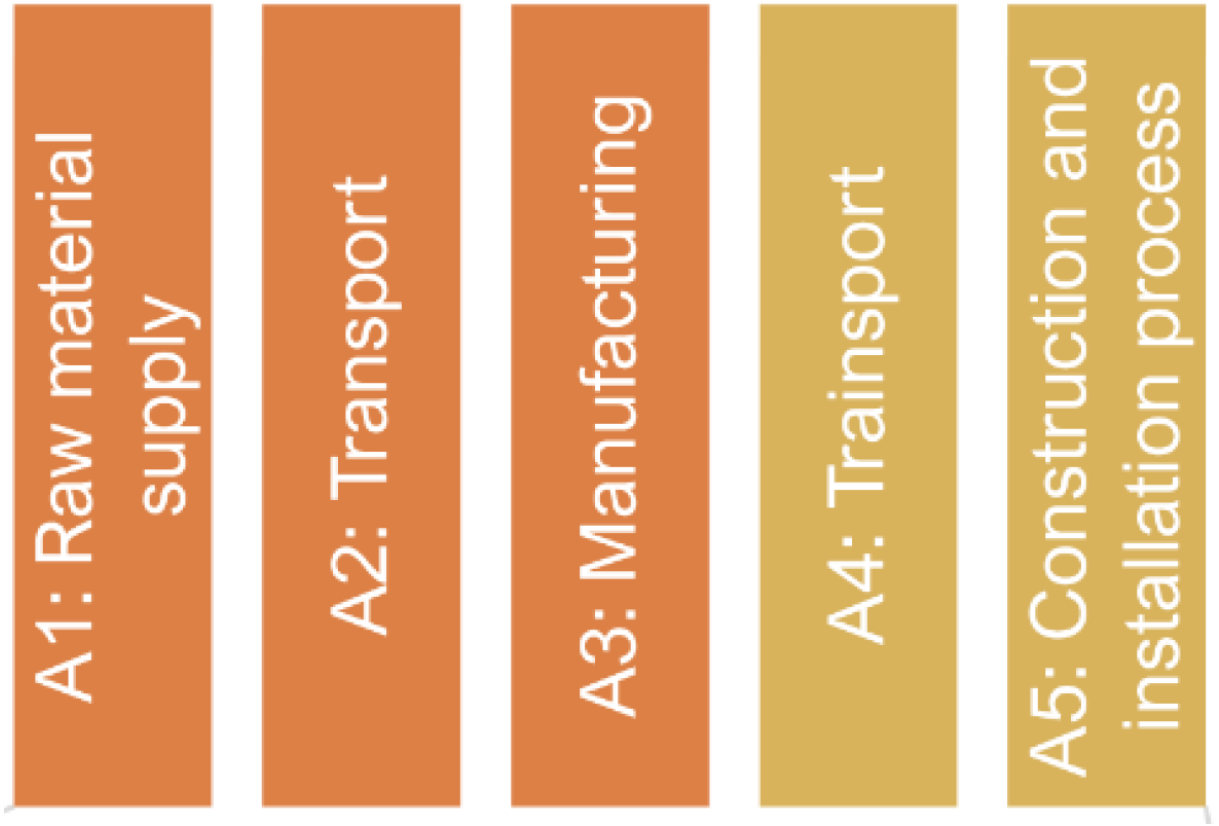
+ Quantification only in stage A
  - Bellapart expertise, minimum assumptions



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+ Distinction between EPD's and Bellapart

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+ Teeuwen et al. approach
  - Two different buildings: Stages C and A
+ Quantification only in stage A
  - Bellapart expertise, minimum assumptions
+ Distinction between EPD's and Bellapart
  - Some of them are null (green energy)
+ Two scenarios considered: reuse and no-reuse
  - Details declared on the paper

GWP assessment

GWP results

Reuse scenario

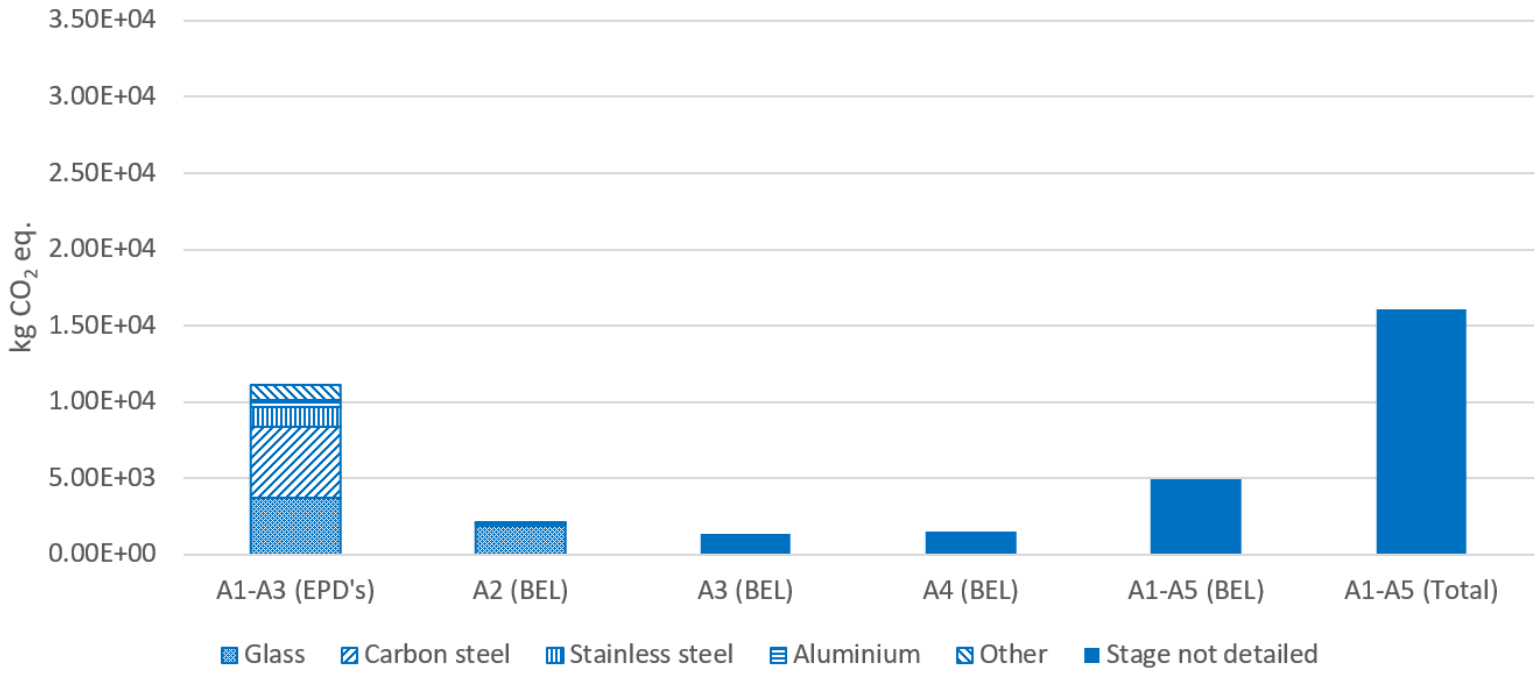
+ Total GWP: 1.61x10^4 kg CO_2 eq.

+ Reused materials
  - 84% weight of the glass
  - 32% weight of the stainless steel

+ A1-A3 (EPD's) is dominant
  - 70% of total GWP
  - New carbon steel entrance frame

+ Importance of A2 (BEL)
  - 13% of total GWP

+ Dominance of reused glass inside A2 (BEL)
  - All original glass transported 715km
  - Local supplier for the new glass (320km)

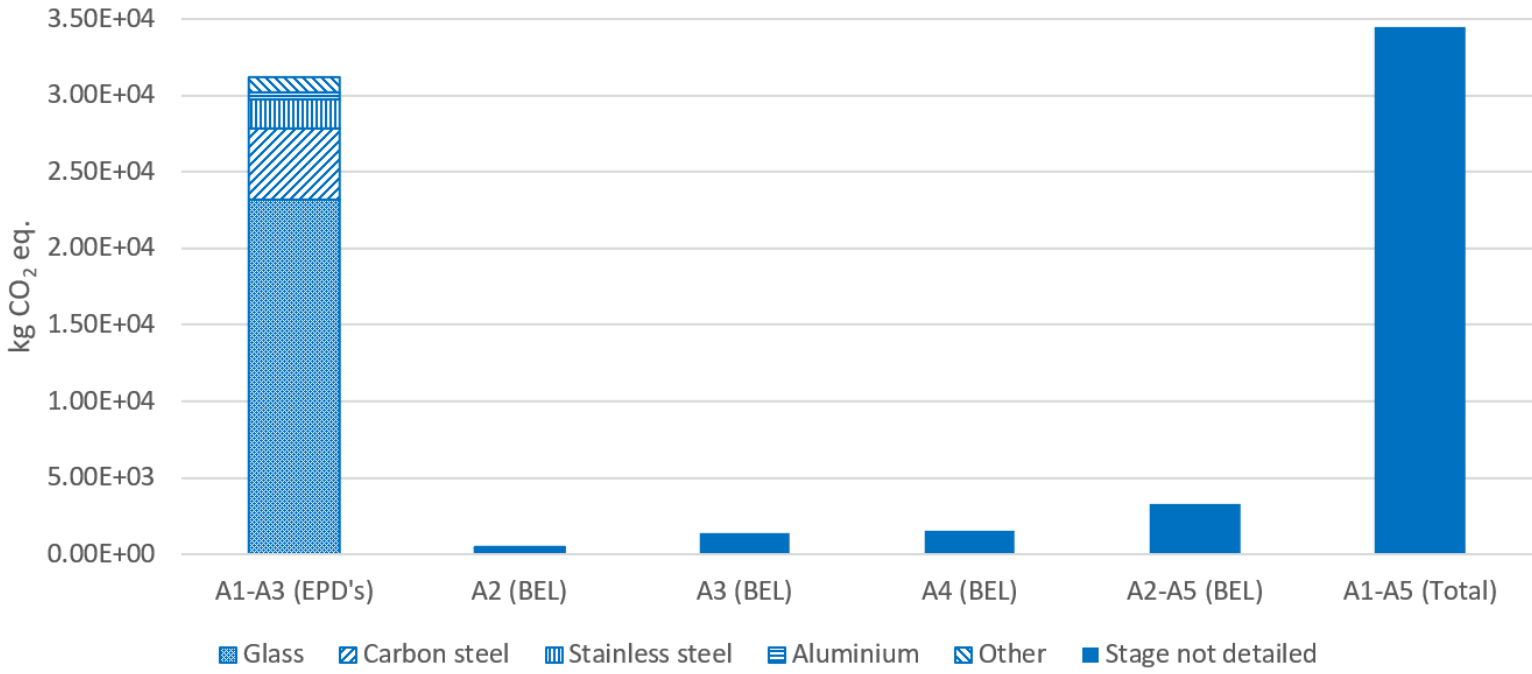


GWP assessment

GWP results

No-reuse scenario

+ Total GWP: 3.45x10^4 kg CO_2 eq.
+ No reused materials
+ A1-A3 (EPD's) is totally dominant
  - 90% of total GWP
+ A1-A3 (EPD's) of glass is dominant
  - 74% of A1-A3 (EPD's) GWP
  - 67% of total GWP
  - 78% of total weight
+ Not relevant module A2 (BEL)
  - 1% of total GWP
  - All transport non-dedicated

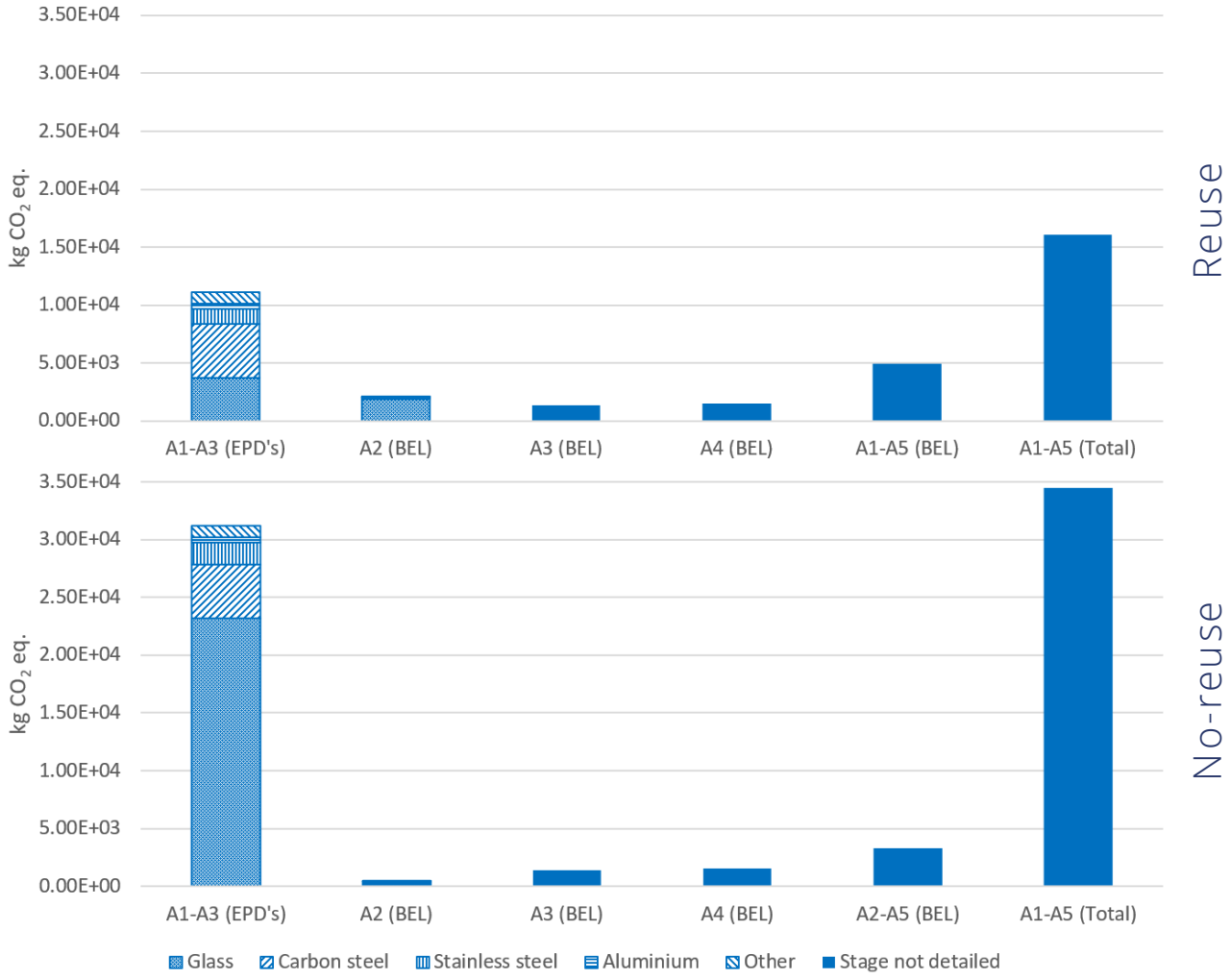


GWP assessment

GWP results

Comparison between scenarios

+ Reuse reduces 53% of total GWP
  - 64% of A1-A3 (EPD's) GWP
+ A1-A3 (EPD's) share is lower in reuse
  - 90% to 70% of total GWP
  - But still dominant
+ Reuse increments 409% A2 (BEL) GWP
  - 1% of total GWP
  - All transport non-dedicated



Conclusion & possibilities

IKEA Valladolid

- Reused lam. glass can be a reality
  - Design and aesthetic constraints
  - Must be understood by the client
- Points on certifications are key
  - BREEAM Circularity
  - Client policies
- Project based GWP improvement possibilities
  - Wider reuse of the panels
  - Reducing amount of carbon steel
  - Reducing salvaged glass transportation
- General GWP improvement possibilities
  - Decarbonizing the electrical gird
  - Reducing HDV emissions