

# Social science perspective on reuse – norms, network and policy

REBUS closing seminar 29.11.2023

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# We have investigated:

1. Barriers, drivers and norms for reuse in the building industry (WP 1)
2. The meaning of participation of network for norms on reuse (WP 5)
3. Reactions to policy on the reuse from those who are at the forefront of reuse (WP 5)



# We have done:

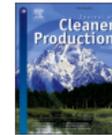
**SURVEY** (2021/2022) on barriers, drivers and norms on reuse in Norway

## **1-YEAR NETWORK** (2021/2022)

- Led by Boligbygg, 18 participants from 8 consultant/entrepreneur firms. 4 seminars with homework.
- **Qualitative interviews** on norms before and after the network, and interviews on reuse-policy on the last network seminar.



# Survey on barriers, drivers, and norms



## User perspectives on reuse of construction products in Norway: Results of a national survey

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### ABSTRACT

Construction industry is one of the main contributors to the world's emissions and material footprints. Reuse of construction products is one way to lower the sector's embodied emissions and increase resource utilisation. The aim of this study is to identify the main drivers and challenges affecting reuse of construction products as well as assess success factors, reuse potential, and potential measures which should be considered to overcome these obstacles. An online national survey was conducted on reuse of construction products among actors from the Norwegian construction industry. The valid responses obtained from 260 participants show 'emission reduction' as the most important driver for reuse of construction products by all user groups. Even if regulatory and economic components were listed under drivers in the survey questions, they were considered as barriers rather than drivers by some of the respondents. All user groups, except suppliers of reused products, rated 'lack of documentation' as the most important barrier, and 'good planning' as the most important success factor. Suppliers of reused products rated 'high cost' and 'good planning' as the most challenging and the most important success factor for reuse, respectively. The findings also reveal different perceptions and levels of optimism among actors. Most respondents were optimistic about availability of reusable products (within less than 5 y), but least optimistic about finding cheaper reusable products in the near future (assuming it might take 9 to 17 y). Laws and regulations, testing, documentation and certification, and economic subsidies are mentioned as the top three measures to address the current barriers. Concerning the definition of the term 'Reuse', the findings indicate a lack of common understanding – and the need to create a clear description and a harmonised definition. The findings from the study show the need to take several actions to address the current challenges of reuse.

### 1. Introduction

The construction industry is responsible for about 35% of total global energy use and 38% of energy related greenhouse gas (GHG) emissions (UNEP, 2020). Of these emissions, ca. 28% is from operational energy use and 10% from the construction and manufacturing of building materials. In Norway, energy related emission from the construction sector is relatively low, accounting for about 15% of the national direct GHG emissions, due to a higher level of renewable energy utilisation (Larsen, 2019). Increase in energy efficiency strategies and use of renewable energy measures have showed large potential in the life cycle GHG emissions reduction due to improved operational energy (Sandberg et al., 2021; Xiang et al., 2022). However, those changes also resulted in increasing the proportions of the embodied energy from production,

construction, maintenance, and end-of-life of the buildings showing the importance of considering measures which enable to reduce GHG emissions through optimisation of both operational and embodied impacts (Röck et al., 2020).

The industry is also responsible for 40% of raw material extraction (IRP, 2020), and 25–30% of the total waste generated in the EU. Norwegian construction sites generate an average of 40–60 kg waste per m<sup>2</sup> gross floor area (Nordby and Warner, 2017). The national statistics data from 2015 to 2019 show that the construction industry generated about 1.87 million tons of construction and demolition (CDW) waste annually. Only 46% of this waste was recycled, while hazardous waste accounted for only 2.1% (Statistics Norway, 2021), implying that there is a large potential for reuse and recovery of waste without requiring special treatment.

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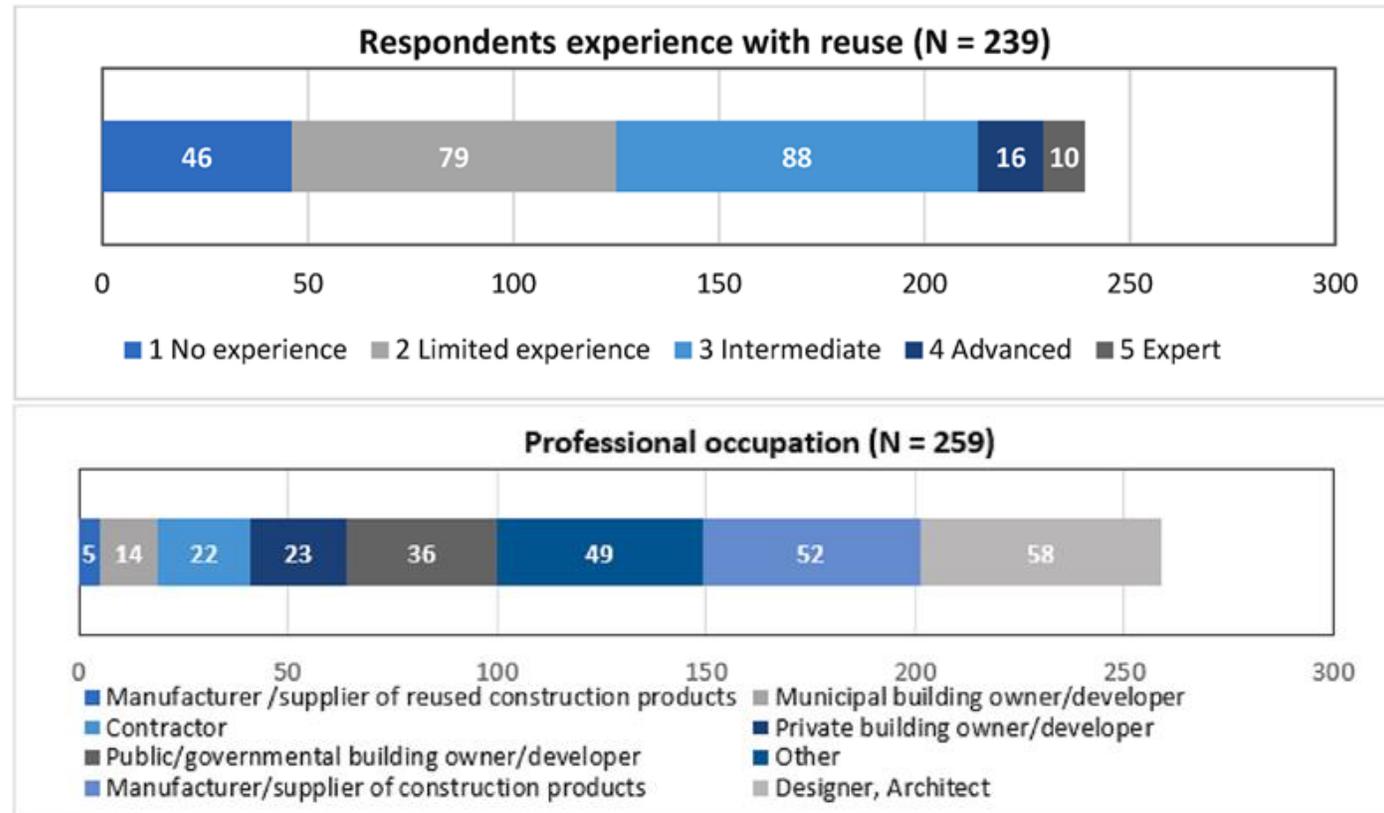
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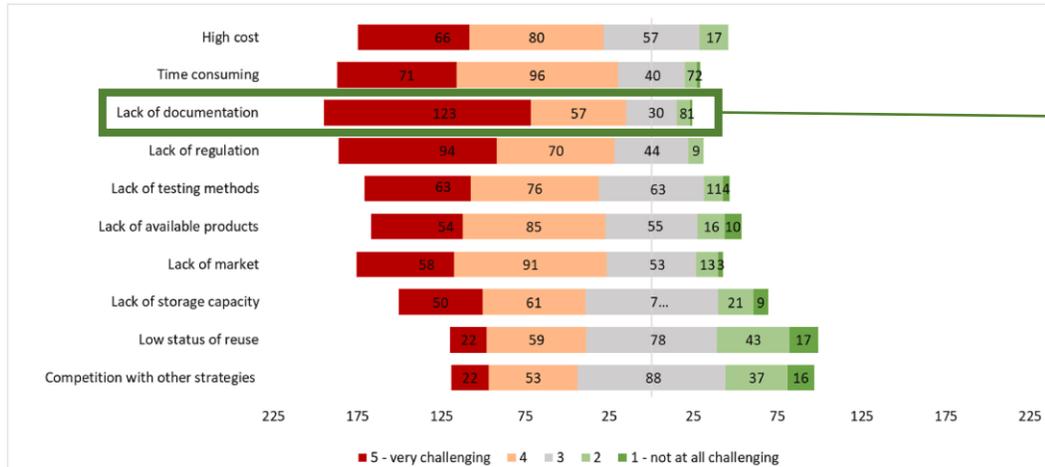
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# Survey on barriers, drivers, and norms

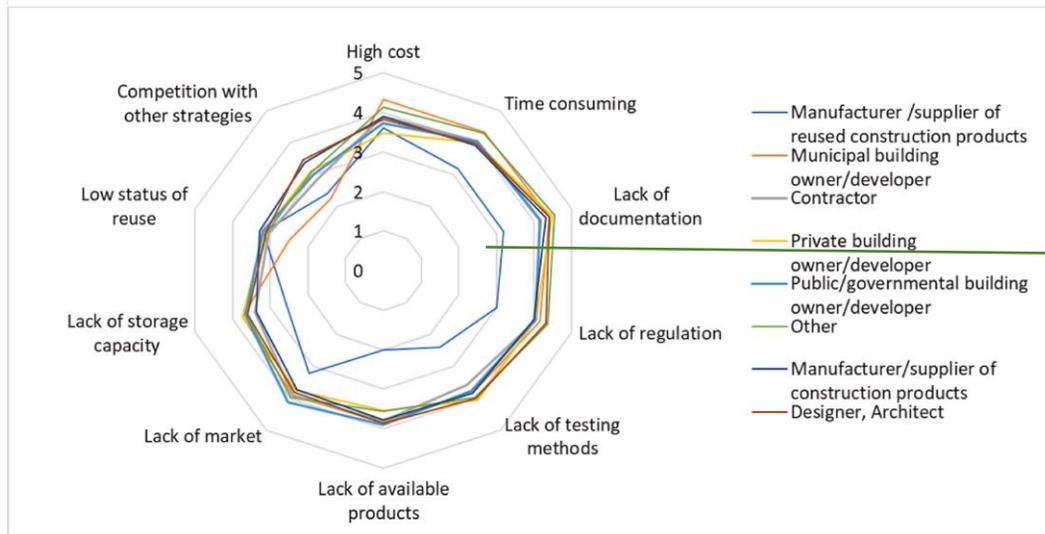


Data Collection: 2020-2022  
Valid responses: 260

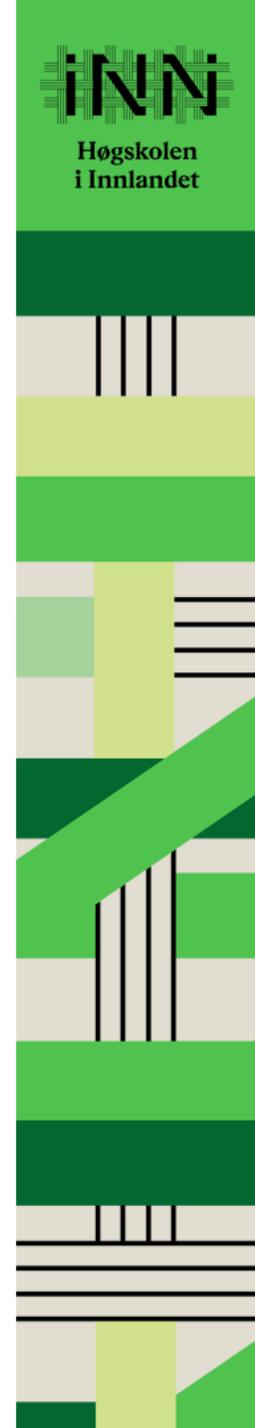
# Barriers for reuse



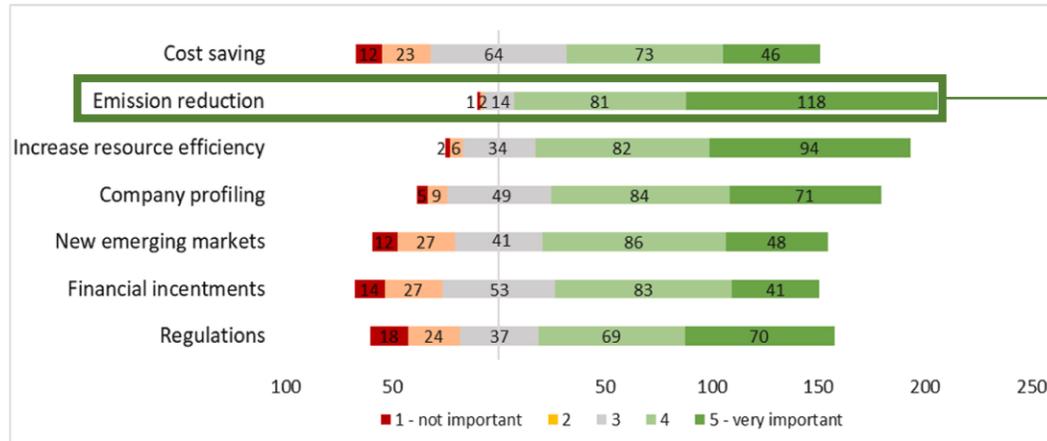
Lack of documentation was rated as more challenging than the other barriers,  $t(215) = 3.25, [0.07, 0.30], p < .001, \text{Cohen's } d = 0.22.$



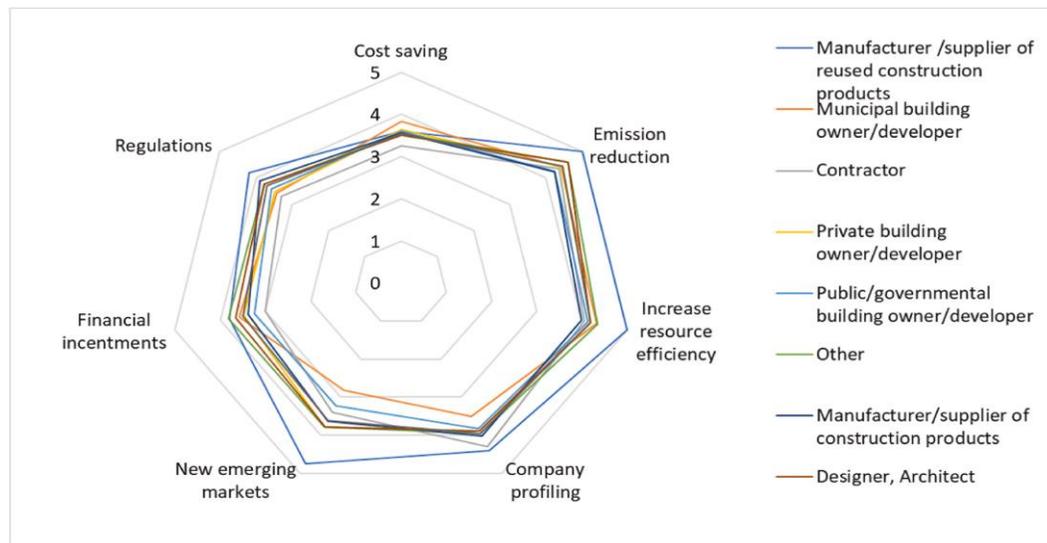
Manufacturers/suppliers of reused construction products score significantly lower on barriers than all other professions (Mean diff. between = 1.00 and 0.80,  $p < .05$ ).



# Drivers for reuse

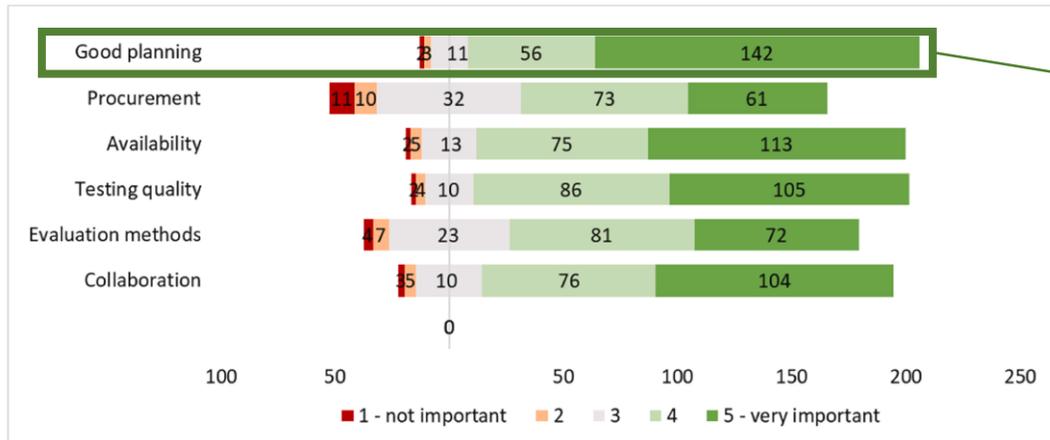


Emission reduction' ( $M = 4.45$ ,  $SD = 0.70$ ) was rated as the most important driver,  $t(214) = 4.84$ ,  $p < .001$   $[0.15, 0.37]$ , Cohen's  $d = 0.33$ .

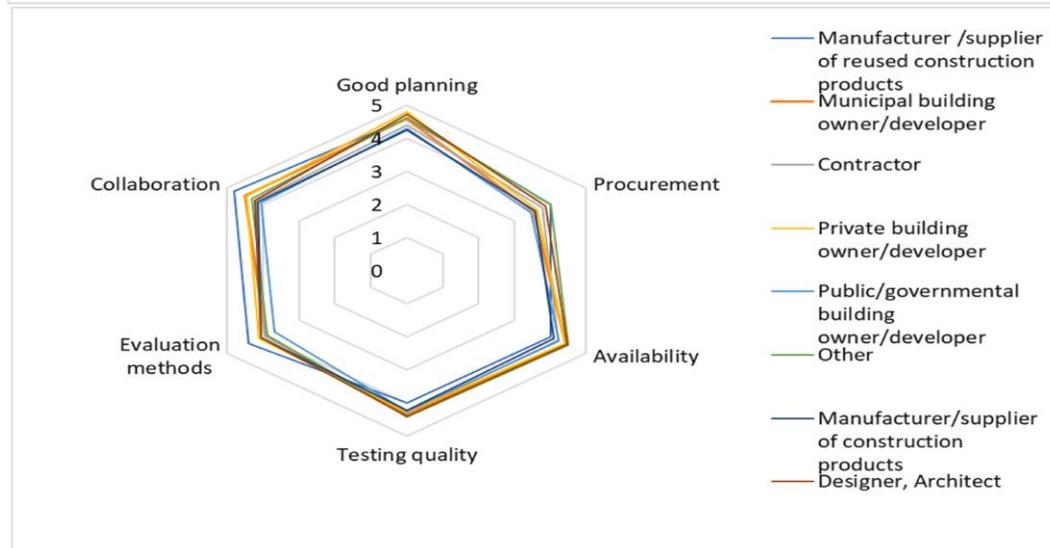


No statistically significant group differences ( $p > .05$ ) - users has similar view on drivers for reuse

# Success factors for reuse

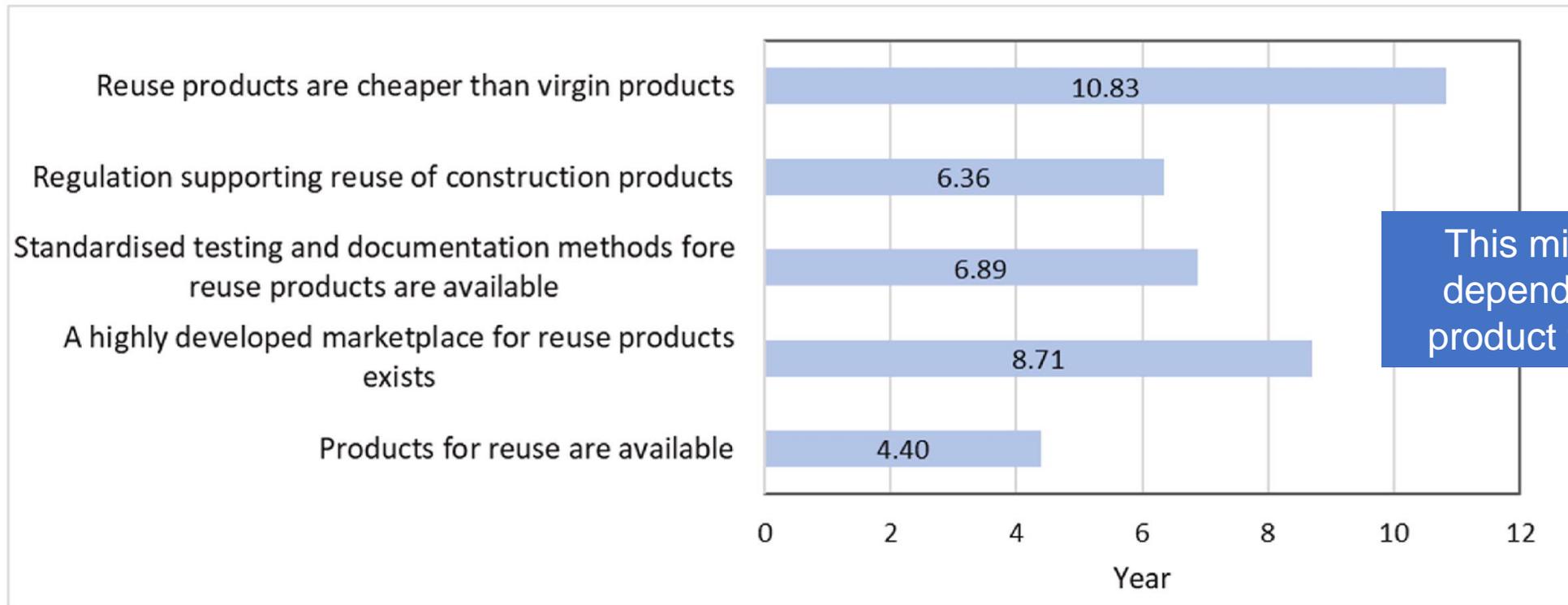


'Good planning' (M = 4.52, SD = 0.77) was rated as the highest success factor,  $t(215) = 4.29$ ,  $p < .001$ ,  $[0.14, 0.38]$ , Cohen's  $d = 0.29$ .



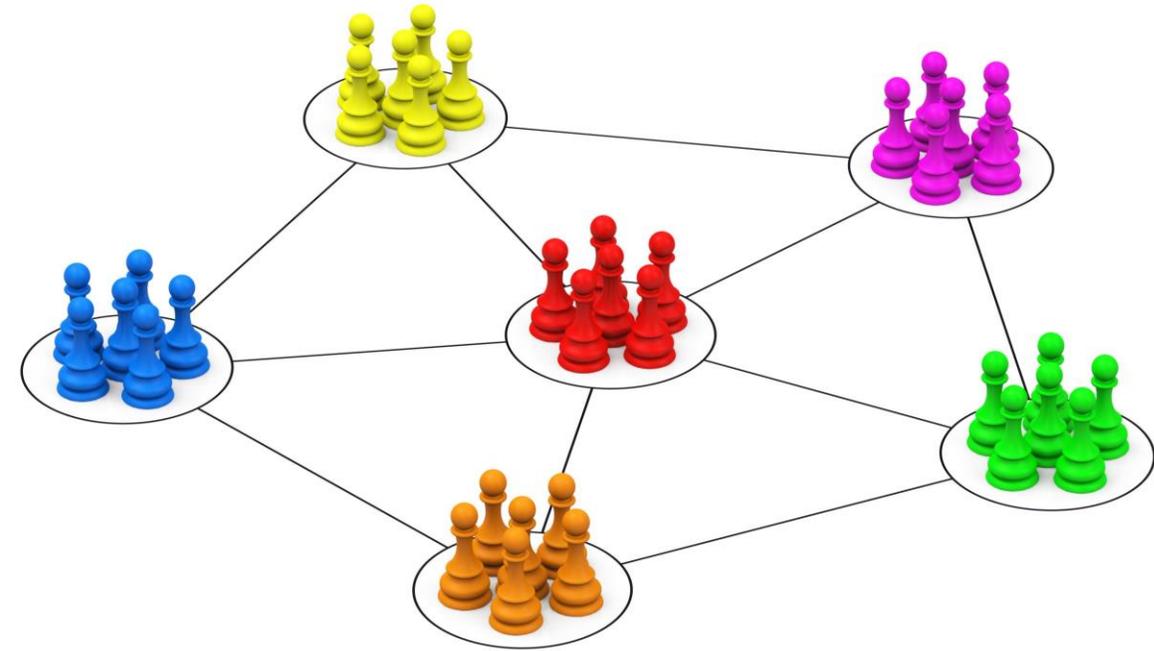
No statistically significant group differences ( $p > .05$ ) – users has similar view on success factors for reuse

# Reuse potential



This might depend on product type

Users has similar optimism about reuse potential ( $p > .05$ )



Network:  
preliminary findings



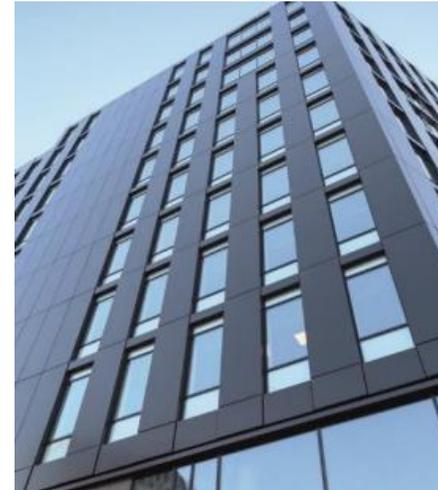
# Interviews: some key points

- Few felt a strong attachment to the network, but there was still a high degree of **trust** and **sharing culture** between participants.
  - Seems to increase **motivation and self-esteem** about own knowledge – “we are facing the same challenges”.
- There could have been a more diverse group with **users/stakeholders from the whole value chain** - especially decision makers.
- There could have been more focus on **practical perspectives**, actual problem solving, and concrete experiences.
  - The excursion and tour of a building with reused materials was a positive experience
- **Homework** between gatherings increased **engagement**

# Office workers' aesthetic evaluations for reuse facades: An environmental psychological perspective

Master thesis by Amalie Dahlby Gjerdbakken (2023)

- **Aim:** Is aesthetic evaluations of re-use facades and new-build facades in buildings influenced by information about the types of facade?
- **Respondents:** 301 office workers without prior knowledge about reuse or the construction industry
- **Survey:** Evaluate aesthetic quality of building facades - 6 pictures (3 of each type)
  - **Survey A:** information was provided as to whether the building facade on the image were reused or new materials
  - **Survey B:** no information was given about the materials



Not reuse



Reuse

# Office workers' aesthetic evaluations for reuse facades: An environmental psychological perspective

- Those who were informed about the facade type (survey A) rated the re-use facades as more **friendly, exciting\*, unusual and engaging** than those who were not informed (survey B)

Informing customers about reuse might be beneficial for their attitude towards aesthetic quality

# Input for policy on the reuse of building materials

- from network members at the forefront of reuse

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Thale Sofie Wester Plesser

## Ombruk av byggevarer – innspill til statlige føringer



# Focus group interviews

- Interviews in the network, on the last seminar:  
Societal frames for reuse in Norway

Presentations on policy before the interviews:

- Enova: Opportunities for financial support
- DiBK: Changes in TEK17 and DOK
- DFØ: Guidance for public procurement



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## Ombruk av byggevarer – innspill til statlige føringer



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# Results, contracting forms

- Project partnering/ “samspillsentreprise” is thought of as the most effective type of contracting for achieving success with reuse.
  - The environmental focus can be maintained from start, in the development phase.
  - You can plan for reuse in cooperation with the stakeholders, before detailed decisions are made.
  - Reduced risk
- Warehouses for building materials should sell both new and used building materials



# Results, apps and public reports

- They are supportive of policies for *mapping reuse* opportunities.
- Risk: the reports go unused and unread.
- They recommend: Make these reports accessible to the public by publishing them online.
- Common digital marketplace for reused materials, like a public “EN TUR”-app.
  - Also for publishing reuse mapping-reports

Example: Asplan Viak’s app that makes reuse-reports searchable



# Results, regulations

- Policies on reuse should also focus on *actual* reuse.
- Policies promoting reuse must be considered in conjunction with regulations on
  - demolitions, recycling, area efficiency, and maintenance.



## Examples:

- Daily fine “dagmulkt” for unused buildings?
- Increase the costs of tearing down a building.
- More incentives for maintenance – it will ease reuse of materials in the long run.

# Tusen takk for oppmerksomheten!

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