



# Philanthropic Investment in Historic Buildings

NN



# Who we are

Udvikler og bevarer



- Realdania By & Byg is a subsidiary of the philanthropic association Realdania founded in 2003
- We work to help realize Realdania's mission *to improve the quality of life through philanthropic investment and active ownership of properties and areas for urban development*
- We do this through philanthropic investments in properties, as it is determined in Realdania's articles of association that one of the associations' purposes is
- *to own and build properties with the purpose of preserving the built heritage and developing the building business.*



# What we do

Udvikler og bevarer



- We own and preserve a collection of 60+ historic buildings that represent the development of Danish building heritage over 500 years. The historic buildings are rented to private individuals or businesses.
- We also develop innovative and experimental new buildings
- And we are involved in long-term urban development projects in partnership with municipalities in order to contribute to the development and quality of Danish towns

## 60+ Historic Buildings



## 15 Building Development Projects



## 4 Urban Development Projects

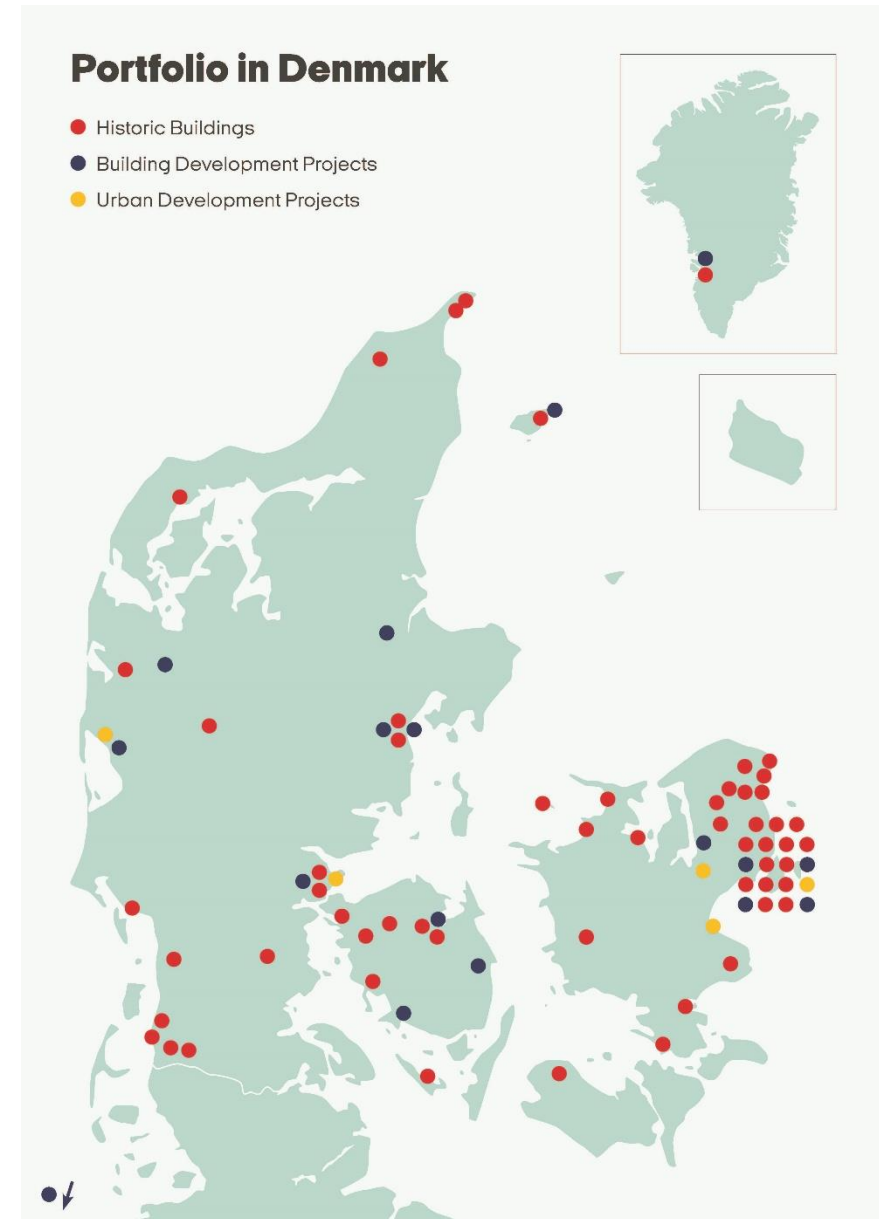


# Portfolio in Denmark

Udvikler og bevarer

- 60+ historic buildings
- 15 building development projects
- 4 urban development projects

Geographically spread all over Denmark!





# Portfolio examples

Udvikler og bevarer



Among others, the portfolio contains the following building categories:

- Architects' own houses
- Farms
- Manor houses
- Estate construction



# Philanthropic Investment

Udvikler og bevarer



- Philanthropic investments: A certain loss or reduced ROI is deemed acceptable to fulfil a philanthropic purpose.
- A philanthropic task in terms of conserving important cultural heritage is essential.
- Ownership provides both long-term commitment and a guarantee that the properties will be continuously maintained at a stable, high level, and preserved for posterity.





# Conservation/restoration

Udvikler og bevarer



- Restoration starts with giving a building a function to ensure that it remains in use and to help generate rental income to finance its future upkeep.
- Many buildings can be conserved through continued usage for the purpose for which they were originally built.
- Other buildings require a new function to ensure continued use. This may involve a major restoration of the property.
- Upon completion of the conservation/restoration, the historic buildings are rented at market trends.



# Business Model

- Properties are bought at market value and on the basis of local estate agent valuations.
- On average, 30%-50% of restoration costs are written off as a philanthropic grant.
- Over time, in by far most cases, devalued properties will increase in value with inflation.
- The individual building must as a minimum be able to generate a rental income sufficient to ensure its ongoing upkeep and operation.
- Property rents follow market trends.
- The average rate of return over the years has been approx. 2% of gross investment at portfolio level.

---

## A hypothetical example (in €1000)

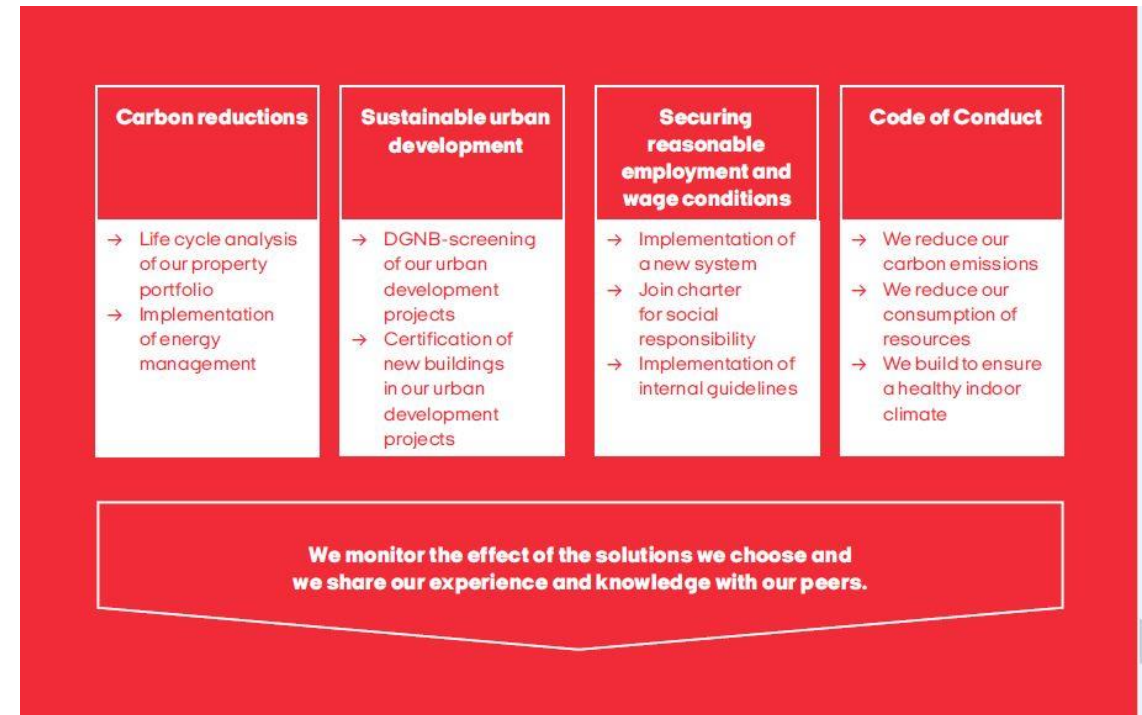
---

Acquisition:	500
Restoration:	400
Total investment:	900
Market value after restoration:	700
Loss/philanthropic grant:	200
Annual rental income:	38
Annual operating and maintenance costs:	10
Annual net operating income:	28
Return on market value after restoration of €700,000	4%
Return on total investment of €900,000	3,1 %



# Goals for Environmental, Social and Governance Issues (ESG)

- Buildings have a huge carbon footprint and highly influence health and the quality of life.
- Consequently, sustainability in the broadest sense of the word permeates everything Realdania By & Byg does.
- In recent years new steps have been taken to ensure that the highest possible level of sustainability is achieved in the projects.
- The purpose is to inspire others to benefit current and future generations.



# Energy efficiency

Udvikler og bevarer



- Energy cost
- Create an overview
- Develop practices

## Energiforbedring i historiske bygninger

– erfaringer og læringer fra Realdania By & Byg







# LCA – Restoring and transforming historic houses

Udvikler og bevarer



← Erik Christians Sørensen own house

Det Harboenske enkefruekloster →



← Meldahls town hall

Bakkekammen 40, Bedre byggeskik →





# LCA – Short introduction

## LCA – Life Cycle Assessment

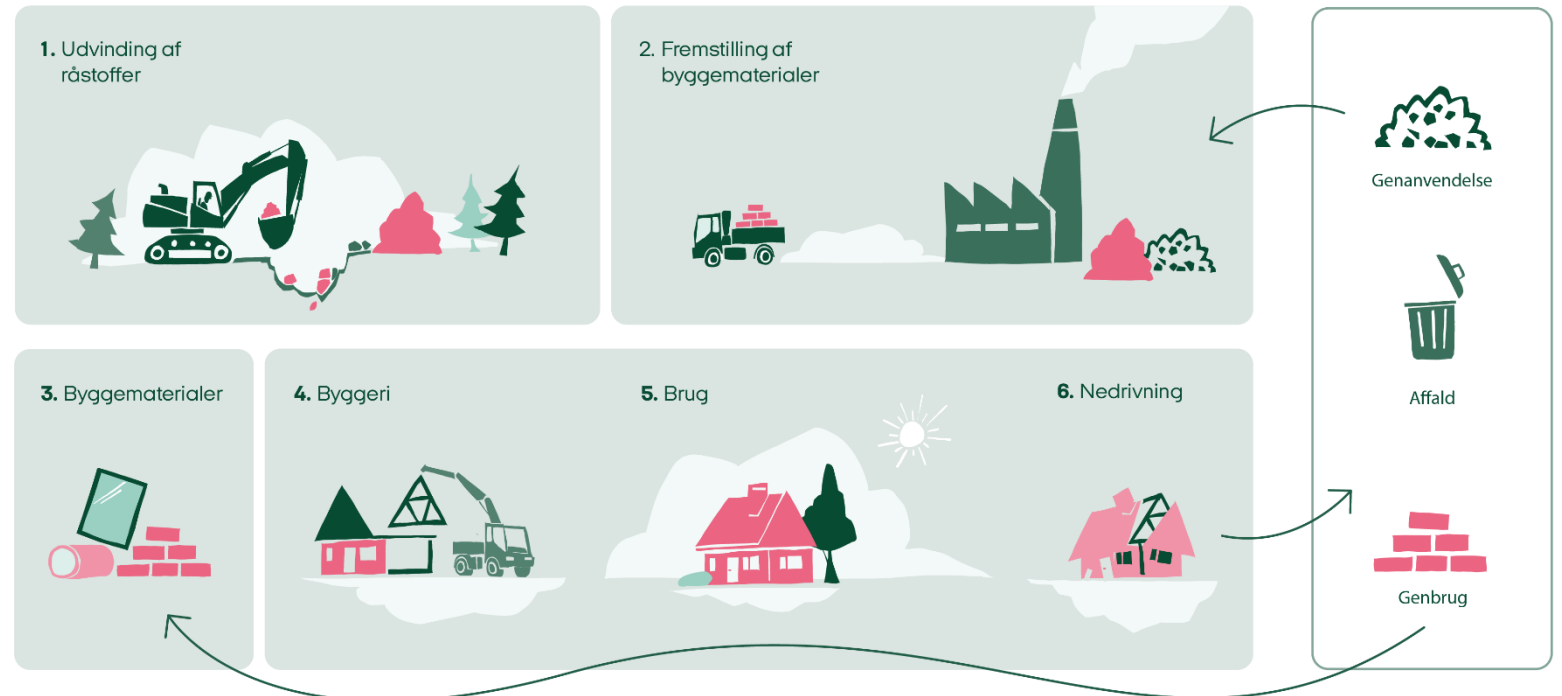
### Global Warming (GWP) [CO2 equivalents]

- Measures all greenhouse gases over a 100 years perspective.
  - CO2, GWP:1
  - Methane, GWP:28
  - Nitrous oxide, GWP:265
  - High GWP-gasses, GWP: Up to 23.500

### Danish requirements today and in the future:

- 2023 – 12 kg CO2/m2/year
- 2025 – 10,5 kg CO2/m2/year
- 2027 – 9 kg CO2/m2/year
- 2029 – 7,5 kg CO2/m2/year

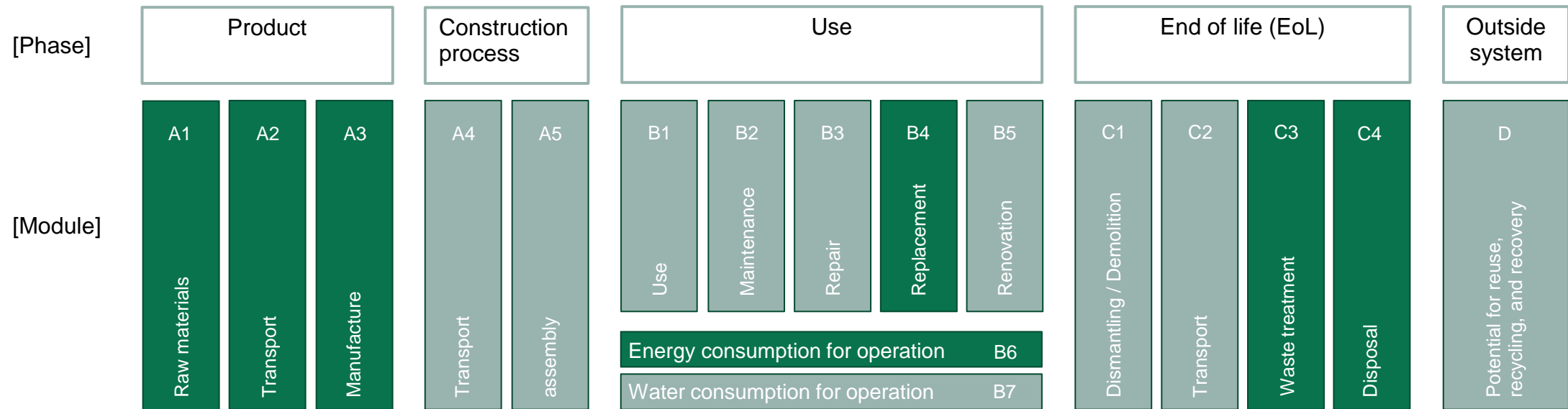
### Livscyklus for byggeri



# LCA – Introduction

## Legal requirements 2023 for new buildings

Udvikler og bevarer

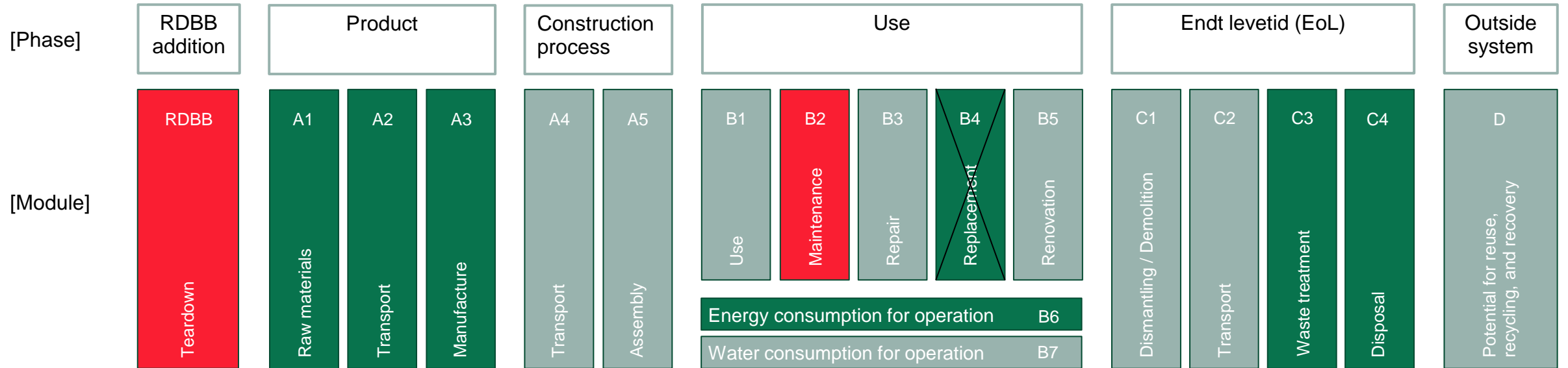




# LCA – Introduction

## RDBB method

Udvikler og bevarer



# LCA – How we did it

Udvikler og bevarer

## Project start 2020

Purpose: Mapping our CO<sub>2</sub> emissions related to our restorations and operation of our properties, with aim to reduce future CO<sub>2</sub> emissions

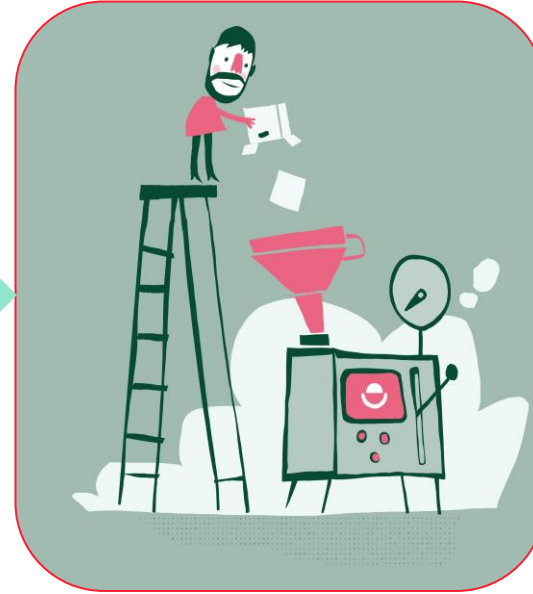
Method: LCAbyg, Energy consumption, maintenance.



Finished restoration



Data collection, drawings,  
descriptions, invoices and  
interviews



Summary of materials  
used, collection of EPDs



Finished CO<sub>2</sub> accounts



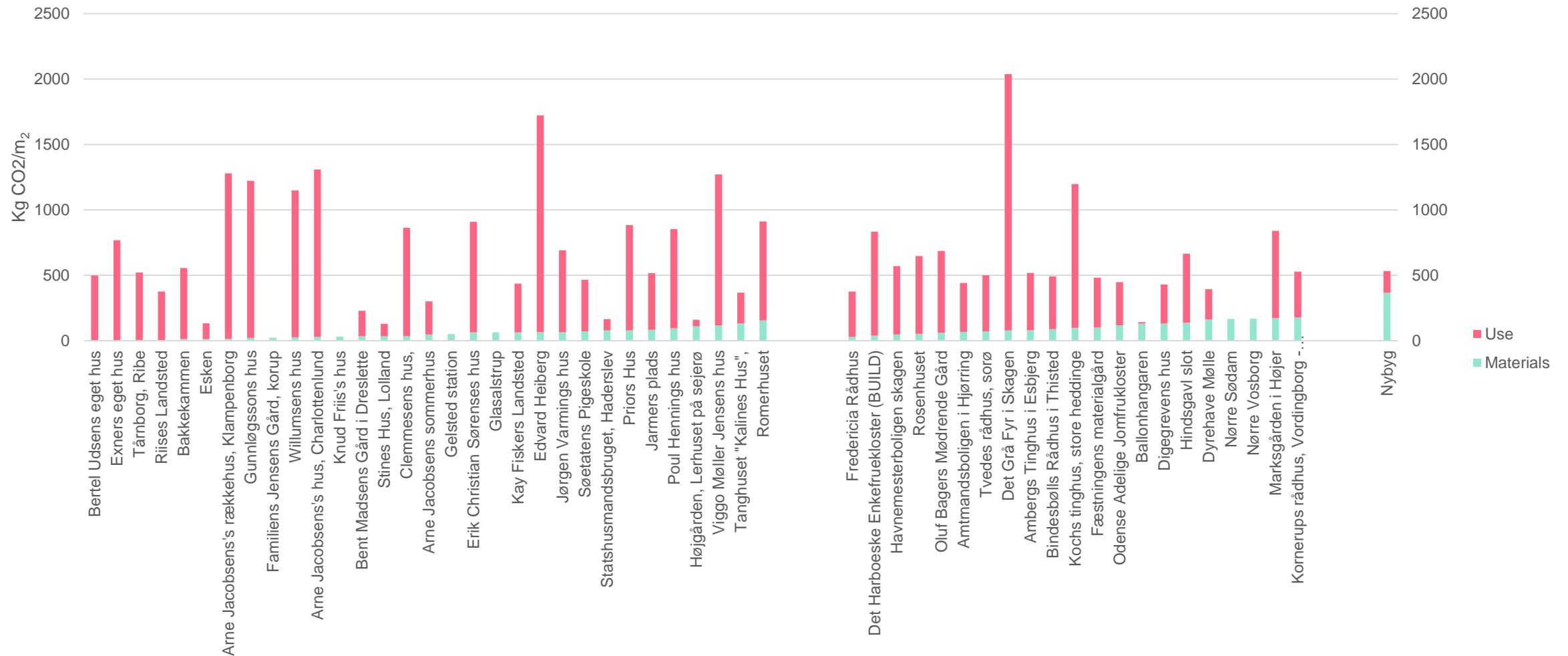
# Results – Portfolio

Udvikler og bevarer



CO2 Emissions - Included modules: Demolition + A1-A3 (Product) + Use (B6) + C3-C4 (End of life)

## Restorations and transformations

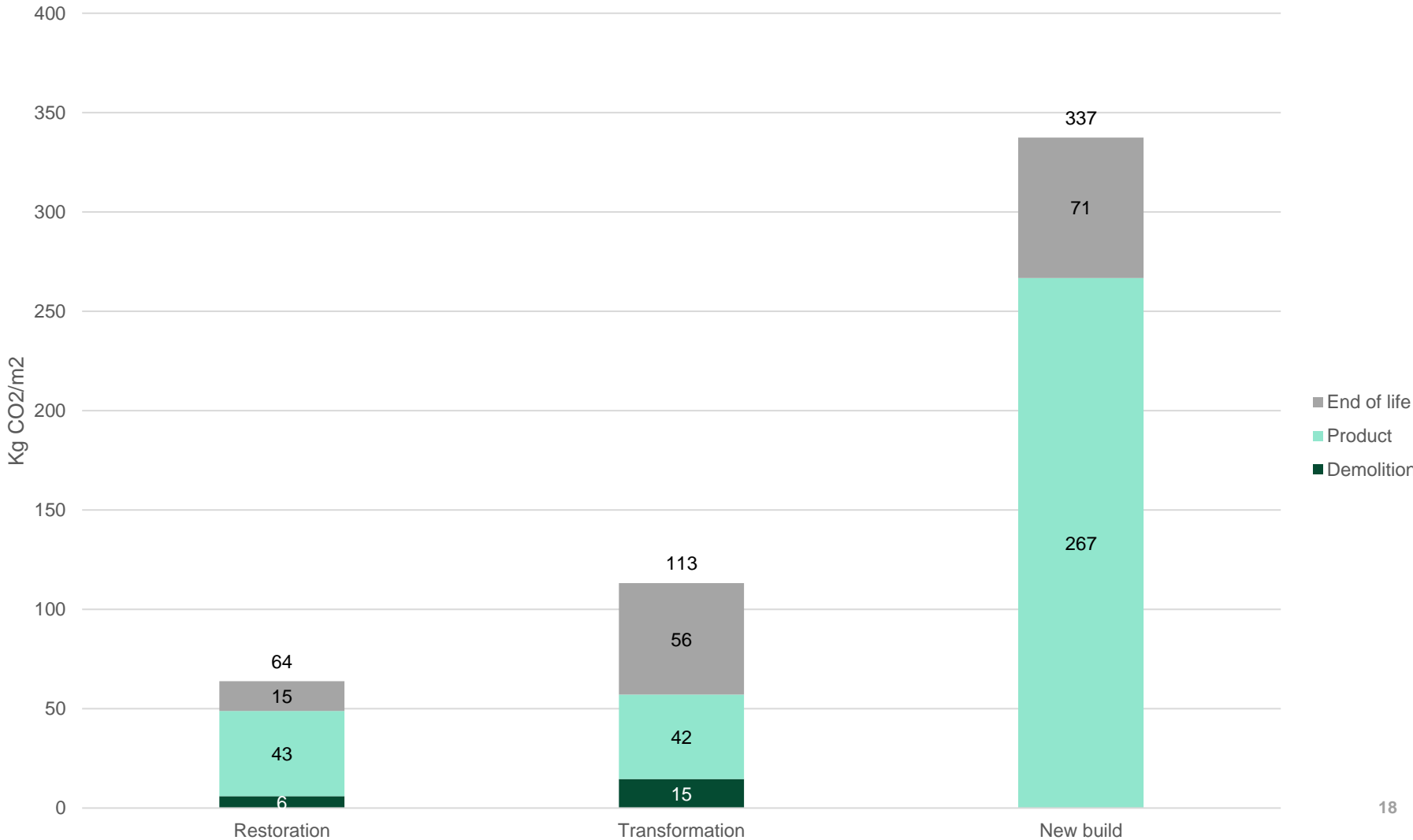


# Results for all properties - Restoration, Transformation, New build

**Included modules**

- Demolition
- A1-A3 (product)
- C3-C4(End of life)
  
- **Use (B6) excluded due to various heating sources**
  - District heating
  - Heatpumps
  - Gas
  - Oil
  
- **Reference, new build**
  - Klimapåvirkning fra 60 bygninger (SBI 2020:04) - Opdaterede værdier baseret på nyere data og danske branche EPD'er

Average CO2 emissions in, Restoration, transformation and new build





# Results for district heating properties - Restoration, Transformation, New build

Udvikler og bevarer

## Included modules

- Demolition
- A1-A3 (product)
- B6 (Use – District Heating)
- C3-C4(End of life)

## Reference, new build

- Klimapåvirkning fra 60 bygninger (SBI 2020:04) - Opdaterede værdier baseret på nyere data og danske branche EPD'er

## CO2 emission projection for district heating from 2020

Average CO2 emissions in restoration, transformation and new build



# Results for district heating properties - Restoration, Transformation, New build

Udvikler og bevarer



**Included modules**

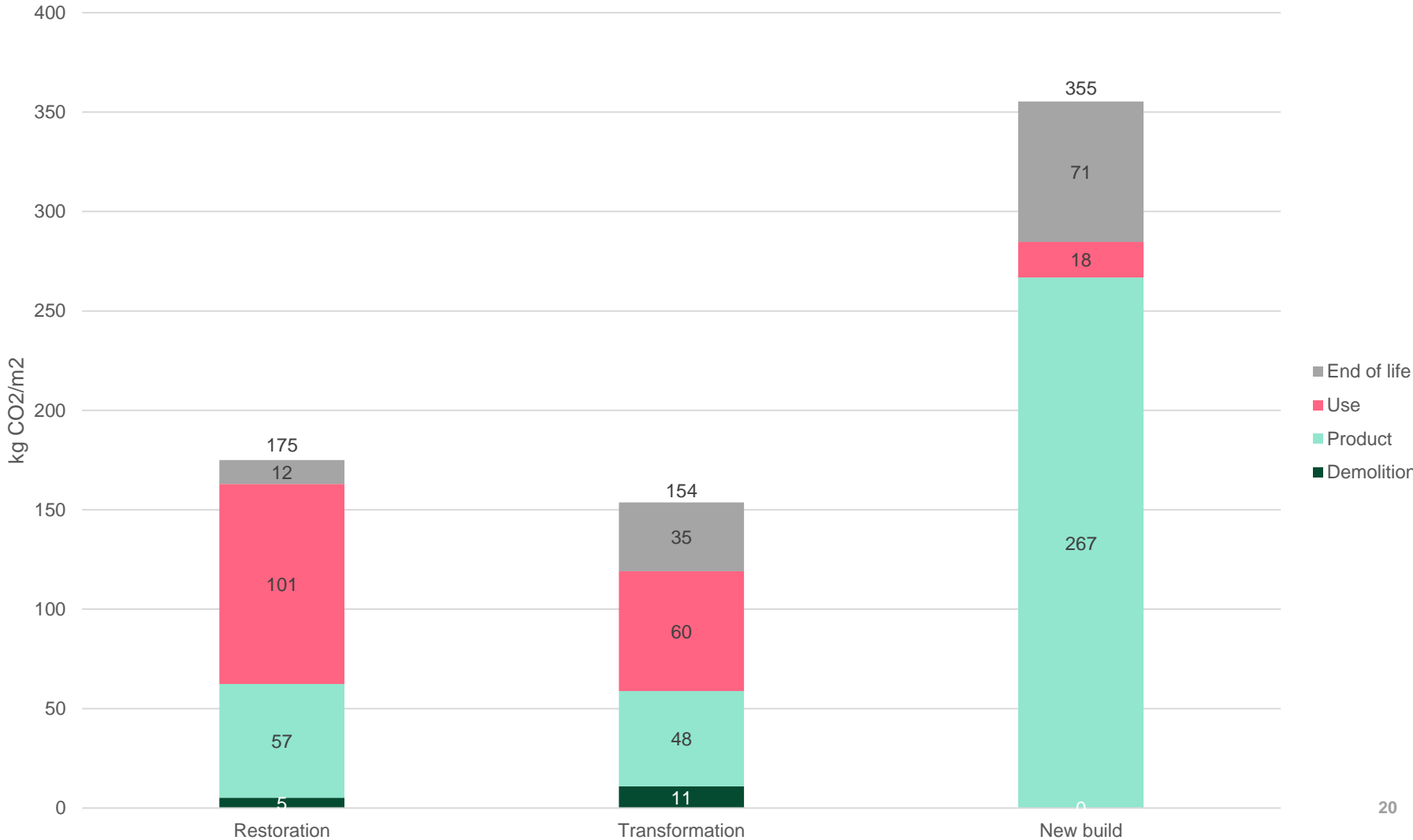
- Demolition
- A1-A3 (product)
- B6 (Use – District Heating)
- C3-C4(End of life)

**Reference, new build**

- Klimapåvirkning fra 60 bygninger (SBI 2020:04) - Opdaterede værdier baseret på nyere data og danske branche EPD'er

**CO2 emission projection for district heating from 2023**

Average CO2 emissions in restoration, transformation and new build



# Results – Town halls

Udvikler og bevarer



## Included modules

- Demolition
- A1-A3 (product)
- C3-C4(End of life)

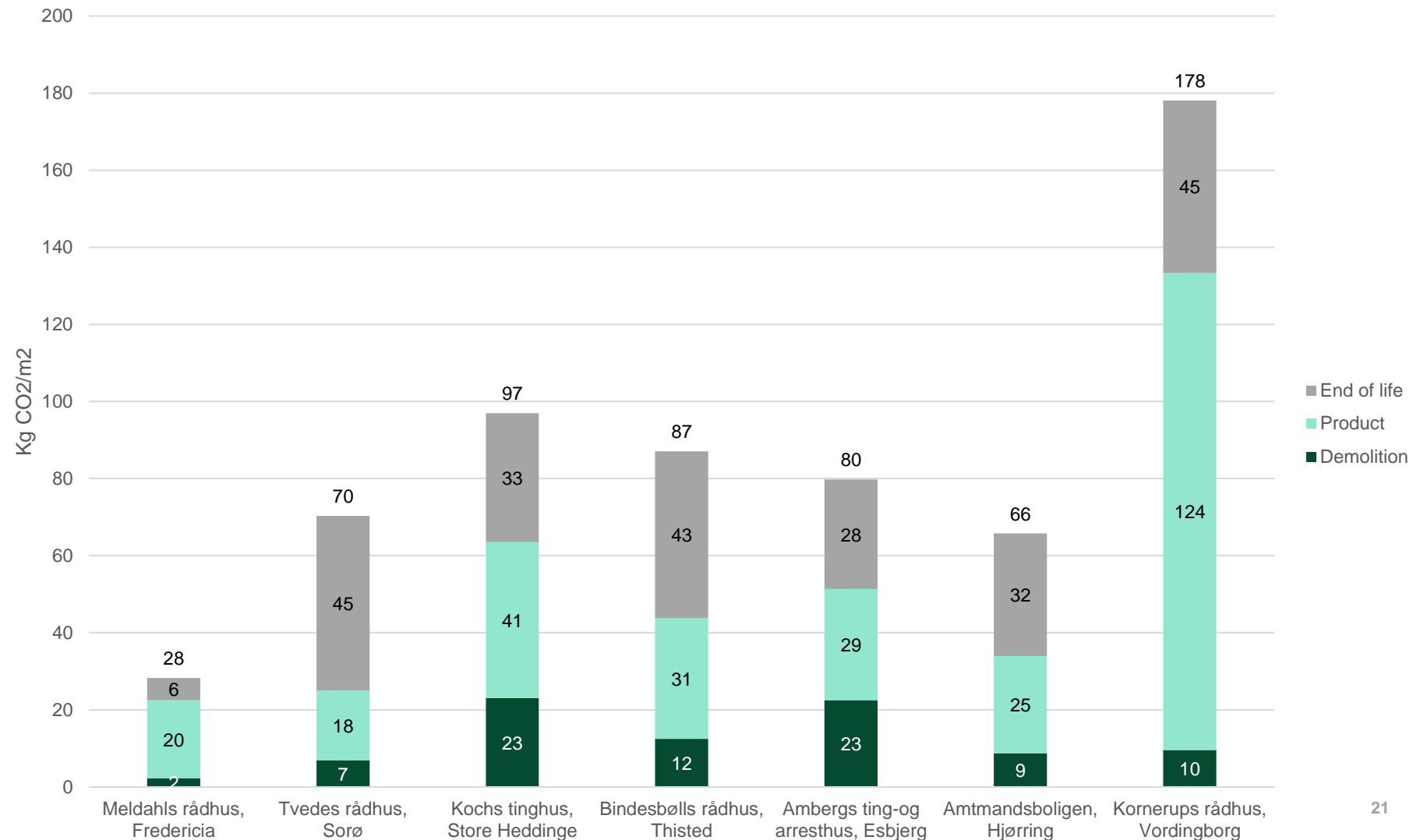
## Use (B6) excluded due to various heating sources

- District heating
- Heatpumps
- Gas
- Oil

## Reference, new build

- Klimapåvirkning fra 60 bygninger (SBI 2020:04) - Opdaterede værdier baseret på nyere data og danske branche EPD'er

CO2 emission broken down on phases – Town halls





# Meldahls townhall

Udvikler og bevarer



**Built:** 1860

**Renovated:** 2005

## CO2 emission from materials in renovation:

- 41 tons CO2
- 28 Kg CO2/m2
- 0,56 Kg CO2/m2/year

## CO2 emission in use:

- 504 tons CO2
- 373 Kg CO2/m2
- 7,47 Kg CO2/m2/year

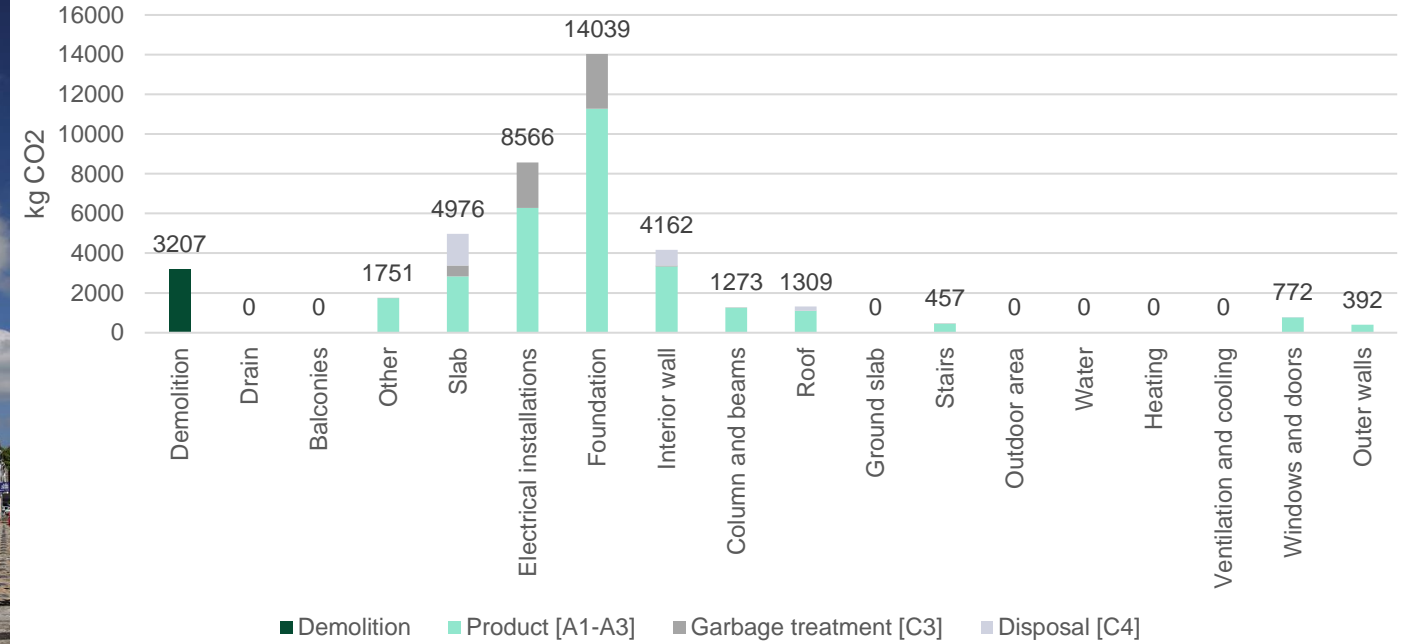


# Results – Meldahls townhall

Udvikler og bevarer



Distribution of CO2 emissions

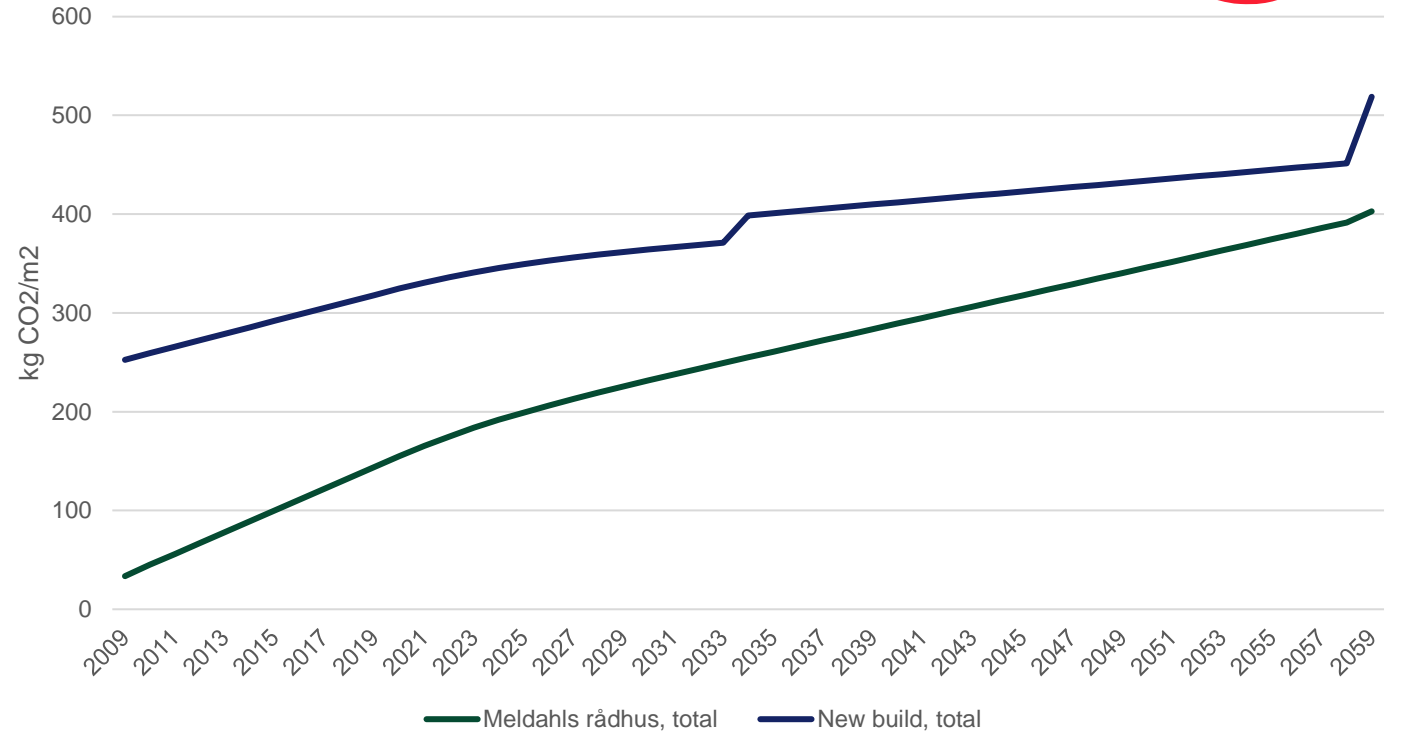


Building part	Kg CO2 emitted	Percentage of the total CO2 emission from the materials	Highest emission from single material [kg CO2]	Second most emission from single material [kg CO2]	Third most emission from single material [kg CO2]
Foundation	14039	34%	Concrete [13745]	Wood [294]	
Electrical installations	8566	21%	New electrical installations [8566]		
Slabs and floors	4977	12%	Rubber floor [3454]	Concrete surfacing [611]	Concrete [168]



# Results – Meldahls townhall

Udvikler og bevarer



Activity	Kg CO2/m2	Percentage of the total CO2 emission	New build	Kg CO2/m2	Percentage of the total CO2 emission
Materials	28	7%	Materials	337	63%
Use (B6) District heating	374	92,7%	Use (B6) District heating	168	31%
Maintenance (B2) [2016-2022]	1	0,3%	Replacement (B4)	28	5%



# Skagen grey lighthouse

Udvikler og bevarer



**Built:** 1858

**Renovated:** 2016

## CO2 emission from materials in renovation:

- 52 tons CO2
- 77 Kg CO2/m2
- 1,5 Kg CO2/m2/year

## CO2 emission in use:

- 1334 Tons CO2
- 1959 Kg CO2/m2
- 39,2 Kg CO2/m2/year

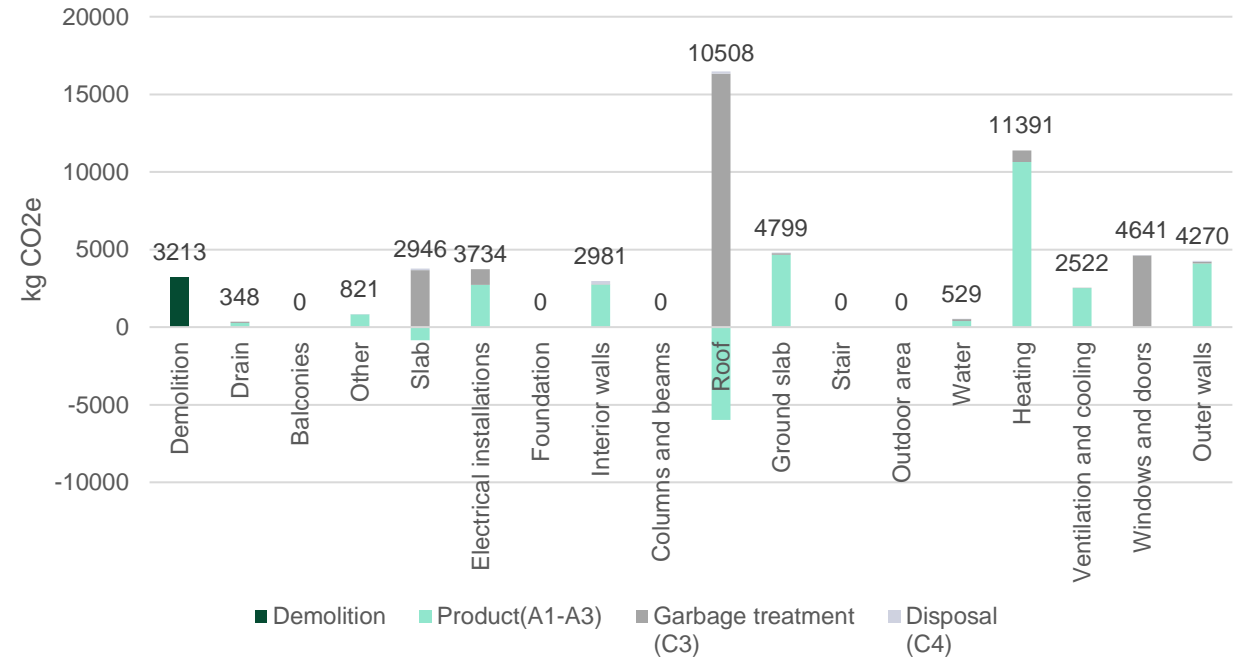


# Results – Skagen grey lighthouse

Udvikler og bevarer



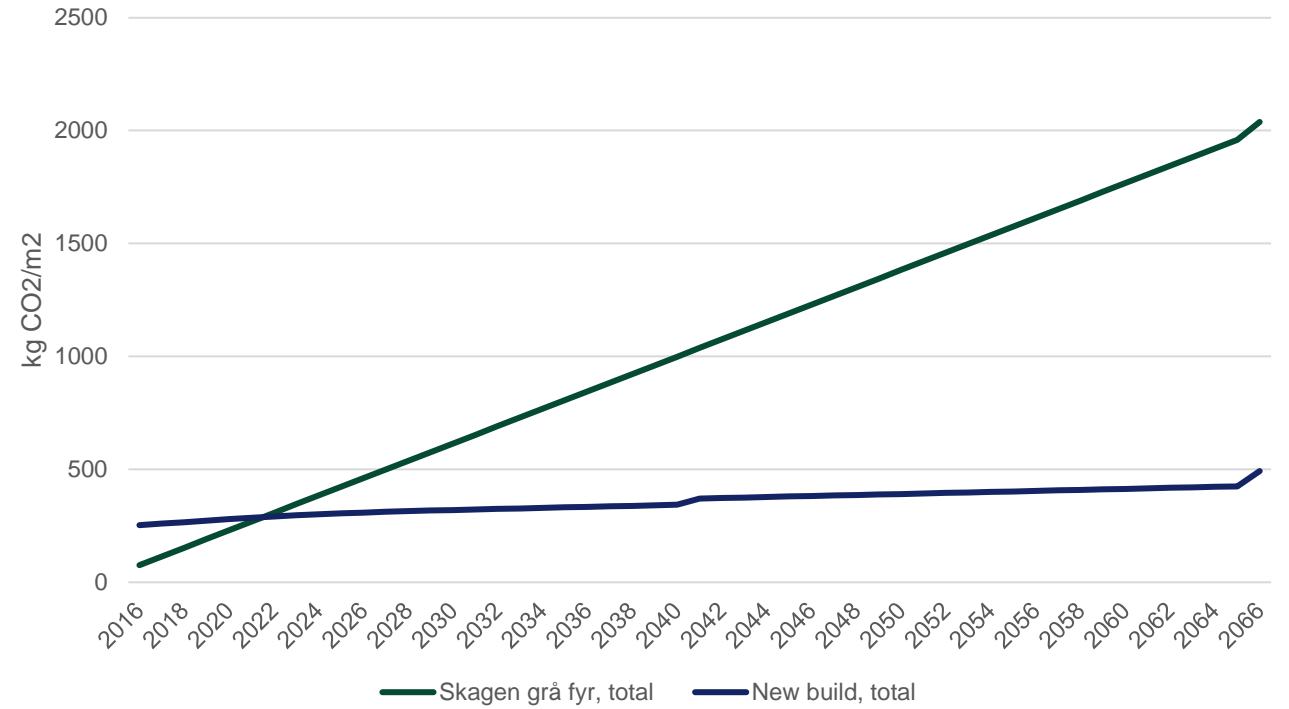
Distribution of CO2 emissions



Building part	Kg CO2 emitted	Percentage of the total CO2 emission from the materials	Highest emission from single material [kg CO2]	Second most emission from single material [kg CO2]	Third most emission from single material [kg CO2]
Heating	11391	21%	Radiator [8958]	Alu-pex pipes [1286]	Floor heating [1039]
Roof and ceiling	10508	20%	Zink [7707]	Wood [2394]	Lime mortar [970]
Windows and doors	4641	9%	Wood frame (400m) [1540]	Alu frame (65m) [1147]	Single layer glass [912]

# Results – Skagen grey lighthouse

Udvikler og bevarer



Activity	Kg CO2/m2	Percentage of the total CO2 emission	New build	Kg CO2/m2	Percentage of the total CO2 emission
Materials	77	3,8%	Materials	337	40%
Use (B6) Oil	1959	96,1%	Use (B6) Oil	473	57%
Maintenance (B2) [2016-2022]	1,3	0,1%	Replacement (B4)	28	3%

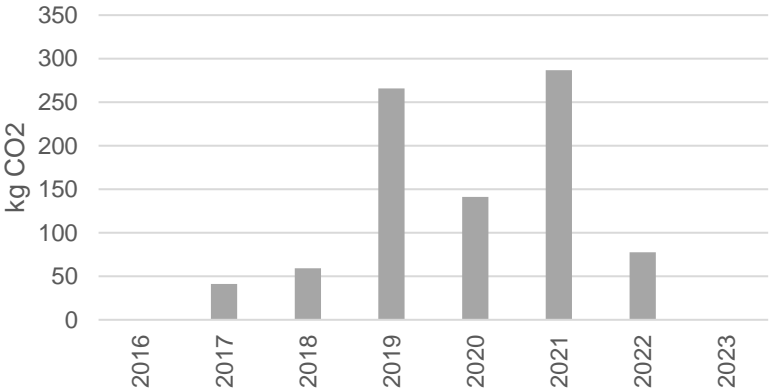


# Tasks where LCA is included.

- Preparation of budgets.
- Carrying out the ongoing maintenance.
- Energy measurement/energy optimization.
- LCA accounting.



CO2 emission related to maintenance

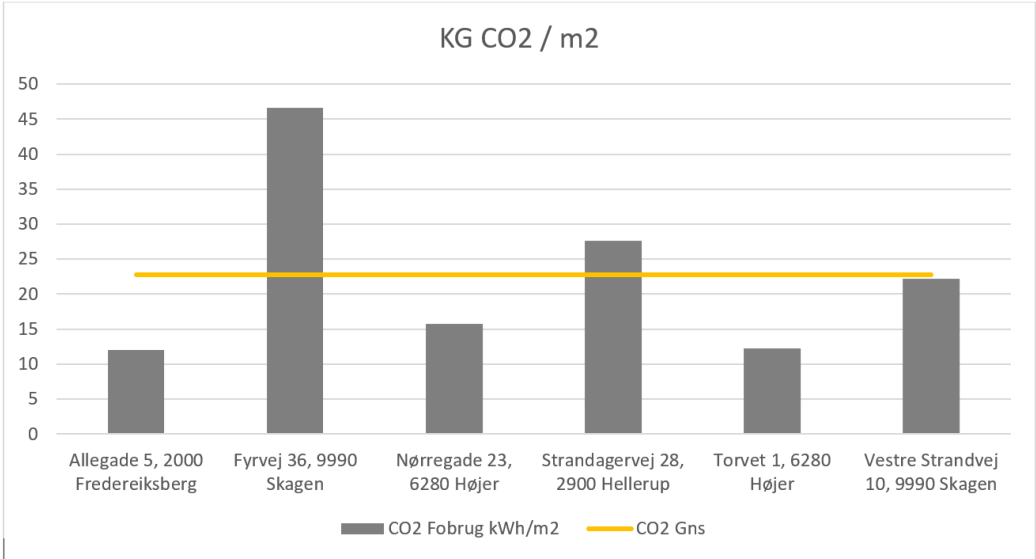


# Heat consumption

Udvikler og bevarer



Realdania  
By & Byg





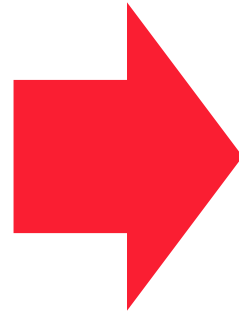
# Energy optimization of heat source

Udvikler og bevarer

Oil boiler



Air to water heatpump

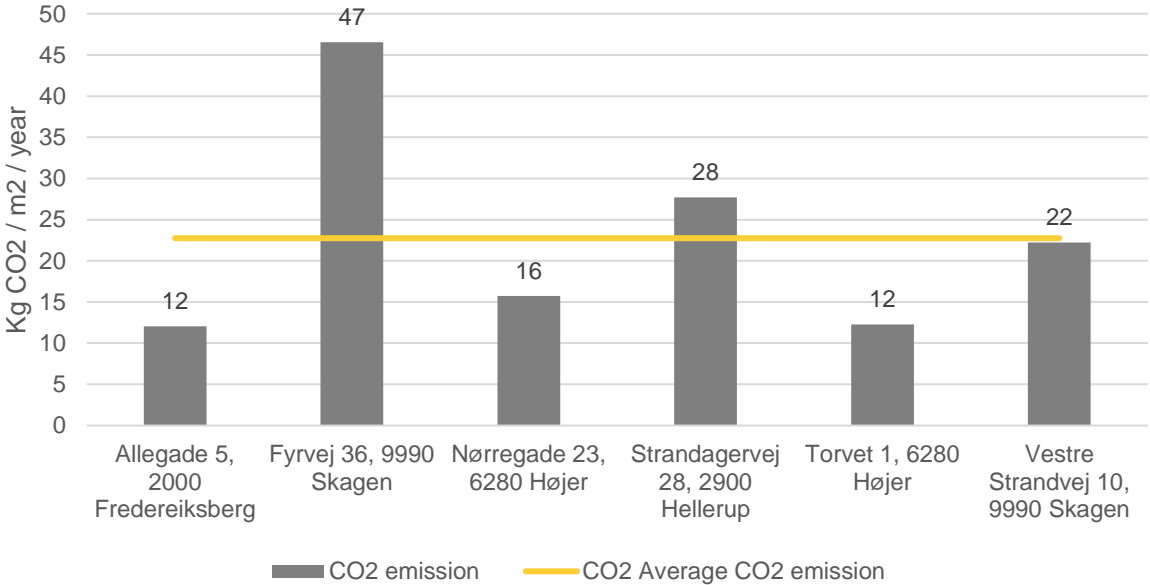




# Energy optimization of heat source

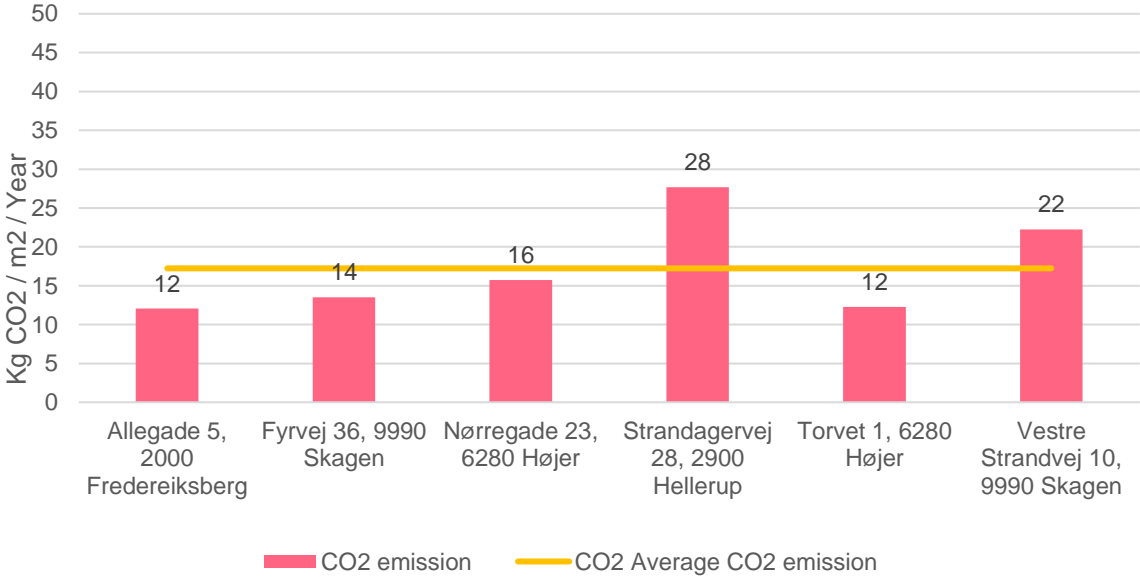
## Skagen grey lighthouse with oil boiler

Yearly CO2 emission related to heat consumption



## Skagen grey lighthouse with heatpump

Yearly CO2 emission related to heat consumption

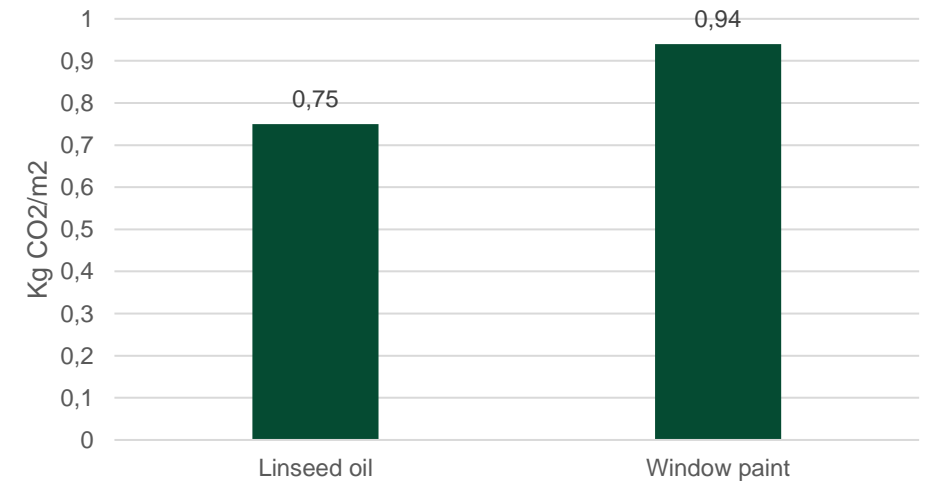


# Maintenance of windows

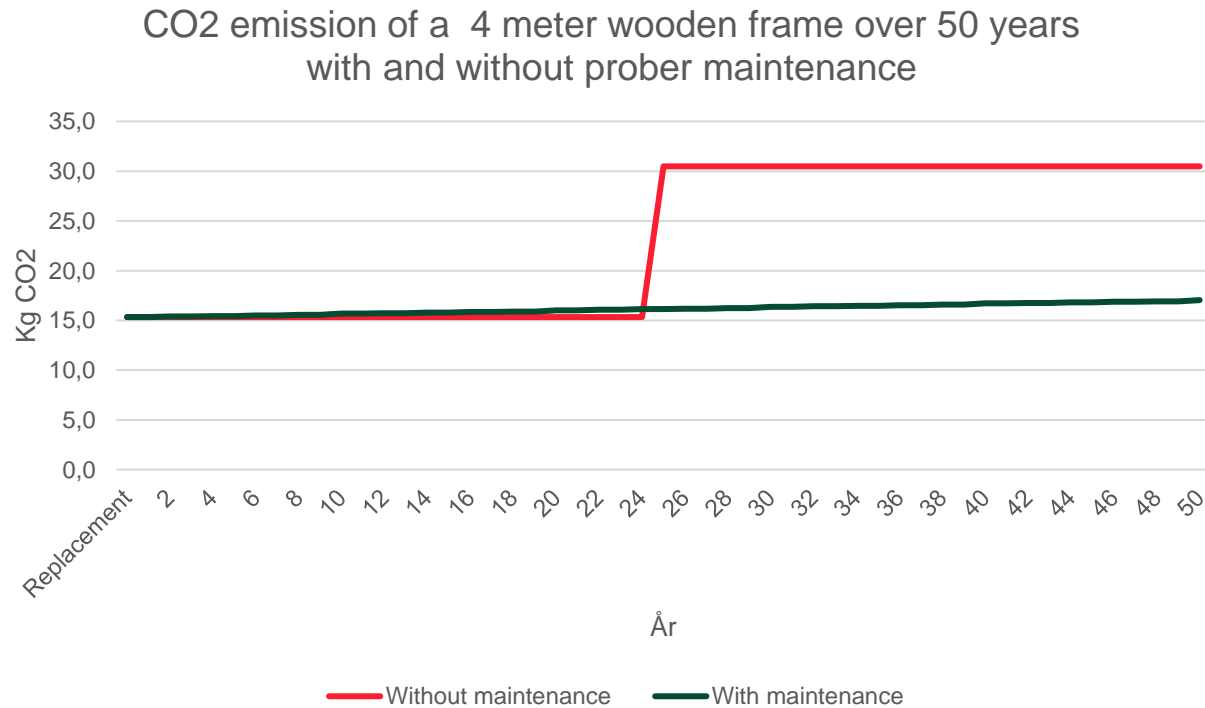
Udvikler og bevarer



Kg CO2/m2 with linseed oil and window paint



# Maintenance of windows



Before maintenance



After maintenance

# Questions?

Udvikler og bevarer

