4 | Case Studies

2. Maskinparken TRE

CLIENT	Lilleby Eiendom A/S	**ARCHITECT**	HUS Arkitekter
CONTRACTOR	Veidekke	**FINISHED**	2018
BUILDING SYSTEM	Cross laminated timber		

Description

Maskinparken TRE is a 3785 m2 apartment building located in Trondheim, Norway. Maskinparken TRE is a rectangular apartment building with 8 floors and consists of 47 apartments. Each apartment has an area between 30-115 m2 with 1-4 rooms, which are designed with open and bright living areas together with large windows.

The building is constructed in CLT-elements for the external walls, internal walls, slabs and roof and is covered with wood facade cladding. Underneath the building there is a basement constructed in cast-in reinforced concrete.

Even though the building is constructed in CLT - to comply with the Norwegian fire regulation and regulations regarding noise, an additional concrete screed on top of the CLT decks as well as gypsum boards on CLT walls are needed.

Results

MODULES	A1-A3 - Construction stage B4 - Replacements C3/C4 - Waste processing/Disposal
BIOGENIC CARBON METHOD	-1/+1 rule - Biogenic carbon included
REPORTED RESULTS	Global Warming Potential - Kg CO_2 eq/m^2/year
CALCULATION PERIOD	50 Years

Pr m^2/year	**4.52 kg CO_2 eq**
Pr m^2	**226 kg CO_2 eq**
Total	**1 055 ton CO_2 eq**

An LCA of Maskinparken TRE has been conducted to evaluate the environmental impact of the building. The results of the LCA show a total global warming potential for the building materials of 1.06E+6 kg CO2 eq or 4.52 kg CO2 eq/m2/year. Furthermore, the results have been investigated for the different building parts and the more specific building materials. Figure 1 shows the results of the global warming potential for the different building parts in Maskinparken TRE and Figure 2 illustrates the results for 9 most CO2 contributing building materials in Maskinparken

The results show that the slabs have the largest impact. This is a result of the additional concrete screed needed to reduce the sound transportation through the slabs. Furthermore, the CLT slabs and a concrete slab in the basement account for the high CO2 impact. Following, the internal walls have the second largest CO2 contribution to the system. This is caused by the many internal walls which are placed in the building and each wall needs an additionally gypsum boards and paint for every surface which has to be repainted every 15 years. The third largest contributor are the windows.

The 9 most contributing specific products are shown in Figure 2. Almost half of the CO2 contribution is related to only three products; windows, concrete and reinforcement. This result shows that even though the most applied product in the building is the CLT-elements it is still not near to become the most contributing product, thus it shows the benefit of applying a wood material instead of concrete as the main structural material.

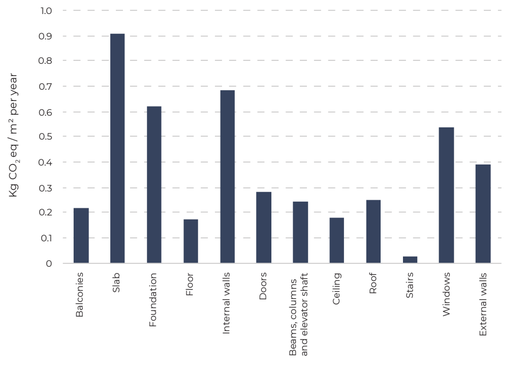

Figure 1 - CO2 emissions for the differnt building parts

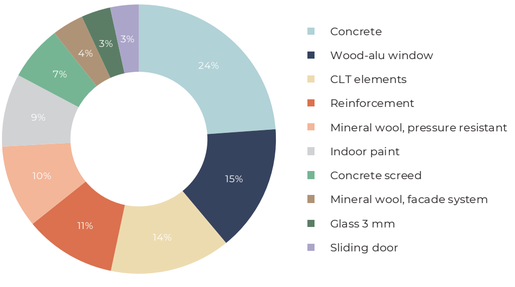

Figure 2 - CO2 emissions for the 9 most emitting products

General Findings

- The three most CO2 contributing building parts are the internal walls, slab and windows
- Construction parts have a relatively low environmental impact
- The most CO2 emitting material is the concrete and secondly the wood/alu windows
- The CLT element constitutes 14% of the most CO2 contributing products.
- The indoor paint is the third largest contributor to the CO2 footprint.