APT Housing cooperative Myhrerenga NO

PROJECT SUMMARY
Renovation comprising:
- Building envelope
- Ventilation system
- New energy central and heating system

SPECIAL FEATURES
New facade insulation system

PLANNING AND DESIGN
Ingvild Røsholt &
SINTEF Building and Infrastructure

OWNER
Myhrerenga housing cooperative

IEA – SHC Task 37
Factor five renovation project using passive house components

BACKGROUND

There are seven similar apartment blocks, three stories high with 24 apartments per block. The buildings were erected in 1967-1968 and now need major renovation. The facades were in poos condition and residents complained about drafts, cold floors and poor air quality.There are two types of apartments, 2-rooms 54 m² (living area) and 3-rooms 68 m². Heat for DHW and space heating is supplied from a local energy plant with oil- and electric boilers. The energy use is high, 310 kWh/m² a, mostly electricity the last 3 years.

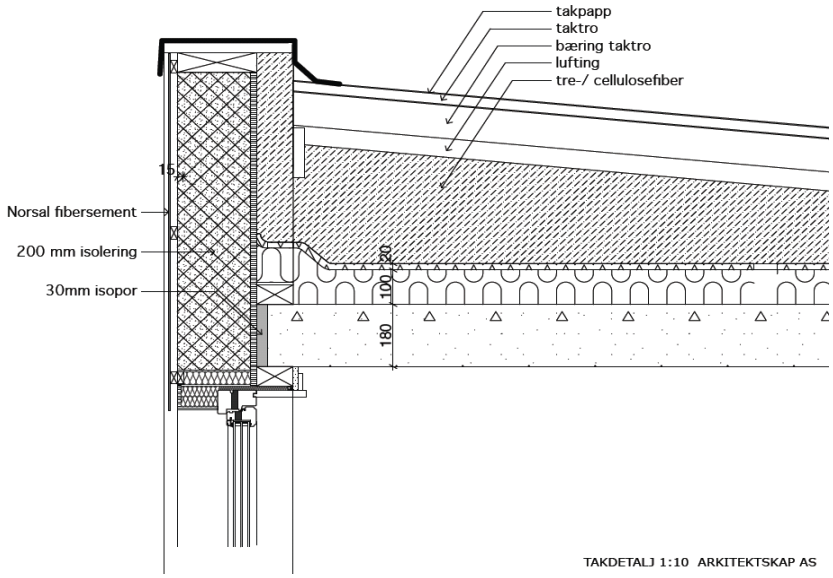
SUMMARY OF THE RENOVATION

- Blown in insulation in the roof construction (350-400mm)
- Adding 200 mm in the external wall in addition to the existing 100 mm
- Adding 100 mm insulation in the floor above the unheated basement
- Balanced ventilation system with high efficiency heat recovery and low specific fan power
- All windows replaced with Passive House quality units
- Improved air tightness meeting Passive House Standards (N50 < 0.6 ach)
- A heating system with one radiator in each apartment, individual metering and accounting of electricity and heat
- A new energy plant with solar collectors and heat pumps

Damage to the facade

Windows in poor condition-

A new facade insulation system from Rockwool is planned for the renovation. The existing 100 mm wooden frame wall will be covered with OSB boards. The 200 mm facade insulation is anchored with long screws in the OSB-boards, providing a nearly thermal bridge free facade.



The roof consists of a concrete ceiling, a relatively large cavity space under a wooden roof construction above. This will be filled with blown in insulation. An air gap of ca. 150 mm will be maintained under the roof construction for venting out any humidity.

Summary of U-values W/(m²·K)

	Before	After
Roof	0.35	0.12
Walls	0.35	0.12
Floor	0.40	0.20
Windows	2.8	0.80

ENERGY PERFORMANCE

Calculated demand for total delivered energy*
Before: 310 kWh/m²
After: 80 kWh/m²
Reduction: ~74 %

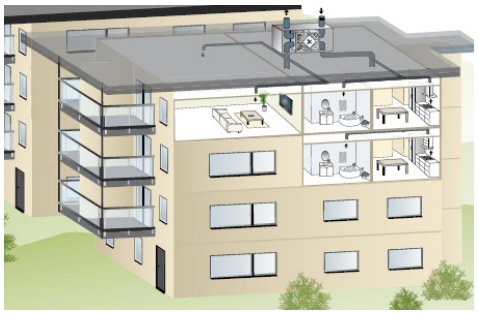
Calculated demand for space heating*
Before: 234 kWh/m²
After: 20 kWh/m²
Reduction: ~91 %

Calculated demand for primary energy**
Before: 620 kWh/m²
After: 118 kWh/m²
Reduction: ~ 81 %

* Based on methodology from NS3031:2007
** A primary energy(PE) factor of 2.35 for electricity is used, and only PE for space heating and DHW is calculated

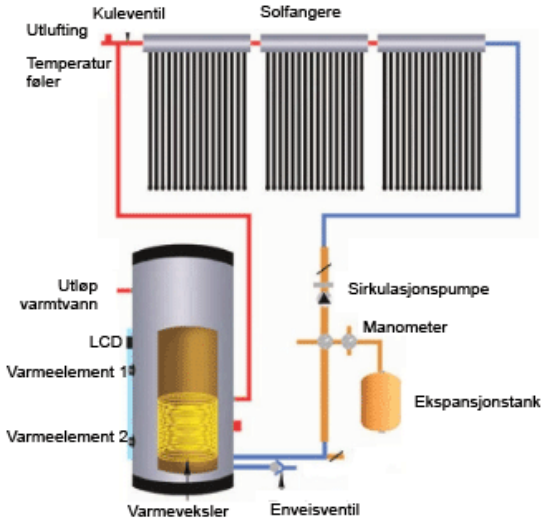
ENERGY SYSTEM

Existing radiators will be removed and one new small radiator (1-1.5 kW) with thermostatic valve will be installed. Individual metering and accounting will be done for each apartment.
The central energy plant will be modernized with vacuum solar collectors and air to water heat pumps.



VENTILATION

The ventilation system is planned with a counter-flow heat exchanger with ~80 % thermal efficiency and an electrical consumption of 1.45 W/m³/h. Each ventilation unit will serve 6 apartments (4 units for each block). Existing shafts will be used for the supply and extract air.



AIR LEAKAGE

The existing air leakage(N50) has not been measured, but estimated at 10-15 ach. The aim of the renovation is to reduce it to the Passive House requirement (0.6 ach).

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