

SFH Log home outside Kongsberg NO

PROJECT SUMMARY

Housing renovation in several stages comprising:

- the building envelope
- a new ventilation system

SPECIAL FEATURES

New facade insulation system

PLANNING AND DESIGN

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IEA – SHC Task 37

Renovation project approaching low energy standard

BACKGROUND

This holiday cottage was built in 1942 using 6" logs. It was converted into a permanent residence in 1997. 200 mm insulation were added in the roof construction and 100 mm in the floor construction and the electrical and sanitary systems were upgraded.

The total floor area is just under 60 m². The heating system consists of electrical floor heating in the hall and bath room and a fireplace used extensively in the winter.

SUMMARY OF THE RENOVATION

- New roofing with more insulation (100-300mm)
- Balanced mechanical ventilation with high efficiency heat recovery
- All windows replaced with triple glazed units, near Passive House Standard ($U \sim 0.8-1.0 \text{ W/m}^2\text{K}$)
- New façade system with 200 mm exterior insulation
- Major efforts to improve air tightness
- Additional insulation and improved tightening the crawl space

Installation of the insulating facade





A layer of studs / OSB panels outside the old log walls were needed to achieve an even surface for the facade insulation, which was anchored to the OSB with long screws..



The floor of the crawl space is covered with a 0.2 mm moisture barrier, then 150 mm insulation. Foundation walls are insulated with 100 mm mineral wool and 70 mm edge insulation. The crawl space is sealed to keep the temperature above the condensation point (temperature and humidity will be monitored).

Under the roofing are a 50mm air layer and 100 mm mineral wool. 60% of the ceiling faces an unheated attic room. The floor is insulated with 200mm mineral wool. The remaining 40% has a extra layer of mineral wool with variable thickness (100-400mm)).

Summary of U-values W/(m²·K)

	Before	After
Roof	0.2	0.10
Walls	0.8	0.11
Floor	0.2	0.15
Windows	2.8	0.9

ENERGY PERFORMANCE

Calculated demand for total delivered energy*

Before: 230 kWh/m²

After: 120 kWh/m²

Reduction: ~66 %

* Based on methodology from NS3031:2007



VENTILATION

A balanced ventilation system with ~80 % temperature efficiency is planned. Air is supplied to the office, living room and the bedroom. Air is extracted from the bath room and the kitchen.

INFILTRATION

The infiltration before was very dependent of the temperature and wind condition, but an average estimate would be about 2 ach in the heating season. Pressure tests will be conducted when the project is finished but expectations is in the area of 0.1 ach.

AUTHOR

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