

Ulvøya, Oslo, Norway

1. OVERVIEW

PROJECT SUMMARY

- Year of construction: **1958**
- Renovation: **2012**
- Building typology: **“Semi-detached house”**

SPECIAL FEATURE

- Exterior insulation
- Windows replacement
- Balanced ventilation

Energy Consultant /
Project Management

Bolig Enøk AS



One Stop Shop Demonstration Project

Brochure SEGEL

2. CONTEXT AND BACKGROUND

BACKGROUND

- *Original building year:* **1958**
- *Renovation year:* **2012**
- *Ownership status:* **private**
- *Net surface area:* **130 m²**
- *Energy performance before renovation according to "Norsk standard" 210,4 kWh/m² year*
- *Occupationnel profile:* **two-family house**

SUMMARY OF THE RENOVATION

- *New windows, U-value of 1,0*
- *22 - 32 cm of roof insulation*
- *Ventilation system with heat recovery.*
- *Air-to-air heat pump*

Pictures



Project location



Existing Outside wall system

Section

3. DECISION MAKING PROCESSES

OBJECTIVES AND PARTICULARITIES

The main goal was to improve the existing house to reduce energy costs and improve indoor climate.

Due to a limited renovation budget, the house owner decided on a simplified renovation project including insulation, window replacement and balanced ventilation.

- Why renovate?

The owner decided to renovate the building to reduce the energy bill and increase comfort.

Mold in attic and poor indoor climate



House 1952



Old insulation, mold in roof due to limited ventilation

Plan



4. THERMAL ENVELOPE

Tilted roof

Existing Construction

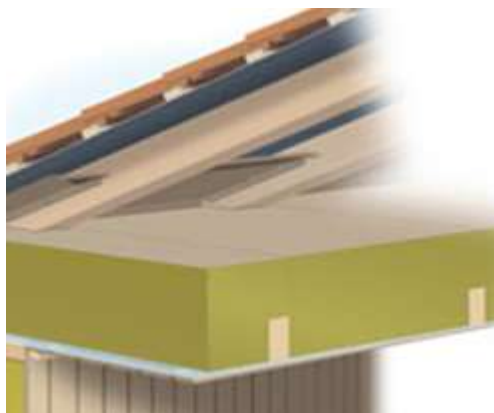
U-value: 0,52 W/m².K

Materials:

Beam structure c/c 60cm	17 cm
Insulation	7 cm
Tar paper	0,1 cm
Wood	1,2 cm
Fiberboard	1 cm
U = 0,52 W/m²K	19,3 cm

Detail

Side section without floor boards



New Construction

2 sollutions due to owners request of storage space in center of attic.

U-value: 0,17 W/m².K. Mid section

U-value: 0,11 W/m².K. Side section

Materials:

Mid section with floor boards

Floor	2 cm
Battens	2,4 cm
Wind barrier	-
Cross battens 5x5cm. c/c 60cm	-
Insulation	5 cm
Beam structure 17cm c/c 60cm	-
Insulation	17 cm
Tar paper	0,1 cm
Wood paneling	1,2 cm
Fiberboard	1 cm
U = 0,17 W/m²K	28,7 cm

Side section without floor boards

Wind barrier	-
Insulation	15 cm
Beam structure 17 cm c/c 60cm	-
Insulation	17 cm
Tar paper	0,1 cm
Wood paneling	1,5 cm
Fiberboard	1 cm
U = 0,11 W/m²K	34,6 cm

Replacement of windows

Existing windows

U-value: 2,8 W/m².K

Materials: Wooden fram, 2-layer with air,

Windows



New windows

Existing Construction

Materials: Wooden fram, 3-layer Argon, insulated frame.

From NorDan

- 2 Bathroom windows
 - 0,7m x 0,9m. U-value = 0,9
- 1 Bedroom window
 - 1,1m x 1,3m. U-value = 0,85
- 1 Living rom window
 - 2,55m x 1,45m. U-value = 0,69
- 1 new entrance door
 - 0,9m x 2,0m. U-value = 0,8

5. BUILDING INTERIOR SYSTEM

HEATING SYSTEM

Electric heating system as before. An air-to-air heat pump has been installed.

Type: Bosch EHP 6 kW

VENTILATION

A balanced ventilation system with heat recovery has been installed. Flexit Uni 2 with a 80% heat recovery. Rotating heat exchanger.

HOT WATER PRODUCTION

Electric hot water production unchanged.

Ventilation

- *The house had poor ventilation*
- *Attic – no ventilation has caused mold in roof boards.*
- *Natural ventilation with few openings is causing a bad indoor climate and a high degree of humidity in building constructions*

Heating

- *The house is a all electrical heating system.*
- *An air-to-air heat pump has been installed to lower heating cost and better circulate the air in the house.*



6. ENERGY PERFORMANCES

Energy performance – before and after, space/water

USE	kWh/m ² year	kWh/year
Primary energy before renovation Calculated by Simien – www.programbyggerne.no	191	24 857
Primary energy after renovation Calculated by Simien – www.programbyggerne.no	148	19 296

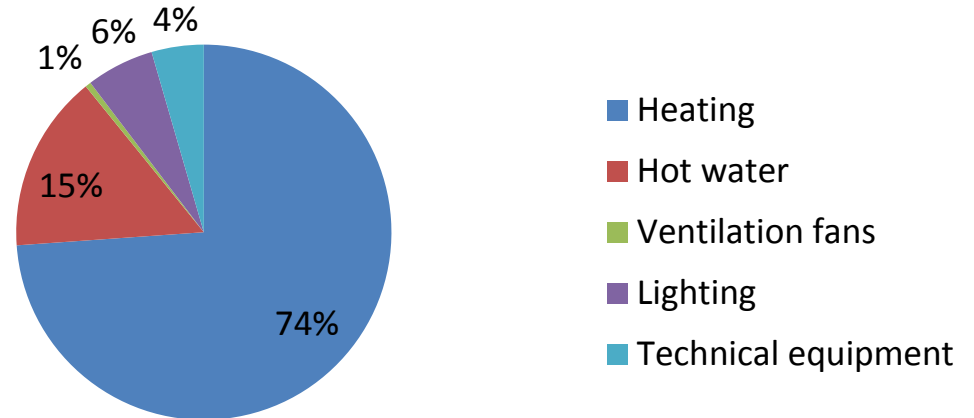
Renewable energy use

Air-to-air heat pump account for 30% of the house hold heating.

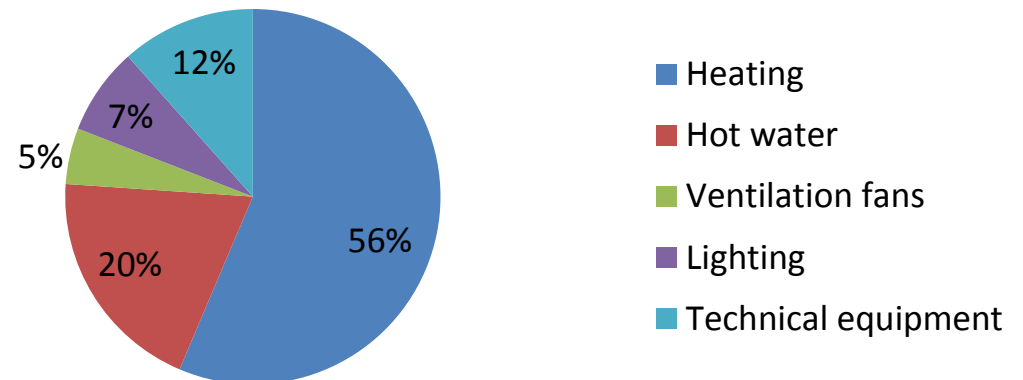
Thermal and electric consumption and costs

The consumption could be lower, but the posterior heating (if it is necessary) is electrical.

Energy performance before renovation



Energy performance after renovation



8. MORE INFORMATION

RENOVATION COSTS

	€ (euro)
Mold remediation Removal of old insulation	6,800
Carpentry - Insulation - Window replacement - Woodwork	22,500
Heat-pump - Air-to-air	4,900
Balanced ventilation	17,100
Electrical work	2,000
TOTAL (excluding finishing and installation)	53,300
Net renovation cost per m ²	410
Net renovation cost per kWh saved	9,4

Cost Distribution

