

SFH in St. Martin AT

PROJECT SUMMARY

Renovation of a single-family house built in 1973 with an added storey for a second housing unit, a staircase and living room addition. Complies with Austrian low energy requirements.

SPECIAL FEATURES

- central mech. ventilation system with heat recovery
- geothermal heat pump

ARCHITECT

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OWNER

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Private



Photo: www.energieplus.at Hartl



IEA – SHC Task 37

Advanced Housing Renovation with Solar & Conservation

Before



Photo: www.gut.bau.at, Hartl



Photo: www.gut.bau.at, Hartl

After

BACKGROUND

The single family house in St. Martin am Tennengebirge was built in 1973 with a central oil heating system, central electric domestic hot water heating and a building envelope typical for the time. The space heating demand was 230 kWh/(m²a).

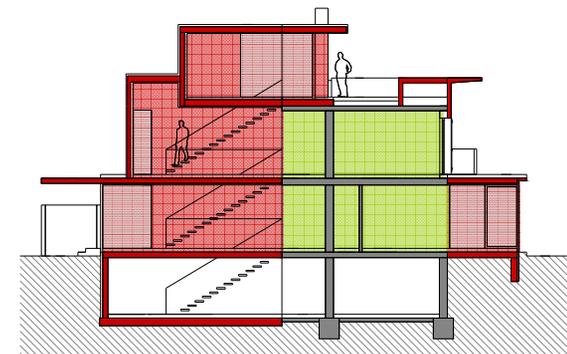
After the renovation 2007 with an added, wooden frame storey and the renovated of the two existing storeys, the house complies with Austrian low energy requirements and needs only 17 kWh/(m²a) for space heating.

OBJECTIVES OF THE RENOVATION

- enlarge the living space economically
- minimize heating costs
- meet Austrian low energy requirements
- renovate with least annoyance of residents

SUMMARY OF THE RENOVATION

- insulation: roof (280 mm), facade (240 mm) basement ceiling (160 mm)
- Triple glazed windows in the new storey
- enhanced first floor layout
- use of prefabricated wall units (second floor)
- new staircase
- enlarged kitchen and new sanitary installations
- mechanical ventilation with heat recovery and air heating
- geothermal heat pump



Section



Ground floor

Renovation
Lasting quality



CONSTRUCTION

Roof construction

(interior to exterior)

softboard	40 mm
OSB airtight	15 mm
mineral wool insulation	280 mm
roof battening	23 mm
mineral wool insulation	160 mm
roof battening	23 mm
roof foil	1 mm
Total	542 mm

U-value: 0.088 W/(m²·K)

Wall construction

(interior to exterior)

boarding	20 mm
air space	25 mm
softboard	40 mm
OSB airtight	15 mm
mineral wool insulation	240 mm
softboard	40 mm
air space	25 mm
boarding	20 mm
Total	425 mm

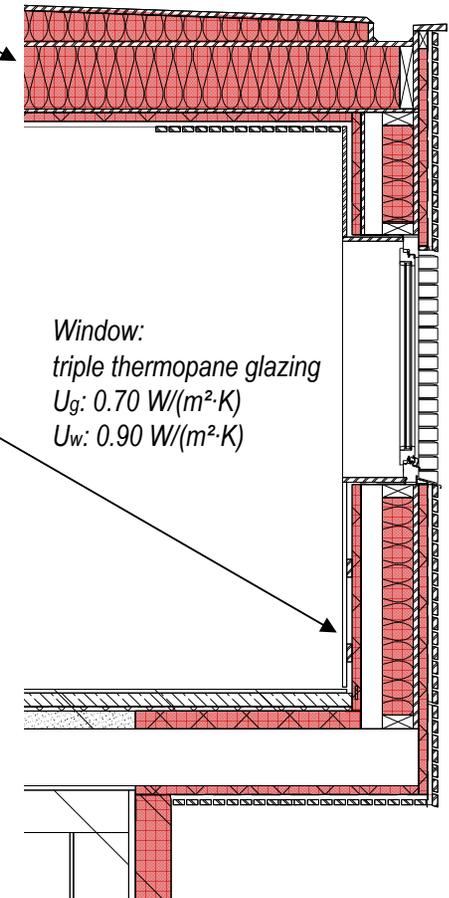
U-value: 0.127 W/(m²·K)

Basement Ceiling

(top down)

floor construction (existing)	121 mm
concrete floor (existing)	160 mm
expanded polystyrene EPS	160 mm
plaster	15 mm
Total	456 mm

U-value: 0.197 W/(m²·K)



*Window:
triple thermopane glazing
U_g: 0.70 W/(m²·K)
U_w: 0.90 W/(m²·K)*

Facade section



Summary of U-values $W/(m^2 \cdot K)$

	Before	After
Attic floor	1.2	0.09
Walls	1.3	0.13
Basement ceiling	0.9	0.20
Windows	ca. 2.5	0.90

BUILDING SERVICES

A geothermal heat pump provides space heating. Heat distribution is by floor heating in the new storey, the other storeys use the existing radiators. The whole building is ventilated by a new, central, mechanical system with 90% heat recovery and air heating is installed in the whole building. An earth to air heat exchanger preheats intake fresh air. Domestic water is heated by the geothermal heat pump with an antibacterial preparation.

RENEWABLE ENERGY USE

Opportunity for a future use of Photovoltaics.

ENERGY PERFORMANCE

Space + water heating (primary energy)*
 Before: 459 kWh/(m²a)
 After: 11.7 kWh/(m²a)
 Reduction: 97 %

* according to OIB Richtlinie 6

INFORMATION SOURCES

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