

Single-family house in Kufstein AT

PROJECT SUMMARY

Renovation of a detached house built in 1981 with a new facade and an enlargement of the living space. Complies with Austrian low energy requirements.

SPECIAL FEATURES

- 10 m² solar collectors for domestic water heating
- Glass space extension

ARCHITECT

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OWNER

Johanna und Klaus Kraiger
Private



Photo: N. Schletterer



IEA – SHC Task 37

Advanced Housing Renovation with Solar & Conservation

Before



After

BACKGROUND

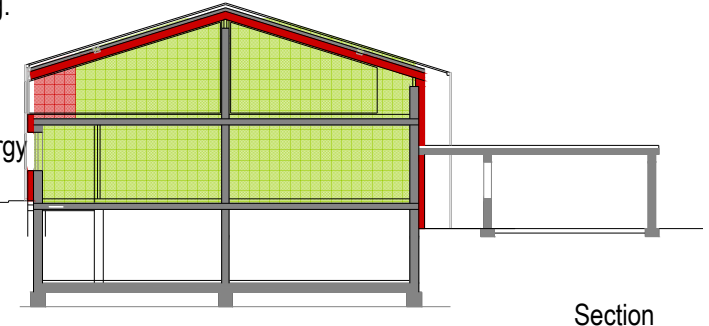
This single family house in Kufstein was built in 1981 with a later installed central oil heating for space and water heating. The building envelope was typical for the time. The space heating demand was 92 kWh/(m²a). After renovation a new energy optimized modern shell has attached to the building and complies with Austrian low energy requirements. The space heating demand was reduced to 46 kWh/(m²a).

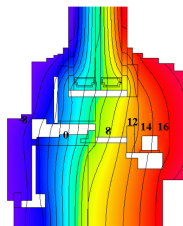
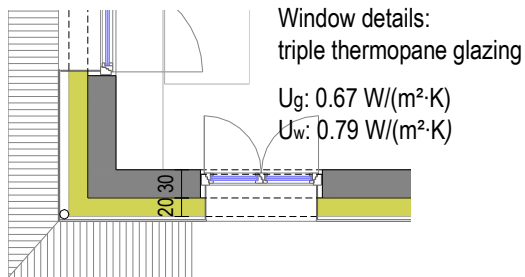
OBJECTIVES OF THE RENOVATION

- enlarge the living space
- reduce heating costs
- improve the architecture
- enlarge windows

SUMMARY OF THE RENOVATION

- high insulation of the building envelope
- triple thermopane glazed windows
- enlargement of the living space
- energy optimized modern shell
- reduction of the thermal bridges
- new sanitary installations
- new kitchen layout
- more and larger windows
- solar collectors for domestic water heating





CONSTRUCTION

Roof construction $U\text{-value: } 0.115 \text{ W}/(\text{m}^2\cdot\text{K})$
(interior to exterior)

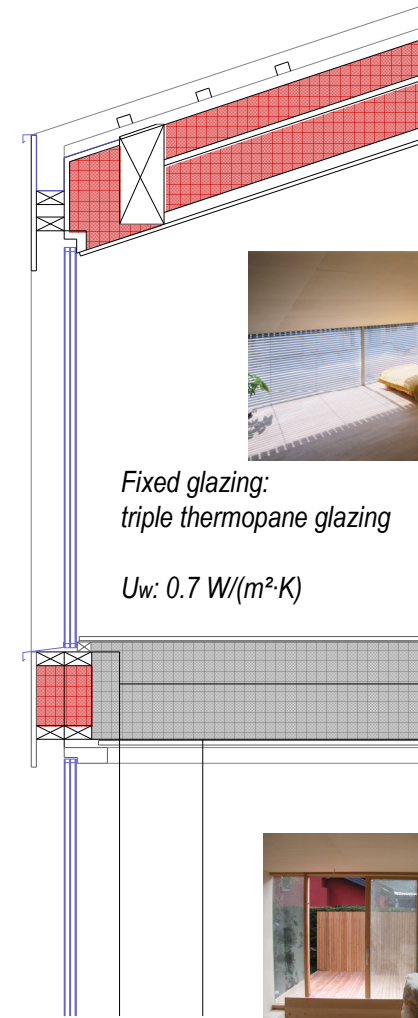
| | |
|---------------------------------|---------------|
| plywood | 20 mm |
| rock wool insulation (existing) | 250 mm |
| rock wool insulation | 120 mm |
| air space | 40 mm |
| lathing | 35 mm |
| roof brick | |
| Total | 465 mm |

Wall construction $U\text{-value: } 0.133 \text{ W}/(\text{m}^2\cdot\text{K})$
(interior to exterior)

| | |
|-------------------------|---------------|
| plywood | 20 mm |
| plaster interior | 10 mm |
| brick | 300 mm |
| plaster | 20 mm |
| rock wool insulation | 200 mm |
| plywood (black painted) | 20 mm |
| air space | |
| lathing | |
| Total | 570 mm |

Ceiling $U\text{-value: } 0.762 \text{ W}/(\text{m}^2\cdot\text{K})$
(top down)

| | |
|-------------------------------|---------------|
| floor construction (existing) | 131 mm |
| concrete floor (existing) | 160 mm |
| Total | 291 mm |



Window section



South-east façade

Photo: N. Schellinger



North-west façade

Photo: N. Schellinger



South-west façade

Photo: N. Schellinger

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

| | Before | After |
|------------------|---------|-------|
| Attic floor | ca. 0.2 | 0.12 |
| Walls | ca. 0.3 | 0.13 |
| Basement ceiling | ca. 0.8 | 0.8 |
| Windows | ca. 2.5 | 0.79 |

BUILDING SERVICES

The building meets the Austrian low energy requirements by means of a high insulation of the roof and the walls, reduction of thermal bridges and windows with triple thermo pane glazing. Solar collectors provide domestic water heating. Space heating and water-heating back-up are supplied by the central oil burner.

RENEWABLE ENERGY USE

10 m² solar collectors with 1000 l storage for domestic hot water preparation. The owners are planning to further improve the energy efficiency of the building. The next step will be the replacement of the oil heating boiler by a pellet stove.

ENERGY PERFORMANCE

Space + water heating (primary energy)*
 Before: 176 kWh/(m² a)
 After: 124.9 kWh/(m² a)
 Reduction: 29% (existing oil heating)

Future reduction 93% (new pellets heating)

*according to OIB Richtlinie 6

INFORMATION SOURCES

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