

## SFH in Mautern AT

### PROJECT SUMMARY

Renovation of a single-family house, built in the 1950ies, with vertical enhancement for a second housing unit and a new staircase.  
Complies with low energy requirement.

### SPECIAL FEATURES

- components of a Passive House in the first floor
- central mechanic ventilation system with heat recovery
- air/air heat pump

### ARCHITECT

Architect Dipl. Ing. FH  
Thomas Abendroth

### OWNER

DI Karin und DI Dr. Reinhard Thayer  
Private



IEA – SHC Task 37

Advanced Housing Renovation with Solar & Conservation

Before



After



### BACKGROUND

This single family house in Mautern near Vienna was built in the fifties with a central gas heating system, a central preparation of domestic hot water by electricity and a typical building envelope with a space heat demand of 332 kWh/(m<sup>2</sup>a).

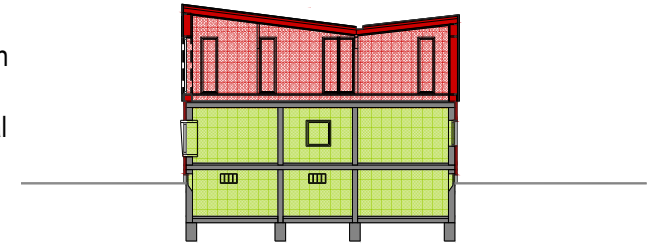
After the renovation in 2004 and addition of a storey in wooden framing, the whole building complies to low energy requirements. The space heating demand is 41 kWh/(m<sup>2</sup>a).

### OBJECTIVES OF THE RENOVATION

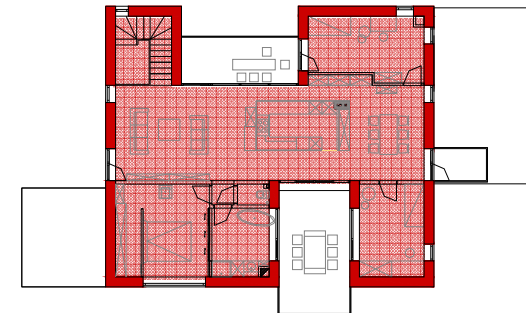
- Double the living space
- Reduce heating costs to a minimum
- Use a high degree of pre-fabrication
- Comply with low energy requirements in the new storey
- Conservation of the garden area
- Renovation with least disturbance of neighbors
- Construct an economic building

### SUMMARY OF THE RENOVATION

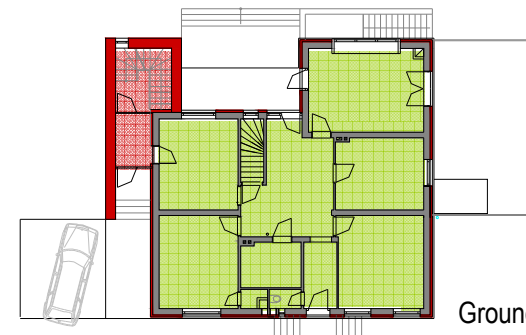
- Insulation: roof (400 mm), façade (300 mm) basement ceiling (180 mm)
- Triple glazed windows in the upper floor
- Enhancement of the ground floor
- Use of prefabricated wall units (first floor)
- New balconies for the first floor
- Addition of a staircase
- More glazing at the ground floor
- Mechanical ventilation system with heat recovery and air/air heat pump for the first floor



Section



First floor



Ground floor





Removing existing roof



Prefabricated walls



Construction south terrace

## CONSTRUCTION

### Roof construction

*U-value: 0.112 W/(m<sup>2</sup>·K)*

(interior to exterior)

plasterboard	15 mm
air space	36 mm
OSB airtight	16 mm
cellulose insulation	400 mm
AGEPAN softboard	16 mm
ventilation space	80 mm
boards, roof covering metal	24 mm
<b>Total</b>	<b>587 mm</b>

### Wall construction

*U-value: 0.143 W/(m<sup>2</sup>·K)*

(interior to exterior)

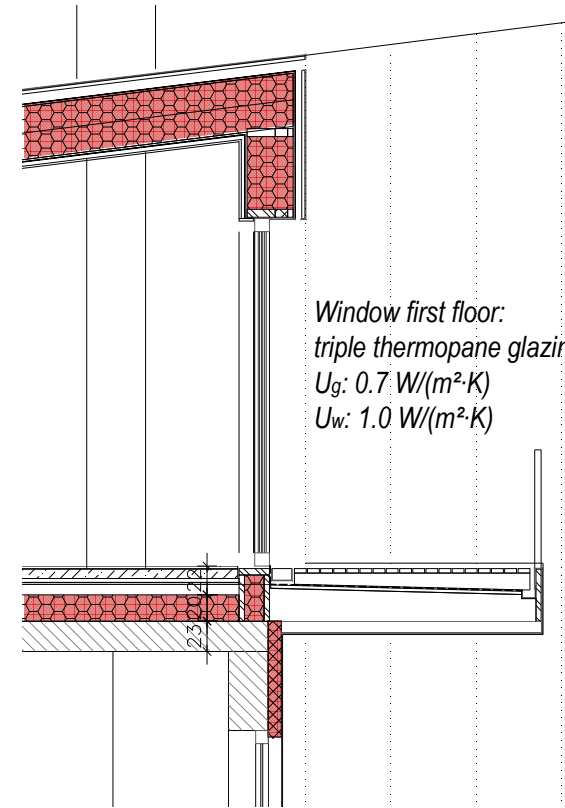
plasterboard	15 mm
air space	36 mm
OSB airtight	16 mm
cellulose insulation	300 mm
AGEPAN softboard	16 mm
ventilation space	50 mm
lathing	25 mm
boarding	25 mm
<b>Total</b>	<b>483 mm</b>

### Basement ceiling

*U-value: 0.194 W/(m<sup>2</sup>·K)*

(top down)

slab	30 mm
floor screed	60 mm
insulation polystyrene	180 mm
concrete floor	160 mm
<b>Total</b>	<b>430 mm</b>



Window first floor:  
triple thermopane glazing  
 $U_g: 0.7 \text{ W/(m}^2\cdot\text{K)}$   
 $U_w: 1.0 \text{ W/(m}^2\cdot\text{K)}$

Window section – south terrace



North-east facade



New staircase

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

	Before	After
Attic floor	1.3	0.11
Walls	1.5	0.14
Basement ceiling	0.9	0.19
Windows	ca. 1.4	1.00

### BUILDING SERVICES

The building meets the local low energy requirement standard\* by means of high insulation of the top floor, walls and floors, reductions of thermal bridges, glazing with Passive House quality windows in the first floor and an air tight envelope.

A new central ventilation system with heat recovery (efficiency 85%) and air/air heat pump is installed in the new storey. The preheating of the cold air is done with a ground-air heat exchanger. The new floor heating in the upper floor and the radiators in the ground floor are supplied by the central gas heating, which also heats the domestic hot water.

### RENEWABLE ENERGY USE

Opportunity for future installation of PV.

### ENERGY PERFORMANCE

Space + water heating (primary energy)\*  
 Before: 495.56 kWh/(m<sup>2</sup> a)  
 After: 186.43 kWh/(m<sup>2</sup> a)  
 Reduction: 62% (existing gas heating)

Future reduction: 83% (new geothermal heat pump)

\*according to OIB Richtlinie 6

### INFORMATION SOURCES

Architekt Dipl.Ing. FH Thomas Abendroth  
 Linke Wienzeile 178/Stiege 2./ 5 St.  
 AT-1060 Wien  
[www.abendroth.at](http://www.abendroth.at)

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TEAM AUSTRIA



## PROJECTS in AUSTRIA

### PROJECT SUMMARY

- P1 Apartment building in Kierling
- P2 5 story apartment house in Linz
- P3 Enhancement house Wimmer in St. Valentin
- P4 Single-family house in Pettenbach
- P5 Old people's home in Landeck
- P6 Housing in Purkersdorf
- P7 Historic building in Irtdning
- P8 Enhancement in Mautern**
- P9 Attic conversion in Innsbruck
- P10 House Schilchegger in St. Martin
- P11 Single-family house Kraiger in Kufstein
- P12 Apartmentbuildings in Dornbirn

