PROJECT SUMMARY
Renovation of an apartment building built in the 1970s, with an added storey and new elevator. Involvement of residents. Complies with Passivhaus Standards.

SPECIAL FEATURES
- Central ventilation system with heat recovery
- 120 m² solar panels for DHW
- Accessible for handicapped people

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IEA – SHC Task 37
Advanced Housing Renovation with Solar & Conservation
BACKGROUND

This four storey apartment building in Kierling, near Vienna, was constructed in the 1970s. The massive exterior concrete walls are not insulated and original windows are still in place. Space heating is supplied by an electrical floor heating, with a demand of 79 kWh/(m²a). The domestic hot water is also provided decentrally by electricity. After the renovation and enlargement from 24 to 30 apartments it will comply with Passive House standards, with a space heat demand of only 13 kWh/(m²a). The project will be sponsored by the federal state of Lower Austria, a program of the federal office for old building redevelopments.

OBJECTIVES OF THE RENOVATION

• Renovation with minimal disturbance of residents
• Involvement of the residents in the planning
• Reduction of heating costs
• Optimised building performance
• Access for handicapped people

SUMMARY OF THE RENOVATION

• 20-30 cm insulation of façade, roof and cellar ceiling
• windows to the Passive House Standards (triple glazing)
• Glazed balconies
• Handicapped access
• Six additional penthouse flats
• Installation of 3 elevators
• Central mechanical ventilation system with heat recovery and air heating
• Solar panels for domestic hot water preparation
• Biomass heating plant
**CONSTRUCTION**

**Roof construction**  
*U-value: 0.083 W/(m²·K)*  
(interior to exterior)  
plasterboard  15 mm  
solid wood board  101 mm  
glass-wool insulation  450 mm  
softboard  20 mm  
battens, ventilation space  50 mm  
zinc metal sheet  5 mm  
Total  641 mm

**Wall construction**  
*U-value: 0.138 W/(m²·K)*  
(interior to exterior)  
interior plaster (existing)  15 mm  
brick Durisol (existing)  300 mm  
exterior plaster (existing)  25 mm  
surfacер  2 mm  
expanded polystyrene EPS  200 mm  
exterior plaster  5 mm  
Total  547 mm

**Basement ceiling**  
*U-value: 0.149 W/(m²·K)*  
(top down)  
floor construction (existing)  131 mm  
reinforced concrete floor (existing)  180 mm  
glass-wool insulation  240 mm  
Total  551 mm

**Window:**  
*triple thermopane glazing*  
*Uₘ: 0.65 W/(m²·K)*  
*Uₘ: 0.85 W/(m²·K)*
BUILDING SERVICES

A new central ventilation system with heat recovery (efficiency 85%) and rotating heat exchanger will replace the existing heat system. Domestic hot water will be provided by solar panels and the remaining heat energy demand is covered by a central biomass plant, instead of decentral electrical boilers in each apartment. In the external zones of the apartments a water based system (radiators) provide back-up.

Lasting quality: shaft with services behind the toilet
Summary of U-values W/(m²·K)

<table>
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<th>Before</th>
<th>After</th>
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<tr>
<td>Roof construction</td>
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<tr>
<td>Walls</td>
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<tr>
<td>Basement ceiling</td>
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<tr>
<td>Windows</td>
<td>ca. 2.8</td>
<td>0.85</td>
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</table>

ENERGY PERFORMANCE
Space + water heating (primary energy)*
Before: 237.6 kWh/(m²a)
After: 36.1 kWh/(m²a)
Reduction: 85 %
* according to OIB Richtlinie 6

INFORMATION SOURCES
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RENEWABLE ENERGY USE
The 120 m² solar panels on the south-facing roof will achieve an annual solar fraction of 57% for domestic hot water preparation. Photovoltaic (PV) is planned as sunscreen on the upper ceiling.

BUILDING STATUS
Work in process
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 Irdning
P8  Enhancement in Mautern
P9  Attic conversion in Innsbruck
P10 House Schilchegger in St. Martin
P11 Single-family house Kraiger in Kufstein
P12 Apartment buildings in Dornbirn