Apartment Building in Kierling / Austria

PROJECT SUMMARY
Housing renovation with
- vertical enhancement
- inhabitant involvement
- elevator installation

SPECIAL FEATURES
90 m² solar collectors on the roof
handicapped accessible

ARCHITECT
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OWNER
BUWOG, Bauen und Wohnen GmbH

IEA – SHC Task 37
Advanced Housing Renovation with Solar & Conservation
BACKGROUND
This four storey apartment building was constructed in the 1970s. The massive exterior walls are not insulated and contain the original windows. The space heating is supplied by an electrical driven floor heating system. The domestic hot water is also prepared decentral by electricity.

SUMMARY OF THE RENOVATION
- insulation of facades, roof and cellar (passive house energy standard is targeted)
- passive house suitable windows
- glazed balconies
- installation of 3 elevators
- mechanical ventilation with heat recovery and air heating
- solar collectors for domestic hot water preparation
- six additional flats at the uppest ceiling
- biomass heating station
## CONSTRUCTION

### Roof construction
(interior to exterior)
- Fibrated concrete roof panels: 30 mm
- Battens: 60 mm
- Softboard: 20 mm
- Mineral wool insulation: 450 mm
- Solid wood board: 100 mm
- Plasterboard: 15 mm
- **Total**: 99 mm

### Wall construction
(interior to exterior)
- Interior plaster (existing): 15 mm
- Brick Dunsol (existing): 300 mm
- Exterior plaster (existing): 25 mm
- Expanded poly styrene EPS: 200 mm
- Exterior plaster: 5 mm
- **Total**: 545 mm

### Basement ceiling
(top down)
- Floor construction (existing): 125 mm
- Reinforced concrete floor (existing): 180 mm
- Mineral wool insulation: 240 mm
- **Total**: 545 mm
Summary of U-values W/(m²·K)

<table>
<thead>
<tr>
<th></th>
<th>Before</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roof construction</td>
<td>ca.0,5</td>
<td>0,11</td>
</tr>
<tr>
<td>Walls</td>
<td>ca.0,7</td>
<td>0,15</td>
</tr>
<tr>
<td>Basement ceiling</td>
<td>ca.1,2</td>
<td>0,12</td>
</tr>
<tr>
<td>Windows</td>
<td>ca.3,2</td>
<td>0,85</td>
</tr>
</tbody>
</table>

**RENEWABLE ENERGY USE**

The 90 m² solar collectors on the south-facing roof achieve an annual solar efficiency factor of the solar heating system of 57% (for warm water).

**ENERGY PERFORMANCE**

Space + water heating (primary energy)

Before: 181,250 kWh/a
After: 68,761 kWh/a
Reduction: 62%

**BUILDING SERVICES**

A new centralised ventilation system with heat recovery (efficiency 85%) and a heat exchanger will replace the existing floor heating.

Domestic hot water will be heated by solar collectors and biomass instead of decentral electric boilers in each apartment.

**INFORMATION SOURCES**

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