



## HÖRSCHING (Austria)

**40 % energy saving**

**From leaky flat to solar roof**

**180 m<sup>2</sup> thermal solar plant**

### Project data

Location, address:	Neubaustraße 30, 32, 34, 4063 Hörsching
Region:	Upper Austria
Surroundings:	North of the country; low hilly landscape
Climate:	Continental climate
Heating degree days:	3690
Year of construction and renovation:	1974 (constructed); 2005/06 (renovated)
Typology:	Apartment building
No of dwellings:	57
Total floor area:	4,724.92 m <sup>2</sup>
Owner:	Joint ownership of the apartment owners
Architect and Builder:	Wohnbau 2000 (social housing association)
Costs of energy saving measures:	Will be added later
Renovation financed by:	Loan and reserves by Wohnbau 2000, owners, subsidies from Regional Government



Figure 1: Building after Renovation

### Objectives and Results

The main reasons for the renovation were the leaky flat roof as well as the overheating of the apartments in the top floor due to the very low insulation level of the flat roof. Additionally, the exterior rendering was in need of repair.

An important measure was that the leaky flat roof was covered by a new "hip roof". This renovation approach was taken for the first time by the social housing association Wohnbau 2000, which planned the project.

The façade was improved by an aluminium-façade with 14 cm mineral wool. The top ceiling was insulated with 26 cm – that is why the apartments in the top floor now have a comfortable climate.

### Renovation concept

#### Key renovation features

- High insulation of façade with mineral wool
- Insulation of top ceiling
- Insulation of ground floor
- Insulation glazing of the windows
- Consisting flat roof has been overbuilt by a hip roof
- Construction of a 180 m<sup>2</sup> thermal solar plant

### State-of-the-art

#### Before renovation

##### Constructions [U-values: W/m<sup>2</sup>K]

- Outside walls [0.72]
- Ground floor [0.84]
- Top ceiling [0.46]
- Windows [2.50]

##### Installations

- Oil boiler

#### After renovation

##### Constructions [U-values: W/m<sup>2</sup>K]

- Insulation of outside walls [0.21]
- Insulation of ground floor [0.28]
- Top ceiling [0.14]
- Windows [1.60]

##### Installations

- Oil boiler
- Construction of a 180 m<sup>2</sup> thermal solar plant for hot water supply and supporting the boiler
- Comprehensive renovation of the loggias

### Energy saving and monitoring

#### Energy consumption before renovation:

kWh/m<sup>2</sup>: will be added later  
Energy Performance Indicator 79 kWh/m<sup>2</sup>,a

#### Energy consumption after renovation:

kWh/m<sup>2</sup>: will be added later  
Energy Performance Indicator 48 kWh/m<sup>2</sup>,a  
Percentage saving 40 %



Figure 2: Thermal Solar Plant on the roof

### Additional information

- The whole roof is used for thermal solar collectors – in total, an area of 180 m<sup>2</sup> were installed on the new hip roof. The plant is used for domestic hot water and also for supporting the oil boiler.
- On the flat roof 26 cm insulation were mounted and then a hip roof was added to ensure protection against leaking.

### Lessons learned and conclusions

- The feedback from the tenants is very positive. Although the very cold winter in 2005/06 was very cold, a decline of heating costs could be monitored.
- The tenants living in the top floor reported about a very comfortable climate in their flats now.

### References

- [1] Wohnbau 2000 GesmbH, Weißenwolfstraße 1, 4020 Linz, Tel.: +43 732 77 91 11, [office@wohnbau2000.at](mailto:office@wohnbau2000.at), [www.wohnbau2000.at](http://www.wohnbau2000.at)