



after refurbishment



before refurbishment



GENERAL INFORMATION	
Building owner	Sozialhilfverband Weiz (Social welfare assistance federation)
Address	Weiz, Styria, Austria
Number of dwellings	77 before and after refurbishment
Number of floors	4
Average size of the dwellings	56 m <sup>2</sup> before refurbishment 65 m <sup>2</sup> after refurbishment
Total heated floor area	4,321 m <sup>2</sup> 4,978 m <sup>2</sup>
Year of construction	1973
Year of refurbishment	2005–2006
Has the refurbishment been carried out while the dwelling was occupied?	Yes
Has an independent quality assurance been carried out?	No
Total building costs	2,150,000 €
Building costs concerning energy recovery	1,190,000 €



#### INITIAL SITUATION/LOCAL CONDITION

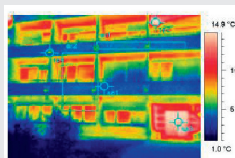


figure: Thermographic photo of the façade before the retrofit.

- outdoor walls and parapets made out of vertically perforated bricks U-Value of 0.96 W/(m<sup>2</sup>K).
- Top ceiling towards attic insulated with 7 cm heat insulation.
- Windows: single wooden windows with 2 layers isolation glass.
- Heating: district heating
- Domestic hot water: partly solar thermal system with energy storage

#### TYPE OF REFURBISHMENT (MEASURES WHICH HAVE BEEN CARRIED OUT)

- Insulation top ceiling (22 cm)
- Insulation outer wall towards out door air (16 cm)
- Insulation outer wall towards non heated room (12 cm)
- Insulation outer wall towards ground (12 cm)
- Insulation basement towards non heated room (12 cm)
- Insulation basement and floor towards out door air (8–16 cm)
- Insulation basement floor (8 cm)
- Insulation heat bridges (8–16 cm)
- New coupled windows + forward spaced façade with 3 layered glass
- Ventilation with 70% heat recovery

The production of this good practice example is supported by

**Intelligent Energy**  Europe

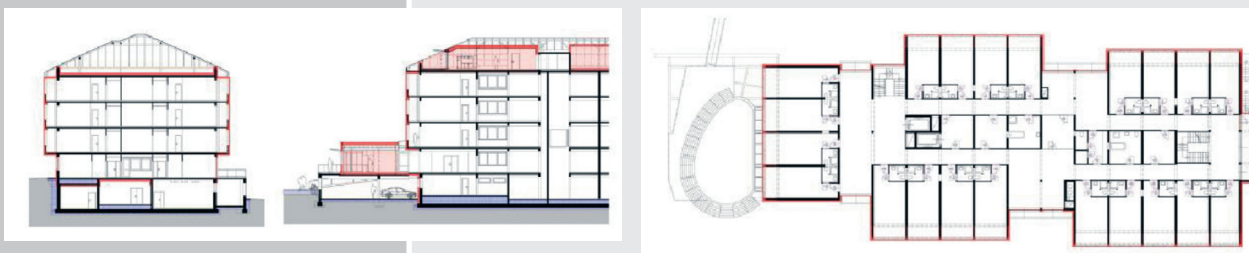
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**WHY HAVE THE MENTIONED MEASURES BEEN CARRIED OUT?**

Degrade the heat energy demand; increase the living comfort, increase the living space by closed balconies ...

**PLANS**

Not available at present.



**ENERGY RELATED ACTIVITIES**

Exterior components

- insulation of the whole heated envelope
- new entrance doors to the apartments
- new windows with passiv house standard

Systems engineering

- controlled room ventilation with heat recovery
- conventional low temperature system with flow and return pipes

**ENERGY RELATED INDICATORS**

	Initial situation	After refurbishment	Reduction
Energy performance	156.9 kWh/m <sup>2</sup> a	24.3 kWh/m <sup>2</sup> a	85 %
Energy consumption	581,660 kWh/a	90,085 kWh/a	85 %
CO <sub>2</sub> -emission	6.4 kg/m <sup>2</sup> a	0.9 kg/m <sup>2</sup> a	
Heating system	district heating	district heating	
DHW-system	solar system combined with district heating	solar system combined with district heating	
Monitoring system	no	a system will be installed in the year 2008	
Regional energy costs	30,450 €/a (heating)	4,190 €/a (heating)	

**SUBSIDIES**

**STATEMENT**

The tenant satisfaction and the competitiveness compared to new buildings have been increased by the comprehensive thermal modernization of the building. Furthermore a contribution to the climatic protection was made.

**CONTACT**

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