



after refurbishment



before refurbishment



GENERAL INFORMATION	
Building owner	City of Graz, Department for Residential Buildings
Address	Vinzenz-Muchitsch-Straße 29/31, 8020 Graz
Number of dwellings	30 before refurbishment 30 after refurbishment
Number of floors	5
Average size of the dwellings	68 m <sup>2</sup> before refurbishment 68 m <sup>2</sup> after refurbishment
Total heated floor area	2,000 m <sup>2</sup> before refurbishment 2,000 m <sup>2</sup> after refurbishment
Year of construction	1960
Year of refurbishment	2001
Has the refurbishment been carried out while the dwelling was occupied?	Yes
Has an independent quality assurance been carried out?	Quality assurance is a core element of Thermoprofit Plus
Total building costs	440,000 €
Building costs concerning energy recovery	124,280 €



#### INITIAL SITUATION/LOCAL CONDITION

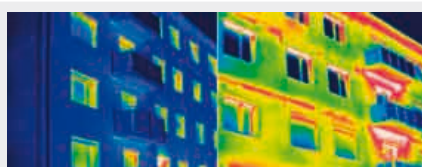


figure: thermografies of the residential estate Vinzenz-Muchitsch-Straße before renovation (right) and after the insulation (left).

Before the refurbishment some windows were replaced and some activities for maintenance were realised. The particularity of this refurbishment was realised as a Thermoprofit PLUS-project. The Graz Energy Agency was responsible for the process of the complete renovation of this residential estate.

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

- Insulation of outer walls
- Insulation of cellar floor
- Insulation of attic floor
- Insulation of thermal weak points
- Replacement of windows

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

To enhance the general comfort of living and utilisation and bring about positive ecological and humanitarian effects.

The production of this good practice example is supported by

Intelligent Energy  Europe

The sole responsibility for the content of this publication lies with the authors. It does not represent the opinion of the European Communities. The European Commission is not responsible for any use that may be made of the information contained therein.

<b>PLANS</b>	Not available at present.
--------------	---------------------------

<b>ENERGY RELATED ACTIVITIES</b>			
Exterior components	<ul style="list-style-type: none"> <li>• Insulation of outer walls (with 10 cm mineral wool)</li> <li>• Insulation of cellar floor (with 8 cm mineral wool slabs)</li> <li>• Insulation of attic floor (with 18 cm mineral wool)</li> <li>• Insulation of thermal weak points (e.g. at the balcony-plates)</li> <li>• Replacement of windows (wood-profiles)</li> <li>• Replacement of blindness with titanium zinc plate</li> </ul>		
Systems engineering	<ul style="list-style-type: none"> <li>• Replacement of electrical installation (free of PVC)</li> <li>• District heating system</li> </ul>		
<b>ENERGY RELATED INDICATORS</b>			
	Initial situation	After refurbishment	Reduction
Energy performance	138 kWh/m <sup>2</sup> a	51 kWh/m <sup>2</sup> a	63 %
Energy consumption	340,000 kWh/a	131,000 kWh/a	62 %
CO <sub>2</sub> -emission	85 t/a	34 t/a	60 %
Heating system	Individual heating systems (gas, oil, break, wood, electricity)	District heating system	
DHW-system	Individual systems	District heating system	
Monitoring system	No monitoring system	Energy management and controlling system	
Regional energy costs	50–150 €/MWh depending on the heating system and the fuel		

<b>SUBSIDIES</b>	Special time loan of the Province of Styria. Term of loan 22 years, 0.5 % interest. The investments are financed through the Maintenance and Improvement Contribution.
<b>STATEMENT</b>	Gerd Schalk (Leader of the management of accommodation units) The city of Graz is very proud of the ecological refurbishment, the savings of energy costs for every tenant and the reduction of the CO <sub>2</sub> -emission about 60 %. This is a very important step towards a sustainable development of the city of Graz. We are striven to refurbish further old buildings in an energetic and ecological way.
<b>CONTACT</b>	Amt für Wohnungsangelegenheiten der Stadt Graz Albertstraße 12 8011 Graz Phone +43 316 8725432 E-mail: gerd.schalk@stadt.graz.at www.graz.at