



after refurbishment



before refurbishment



<b>GENERAL INFORMATION</b>	Social housing for elderly people
Building owner	Bregovo Municipality
Address	Village Kudelin
Number of dwellings	48 before refurbishment and after refurbishment
Number of floors	3
Average size of the dwellings	12 m <sup>2</sup> before refurbishment and after refurbishment
Total heated floor area	1,120 m <sup>2</sup> before refurbishment and after refurbishment
Year of construction	1973
Year of refurbishment	2007
Has the refurbishment been carried out while the dwelling was occupied?	Yes
Has an independent quality assurance been carried out?	An energy audit has been carried out. The quality of reconstruction has been approved by licensed experts.
Total building costs	101,853 €
Building costs concerning energy recovery	101,853 €
<b>INITIAL SITUATION/LOCAL CONDITION</b>	<ul style="list-style-type: none"> <li>• Poor condition of insulation of external walls</li> <li>• Poor condition of insulation of roof</li> <li>• Lower indoor air temperature that is not in compliance with national ordinances</li> </ul>
<b>TYPE OF REFURBISHMENT (MEASURES WHICH HAVE BEEN CARRIED OUT)</b>	<ul style="list-style-type: none"> <li>• Thermal insulation of walls</li> <li>• Replacement of windows</li> <li>• Thermal insulation on ceiling and roof repairs</li> <li>• Reconstruction of boiler room, installation of new boiler on solid fuel</li> </ul>
<b>WHY HAVE THE MENTIONED MEASURES BEEN CARRIED OUT?</b>	Decreasing heat losses and improving the built environment

<b>PLANS</b>	Not available at present.
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<b>ENERGY RELATED ACTIVITIES</b>			
Exterior components	<ul style="list-style-type: none"> <li>• 5 cm thermal insulation on 1,123 m<sup>2</sup> of walls</li> <li>• Replacement of 265 m<sup>2</sup> windows</li> <li>• 10 cm thermal insulation of ceiling</li> <li>• Roof repairs</li> </ul>		
Systems engineering	<ul style="list-style-type: none"> <li>• Installation of new boiler on solid fuel 180 kW, replacement of pumps</li> <li>• repairs and replacement of fittings</li> <li>• installation of automatic valves</li> </ul>		
<b>ENERGY RELATED INDICATORS</b>	<b>Initial situation</b>	<b>After refurbishment</b>	<b>Reduction</b>
Energy performance	499 kWh/m <sup>2</sup> a	184.6 kWh/m <sup>2</sup> a	63 %
Energy consumption	156,840 kWh/a		
CO <sub>2</sub> -emission			57 kg/m <sup>2</sup> a
Heating system	Centralized water heating system	Centralized water heating system	
DHW-system	Boiler on light oil	Boiler on solid fuel	
Monitoring system			
Regional energy costs	Light oil: 810 €/t, Solid fuel: 94 €/t		

<b>SUBSIDIES</b>	75 % of the refurbishment investments is obtained through credit and 25 % is financed by the municipality
<b>STATEMENT</b>	The general condition of building was estimated to be poor and inadequate for living of the tenants due to the poor condition of insulation of external walls and roof. It was concluded that 63 % energy saving could be achieved after applying a package of 4 energy saving measures.
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