

## Block of flats No.10



after refurbishment



before refurbishment



<b>GENERAL INFORMATION</b>	Multifamily building
Building owner	Condominium property
Address	Zaharna fabrica District, Sofia
Number of dwellings	13 before refurbishment 13 after refurbishment
Number of floors	3
Average size of the dwellings	
Total heated floor area	1,019 before refurbishment 1,214 after refurbishment
Year of construction	1946
Year of refurbishment	2004
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 refurbishment measures has been approved by licensed experts.
Total building costs	NA
Building costs concerning energy recovery	NA



<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>• Low 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>• Reconstruction of roof</li> <li>• Thermal insulation of roof</li> <li>• Thermal insulation of walls</li> </ul>
<b>WHY HAVE THE MENTIONED MEASURES BEEN CARRIED OUT?</b>	The refurbishment measures have been carried out in order to reduce heat losses and to improve living conditions for the tenants.

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<b>PLANS</b>	Not available at present.
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ENERGY RELATED ACTIVITIES			
Exterior components			
Systems engineering			
ENERGY RELATED INDICATORS	Initial situation	After refurbishment	Reduction
Energy performance	213.3 kWh/m <sup>2</sup> a	138.9 kWh/m <sup>2</sup> a	35 %
Energy consumption	217,390 kWh/a	168,658 kWh/a	22 %
CO <sub>2</sub> -emission	193.9 kg/m <sup>2</sup> a	121.3 kg/m <sup>2</sup> a	72.6 kg/m <sup>2</sup> a
Heating system	Centralized water heating system	Centralized water heating system	
DHW-system	District heating-natural gas	District heating-natural gas	
Monitoring system			
Regional energy costs	District heating: 1 MWh = 40 €		

<b>SUBSIDIES</b>	Financing of the refurbishment was realized by long-term loan with low interest rates. The loan was financed after signing a contract between the Bulgarian Housing Association and the Association of apartments' owners
<b>STATEMENT</b>	The general condition of the building was estimated to be poor and inadequate for living due to poor external walls and roof insulation. It was concluded that considerable energy savings could be achieved after applying three different energy saving measures (roof reconstruction, external wall and roof insulation).
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