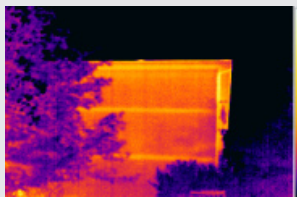


GENERAL INFORMATION	
Building owner	Municipality of Castelnuovo ne' Monti
Address	Via Rubertelli 10, Castelnuovo ne' Monti loc. Felina
Number of dwellings	6 before and after refurbishment
Number of floors	4
Average size of the dwellings	80 m ² before and after refurbishment
Total heated floor area	510 m ² before and after refurbishment
Year of construction	1970
Year of refurbishment	2006–2007
Has the refurbishment been carried out while the dwelling was occupied?	Yes
Has an independent quality assurance been carried out?	
Total building costs	83,000 €
Building costs concerning energy recovery	81,494 €



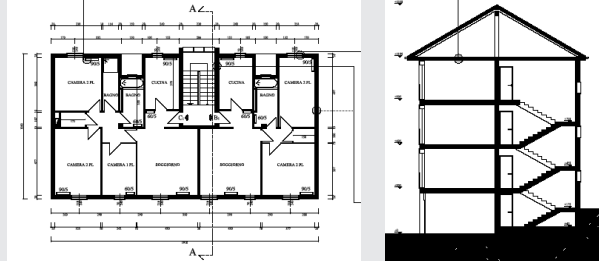
INITIAL SITUATION/LOCAL CONDITION	 <ul style="list-style-type: none"> The building is part of a larger housing estate built in the '70. The location is on the hills at about 600 m. above sea level. The temperature in winter is very low in comparison to the summer. The heating period is 183 days long, the heat degree day is by 3,182 Kd/a Outside design temperature: - 5°C, Inside design temperature: 20°C. The solar radiation is 470 kWh/m²a to the South, 295 to East and West and 132 to North <ul style="list-style-type: none"> Roof: Insulation on the basement of the attic: 6 cm polystyrene board Facade: External wall insulation with reduction or total elimination of thermal bridges Windows: Substitution of the existing windows with low emission high insulation glasses and insulation of the box containing the rolling shutter. Heating system: Substitution of the existing burner with a natural gas burner with high efficiency and low emissions. Metering system for the heat-consumption control for a better cost-splitting method. Two-way valves for a better distribution of the heat, that will be more constant in all the units.
TYPE OF REFURBISHMENT (MEASURES WHICH HAVE BEEN CARRIED OUT)	<ul style="list-style-type: none"> replacement of dwellings gas-boiler with a central heating for the whole building each dwelling provided with a management unit (thermostate and on/off) also DHW is produced by the central heater
WHY HAVE THE MENTIONED MEASURES BEEN CARRIED OUT?	To achieve a heating-costs reduction

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PLANS



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	182.33 kWh/m ² a	106.15 kWh/m ² a	42 %
Energy consumption	422.34 kWh/a	77 kWh/a	82 %
CO ₂ -emission	14 kg/m ² a	7 kg/m ² a	
Heating system	oil heater: power 90 kW	natural gas heater, with high efficiency and low emissions level	
DHW-system	storage system with a 500 l tank	storage system with a 500 l tank	
Monitoring system	No monitoring system	measurement system for heat-metering two-way valves controlled by chronothermostats	
Regional energy costs			

SUBSIDIES

The measure was realized with own funds from the housing association (owner of the building and in charge for the maintenance).

STATEMENT

CONTACT

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