



after refurbishment



before refurbishment



GENERAL INFORMATION	
Building owner	ATC Novara
Address	via Andoardi 1, Novara (NO)
Number of dwellings	14 before and after refurbishment
Number of floors	3
Average size of the dwellings	45 m ² before and after refurbishment
Total heated floor area	600 m ² before and after refurbishment
Year of construction	
Year of refurbishment	2007–2008
Has the refurbishment been carried out while the dwelling was occupied?	No
Has an independent quality assurance been carried out?	No
Total building costs	788,000 €
Building costs concerning energy recovery	236,000 €

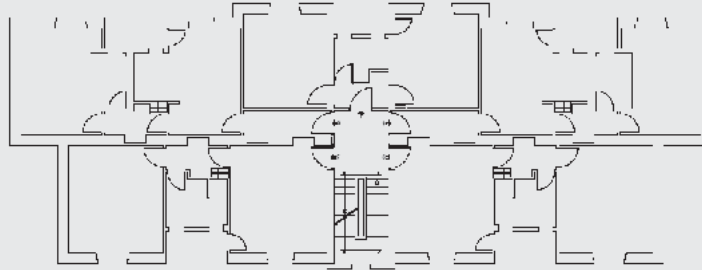
INITIAL SITUATION/LOCAL CONDITION	
TYPE OF REFURBISHMENT (MEASURES WHICH HAVE BEEN CARRIED OUT)	<ul style="list-style-type: none"> • New central heating system for space heating and DHW • Indoor temperature control in each unit with single thermostats • Consumption metering for each unit
WHY HAVE THE MENTIONED MEASURES BEEN CARRIED OUT?	The old building had to be refurbished in the interiors, with new space design for kitchen and bathroom, and new electric and thermal plants, in particular heating and DHW. In this situation we decided to provide a thermal insulation of the outer walls and to replace the windows.

The production of this good practice example is supported by

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PLANS



ENERGY RELATED ACTIVITIES

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|---------------------|--|
| Exterior components | <ul style="list-style-type: none"> • Polystyrene thermal insulation on the walls – 6 cm thick • Polyurethan thermal insulation in the roof – 5 cm • New aluminium frames with thermal break and double glass 4-12-4 mm, shadowings |
| Systems engineering | <ul style="list-style-type: none"> • condensing boiler with thermostatic regulation • solar thermal collectors for space heating and DHW • space control thermostat for each unit • consumption metering for each unit of heating, DHW and drinkable water |

ENERGY RELATED INDICATORS

	Initial situation	After refurbishment	Reduction
Energy performance	160 kWh/m ² a (estimated)	78.3 kWh/m ² a	49 %
Energy consumption	96,000 kWh/a (estimated)	47,000 kWh/a	49 %
CO ₂ -emission	19 t/m ² a (estimated)	13.5 t/m ² a	49 %
Heating system	single boiler per flat	centralized DHW production	
DHW-system	single boiler per flat	centralized DHW production	
Monitoring system	no possibility to collect the consumption data	yearly consumption	
Regional energy costs	natural gas 0.6 €/m ³		

SUBSIDIES Funded by Law 513/77 ex art. 25

STATEMENT The estimated savings were about 10%. The actual reduction is less than expected, and it is due mainly to a managing problem. The refurbishment is not so worth, if the tenants use the windows as the only existing temperature regulation.

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