Factsheet

Housing complex– via Brescia, Bolzano

SINFONIA stands for "Smart INitiative of cities Fully cOmmitted to iNvest In Advanced large-scaled energy". This project has received funding from the European Union's Seventh Programme for research, technological development and demonstration under grant agreement No 609019

PROFILE

Name and address	Europa-Novacella Quarter, via Brescia 1-3-5; via Cagliari 10-10/A
Map	 
Description	The building was built in the mid '70s in the so-called 'semi-rural' district and delivered to the tenants in 1978. There are 106 apartments and 120 garages; the surface of the apartments varies from 45m² to 102m². The building is divided into 5 staircases. The smallest block counts 7

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	floors and 21 apartments. The bigger has 8 floors and 24 apartments. The building needs to be refurbished in order to: • Replace building hardware: current doors and windows; • Substitute the parapets of the balconies; • Restore the hydrothermal and the electrical systems; • Remake the roof by converting the roof space into new apartments. The final aim of these refurbishing measures is to improve the energy efficiency of the building to reach enveloping performances of at least 25 kWh/m²yr. Moreover, a 354 m² solar-thermal system should be installed to cover at least 50% of the building's hot water demand. Finally, a 20kWh photovoltaic system will be installed.		
Ownership	IPES-WOBI Social Building Institute of the Autonomous Province of Bolzano		
Gross volume	Circa 31.700 m³	**Gross surface**	Circa 7.800 m²
Number of dwellings	106		
Energy performance	BEFORE	176 kWh/m²yr	
	AFTER	< 25 kWh/m²yr	

1 - Description before refurbishment

Detailed characteristics of building	Traditional building structure with reinforced concrete pillars and beams. Roof space with prefabricated sheet panels with weight reduction polystyrene and concrete casting in place. Basement retaining walls in reinforced concrete. Continuous foundation beams. Gabled roof with the same structured plan type of the roof space. The garages are covered by slab roof spaces, weight is not reduced, supported by septa. The five staircases (named 10, 10A, 5, 3, and 1 in the next page picture) are together 106 meter long. Thera are not perfect in line but they describe a little bend. The last one (number 1 in the picture) is the smaller with only 7 floors, the other are all 8 floors high but the total high of each one is a little bit different. For these reasons, the roofs have different altitude and orientation.

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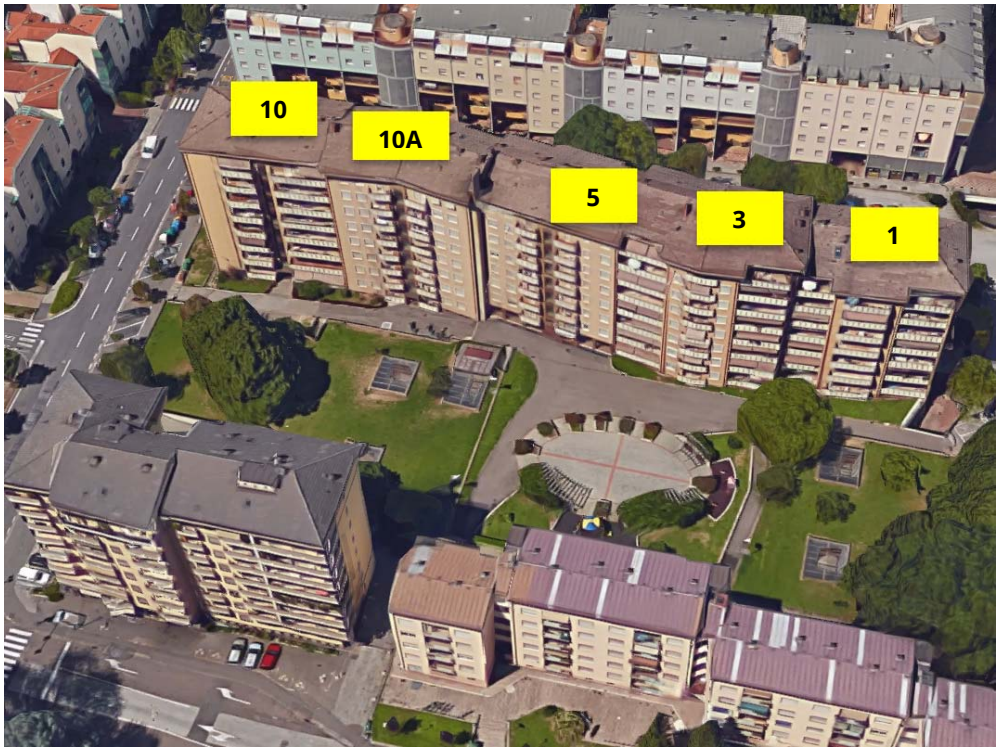
Plot map	
Building envelope	External walls in masonry: • 10cm (brick) + 6cm (air) + 10cm (brick) • U=1,44 W/m^{2}K Predalle type roof space • U=1,12 W/m^{2}K Windows: • Double panel glass: 6+12+6 U_g = 2,7 Wm^2/K • Wood frame: U_f = 1,4 Wm^2/K • Aluminium spacer • Total: U_w = 3 Wm^2/K
Technical system	The heating system receives the energy from the district heating grid through a heat exchanger. The hot water is distributed through columns rising from below (one for each stairwell). On the floor the water is distributed through a distribution ring to which radiators are connected. Domestic hot water is produced by the district heating system too and it is distributed to the apartments through a different column. The insulation of both system is very poor.

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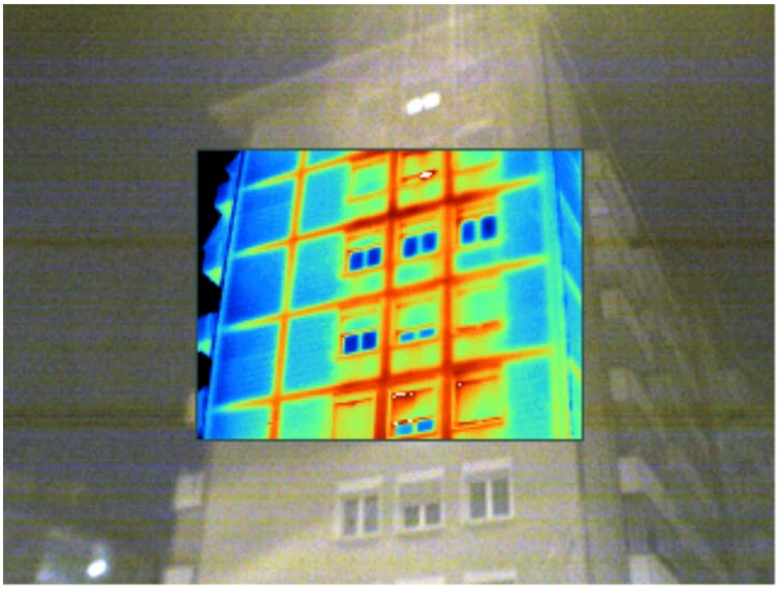
Thermal imaging before refurbishment	
Energy performance certificate	
Other relevant technical aspects	None

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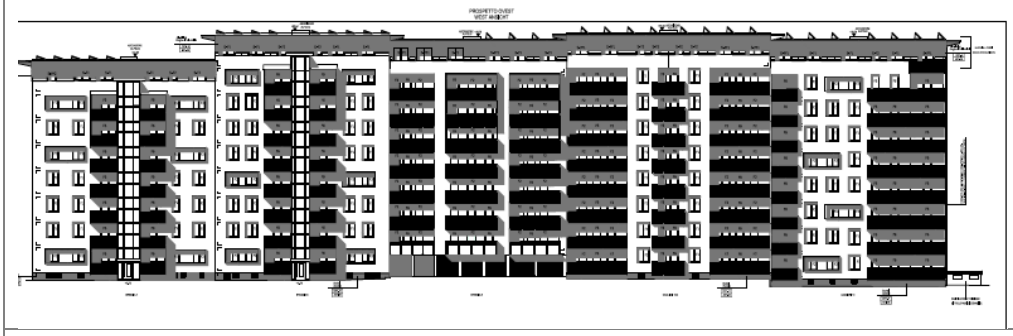
2 – Refurbishment Concept

Concept	The interventions scheduled on the building are: - renovation of the overall building, specially the balconies, degraded because weather-beaten, with new railings; - insulation of the building facade with 16 cm rockwool panels - insulation of the cellar ceiling with 10cm rockwool panels, however 210 cm internal height will be guarantee; - enlargment of the stairwell with glass and metal structures, to contain the new technical installation. - replacement of the external windows (included the concrete frames), to remove the thermal bridges.
	 View of main facade
Energy Solutions	The following solutions have been planned: - assembling a 354m^2 solar thermal plant; 144m^2 will be positioned vertically in south multifunctional façade. - building a new underground technical room, in which two big thermal storage units will be realizaed. Due to the huge solar thermal surface, the overall thermal storage will contain about 40 m^3 of stored hot water. - The natural gas heating system will be abandoned. - Renovation of thermal power station. - Keeping in use heating and hot water pipelines during construction period, to grant this service to tenants (that won't leave the buildings) - New pipelines will be built, for cold and hot water, with new heat exchangers. In new apartments, floor heating systems will be

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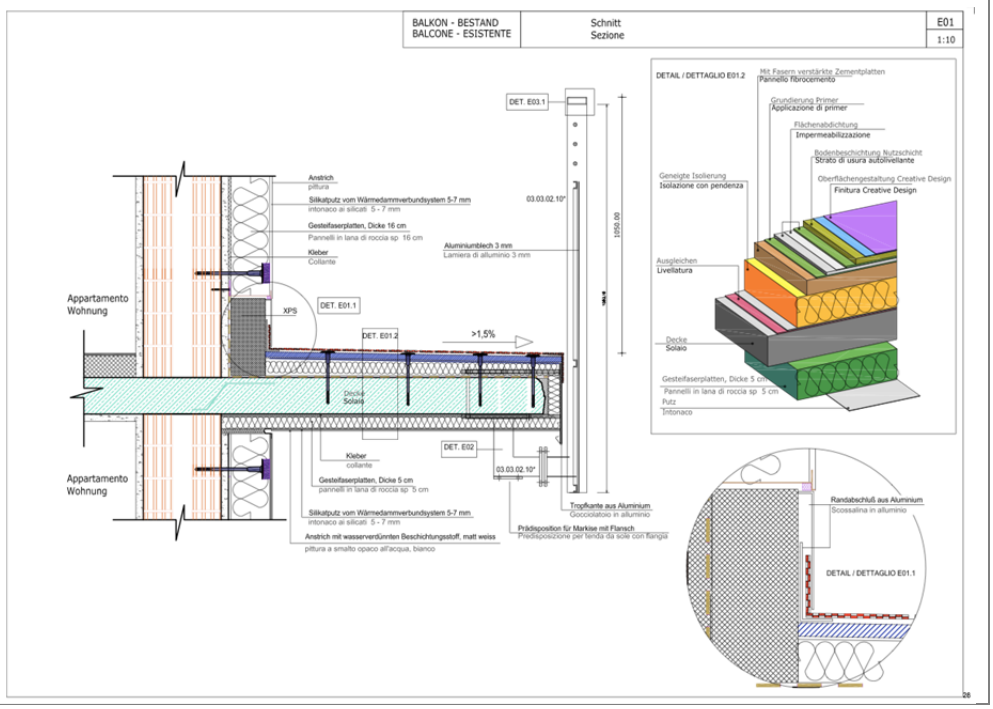
	installed, while in old ones the traditional raditaros will left. Efficiency will raise due to new insulated pipelines. - A new photovoltaic system will be installed on ther roof, with a 20kWp production of electricity, that will be addressed to common utilities.
Performances Targets	Envelope Efficiency 18 kWh/m^{2}yr Global efficiency 9 kg CO_2/m^{2}yr Total Renewable Energy 66%
Financing Model	-

Envelope details

Balcony refurbishment (thermal bridge)	

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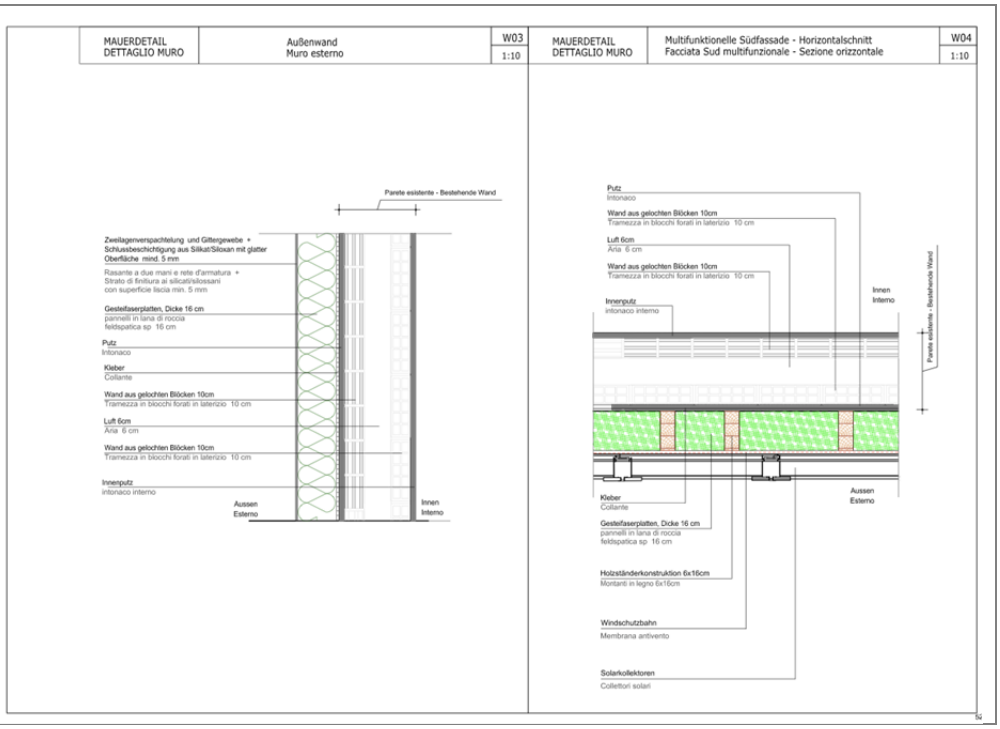
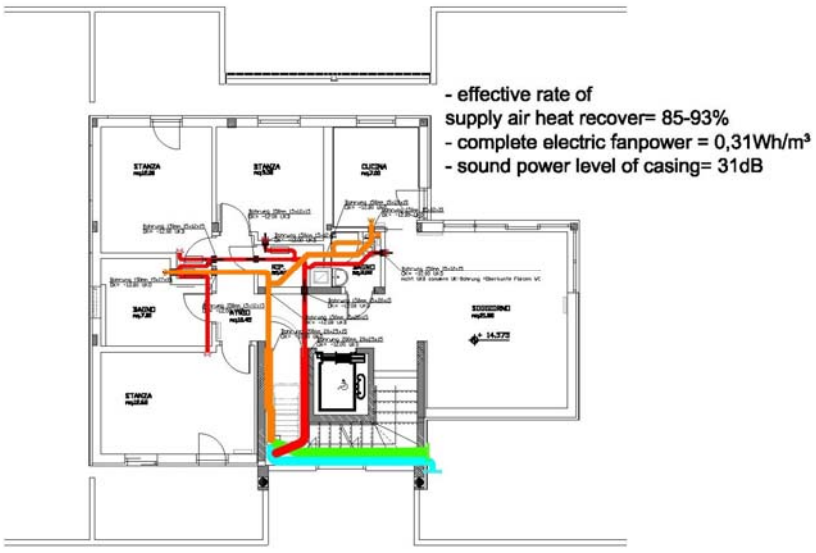
Multifuntional Façade and wall section	

Technical system

Mechanical ventilation	

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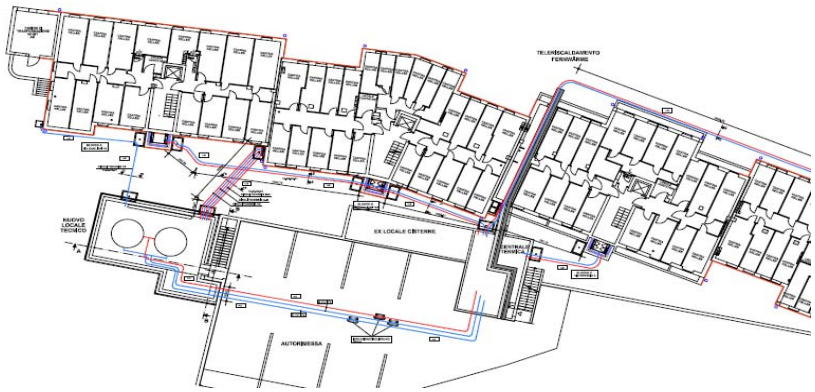
Hot water distribution	
Electric renewable integration