



Factsheet

Housing complex– via Brescia, Bolzano



SINFONIA stands for "Smart INitiative of cities Fully cOmitted 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	<p>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</p>



	<p>floors and 21 apartments. The bigger has 8 floors and 24 apartments.</p> <p>The building needs to be refurbished in order to:</p> <ul style="list-style-type: none"> • 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. <p>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.</p>		
Ownership	IPES-WOBI Social Building Institute of the Autonomous Province of Bolzano		
Gross volume	Circa 31.700 m ³	Gross surface	Circa 7.800 m ²
Number of dwellings	106		
Energy performance	BEFORE	176 kWh/m ² yr	
	AFTER	< 25 kWh/m ² yr	

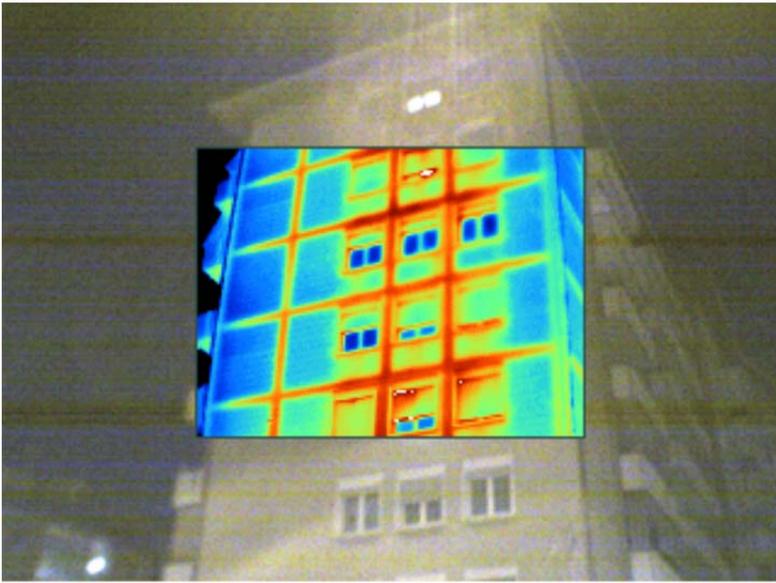
1 - Description before refurbishment

Detailed characteristics of building	<p>Traditional building structure with reinforced concrete pillars and beams. Roof space with prefabricated sheet panels with weight reduction polystyrene and concrete casting in place.</p> <p>Basement retaining walls in reinforced concrete. Continuous foundation beams. Gabled roof with the same structured plan type of the roof space.</p> <p>The garages are covered by slab roof spaces, weight is not reduced, supported by septa.</p> <p>The five staircases (named 10, 10A, 5, 3, and 1 in the next page picture) are together 106 meter long. There 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.</p>
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<p>Plot map</p>	
<p>Building envelope</p>	<p>External walls in masonry:</p> <ul style="list-style-type: none"> • 10cm (brick) + 6cm (air) + 10cm (brick) • $U=1,44 \text{ W/m}^2\text{K}$ <p>Predalle type roof space</p> <ul style="list-style-type: none"> • $U=1,12 \text{ W/m}^2\text{K}$ <p>Windows:</p> <ul style="list-style-type: none"> • Double panel glass: $6+12+6U_g = 2,7 \text{ Wm}^2/\text{K}$ • Wood frame: $U_f = 1,4 \text{ Wm}^2/\text{K}$ • Aluminium spacer • Total: $U_w = 3 \text{ Wm}^2/\text{K}$
<p>Technical system</p>	<p>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.</p>

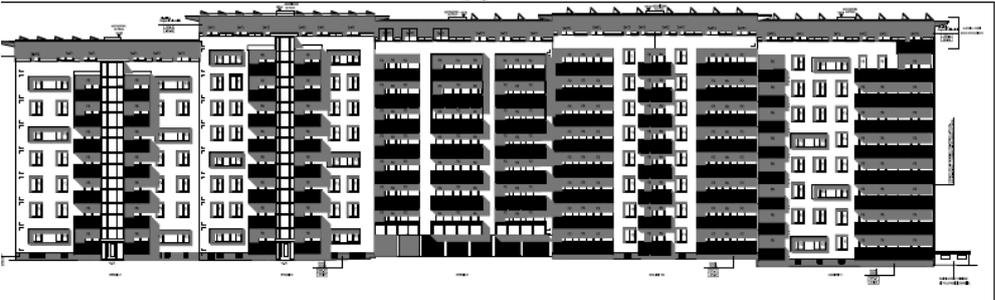


<p>Thermal imaging before refurbishment</p>							
<p>Energy performance certificate</p>	 <p>Certoificato energetico</p> <p>Proprietario IPES della provincia Autonoma di Bolzano Ubicazione Via Brescia 1,3,5 - Via Cagliari 10,10/A Comune 39100 Bozano Permesso di costruire --- P.F. --- P.Ed. 3683 C.C. Gries Progettista ----</p> <table border="1"> <thead> <tr> <th>Efficienza energetica dell'involucro</th> <th>Efficienza complessiva</th> <th>Sostenibilità ambientale</th> </tr> </thead> <tbody> <tr> <td>G 178,23 kWh/m²a</td> <td>D 39,84 kg CO₂/m²a (48,34 kWh/m²a)</td> <td></td> </tr> </tbody> </table> <p>Efficienza energetica dell'involucro riferito all'ubicazione: 178,23 kWh/m²a Indice di prestazione per la climatizzazione invernale: 26,36 kWh/m²a</p> <p>ZERTIFIZIERT KlimaHaus CasaClima CERTIFICATO</p> <p>AGENZIA PER L'ENERGIA ALTO ADIGE - CasaClima Direttore Ulrich Bente</p> <p>Data: 17.07.2014 Numero GS-2014-02740</p> <p>Pagina 1 di 12</p>	Efficienza energetica dell'involucro	Efficienza complessiva	Sostenibilità ambientale	G 178,23 kWh/m ² a	D 39,84 kg CO ₂ /m ² a (48,34 kWh/m ² a)	
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G 178,23 kWh/m ² a	D 39,84 kg CO ₂ /m ² a (48,34 kWh/m ² a)						
<p>Other relevant technical aspects</p>	<p>None</p>						



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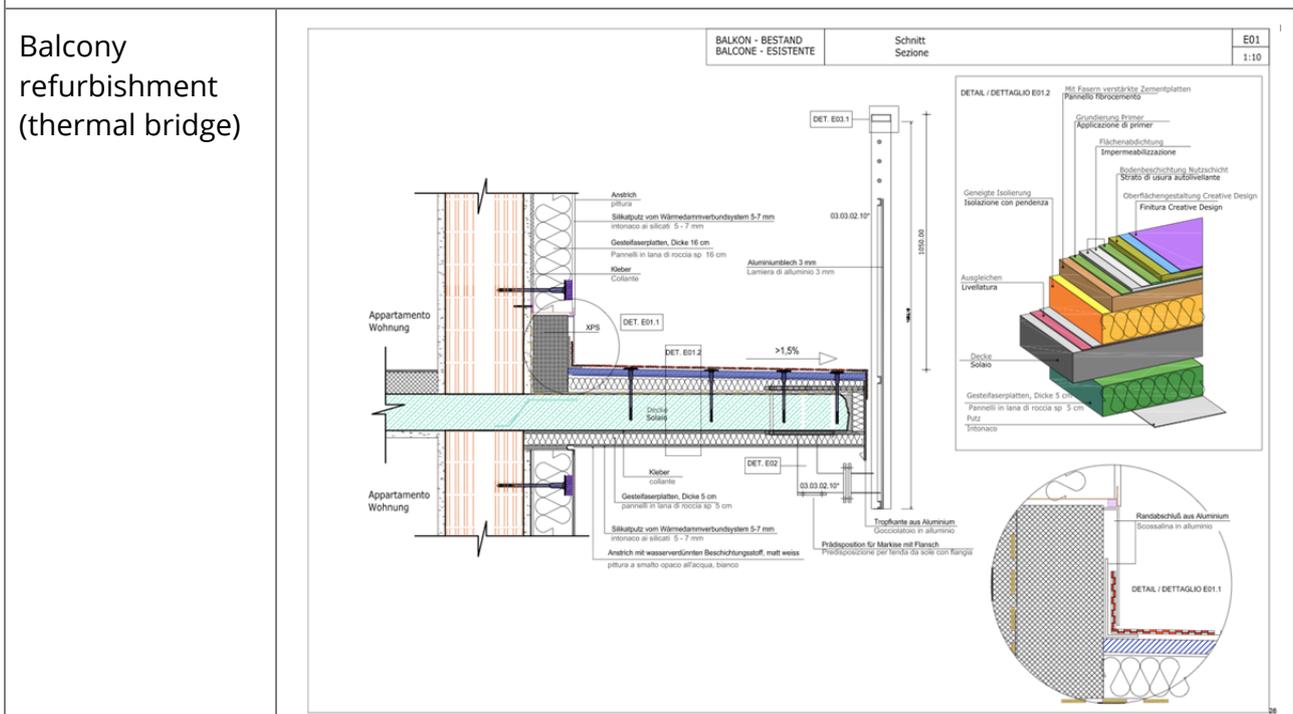
2 – Refurbishment Concept

<p>Concept</p>	<p>The interventions scheduled on the building are:</p> <ul style="list-style-type: none"> - 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.
	 <p style="text-align: center;">View of main facade</p>
<p>Energy Solutions</p>	<p>The following solutions have been planned:</p> <ul style="list-style-type: none"> - assembling a 354m² solar thermal plant; 144m² 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 m³ 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

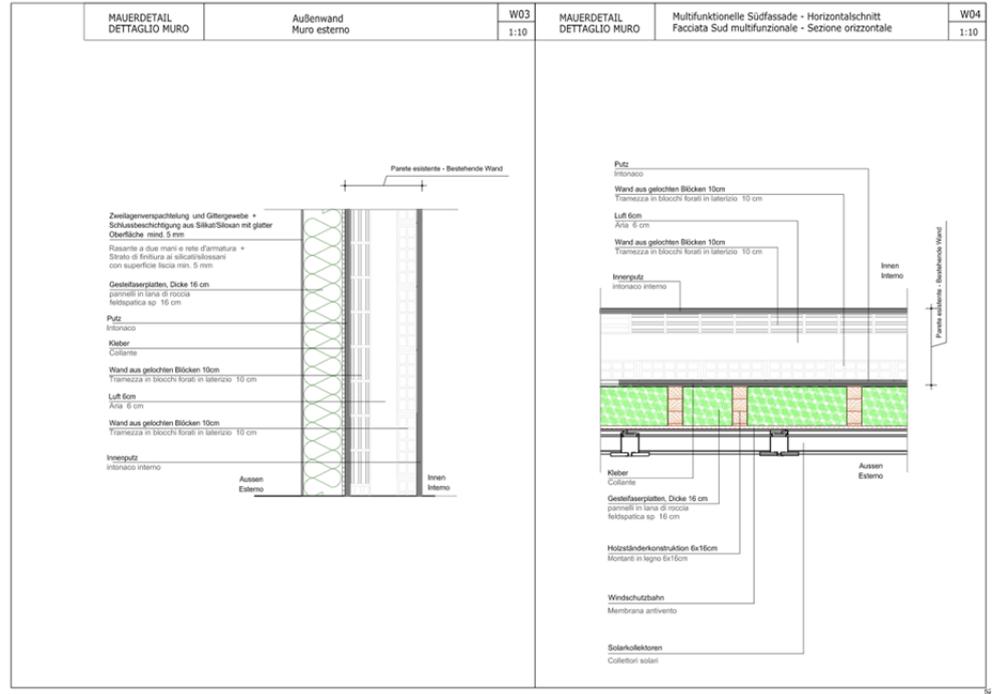


	<p>installed, while in old ones the traditional raditaros will left. Efficiency will raise due to new insulated pipelines.</p> <ul style="list-style-type: none"> - A new photovoltaic system will be installed on ther roof, with a 20kWp production of electricity, that will be addressed to common utilities.
Performances Targets	<p>Envelope Efficiency 18 kWh/m²yr Global efficiency 9 kg CO₂/m²yr Total Renewable Energy 66%</p>
Financing Model	-

Envelope details

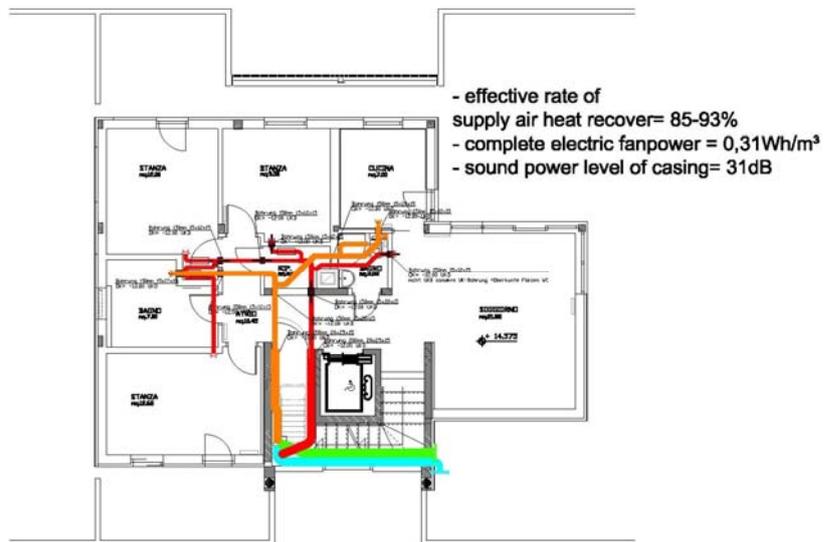


Multifunctional Façade and wall section

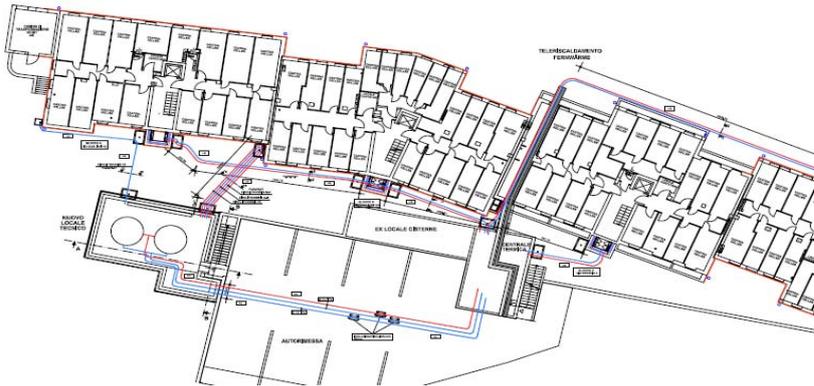
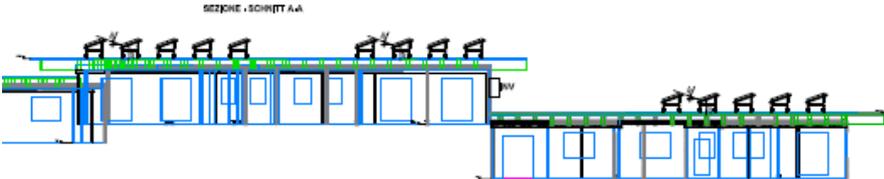
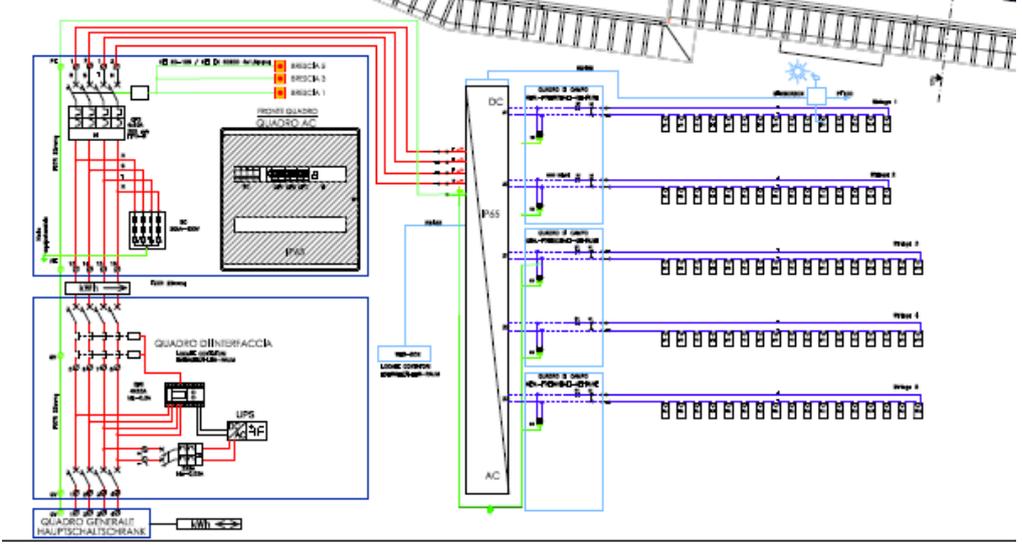


Technical system

Mechanical ventilation



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<p>Hot water distribution</p>	 <p>A detailed floor plan of a building showing the hot water distribution network. Red lines indicate the supply network, and blue lines indicate the return network. Key areas labeled include 'TELESECCO DAREVVO FERRARIANO', 'EX LOCALE ENTERRATO', and 'ACQUEDOTTI'.</p>
<p>Electric renewable integration</p>	 <p>A cross-section diagram of a building labeled 'SEZIONE - SCHNITT AA'. It shows solar panels installed on the roof, with green lines representing the solar energy integration system.</p>
	 <p>A complex electrical schematic diagram showing power distribution. It includes a 'QUADRO GENERALE HAUPTSCHLEISCHENK' (main switch) connected to a 'KWL' (water meter). The diagram shows various electrical panels: 'QUADRO DI INERZIA', 'QUADRO AC', 'QUADRO DC', and 'QUADRO DI INERZIA'. It also shows a 'PSS' (Power Supply System) and a 'LINEAR CONVERTER'. The diagram is color-coded with red, green, and blue lines representing different power lines.</p>

