

# FACTSHEET

## Demonstration building

Housing Complex – Via Passeggiata dei Castani,  
Bolzano


Note: the content of this document will be  
subject to changes until the end of the Sinfonia  
project (May 2020)

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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


|                         |  |
|-------------------------|--|
| <b>Name and address</b> | Aslago-Oltrisarco Quarter<br>Via Passeggiata dei Castani 33/abcd Building A and 33/efgh Building B   |
| <b>Map</b>              |  <p>Images ©2017 Google, Cartographic Data ©2017 Google</p> |



|                            |   |   |
|----------------------------|---|---|
| <b>Description</b>         | Passeggiata dei Castani Area is located in the east side of the city of Bolzano, on to the mountain called Colle di Bolzano/Kohlern and it was built in 1985. |   |
| <b>Ownership</b>           | Municipality of Bolzano   |   |
| <b>Gross volume</b>        | circa 23.500 m <sup>3</sup>   |   |
| <b>Gross surface</b>       | 7.364,8 m <sup>2</sup>  |   |
| <b>Number of dwellings</b> | 72  |   |
| <b>Energy performance</b>  |   |   |
|                            | Energy consumption excluded RES contribution  |   |
|                            | <b>BEFORE</b>   | 236,15 kWh/m <sup>2</sup> year (heating, domestic hot water and lighting)             |
|                            | <b>AFTER</b>  | 60,37 kWh/m <sup>2</sup> year (heating, domestic hot water, ventilation and lighting) |
|                            | Energy consumption included RES contribution (Total Building Energy Use)  |   |
|                            | <b>AFTER</b>  | 22,52 kWh/m <sup>2</sup> year   |

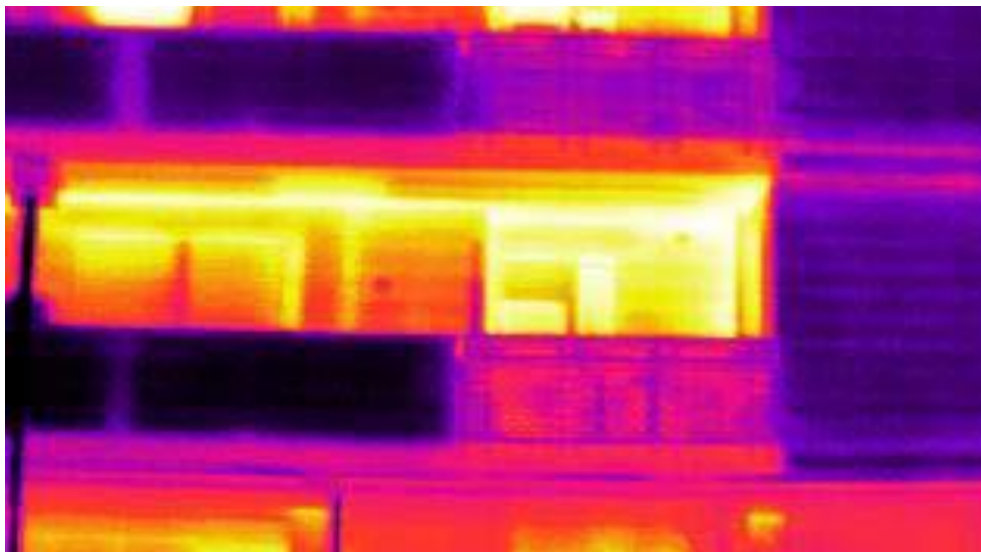


# 1 - Description before refurbishment

|  |  |
|--|--|
| <p><b>Detailed characteristics of building</b></p> | <p>The project concerns the renovation of the buildings located in Via Passeggiata dei Castani 33/abcd (building A) and 33/efgh (building B) in Bolzano. Each building is composed of 4 staircase for a total of 72 flats, plus a common garage in the basement.</p> <p>The buildings have no cantilevered elements, the balcony spaces are made up of three side enclosed loggias.</p> <p>The shading is affected by the position of the mountainous hill close to the south-east side and this strongly penalize the energy aspect of the intervention, regarding to the solar gains on the façade.</p>  |
| <p><b>Plot map</b></p>                             |  <p>Images ©2017 Google, Cartographic Data ©2017 Google</p>   |
| <p><b>Building envelope</b></p>                    | <p>The perimeter walls are made of hollow wall tiles with an insulation layer of 4 cm. The stairwells walls are reinforced concrete insulated towards the flats with 8 cm perforated bricks.</p> <p>The slab to the basement is devoid of thermal insulation, while the underside of the first floor slab has been isolated with different thickness in the two buildings.</p> <p>The reinforced concrete structures are insulated with Eraclit or polystyrene panels, with a variable thickness of 4 to 6 cm, in the outer side.</p> <p>Covering has an insulating layer and a waterproofing sheath covered with nonwoven fabric and protective gravel.</p> |
| <p><b>Technical system</b></p>                     | <p>Heating and domestic hot water are produced by autonomous boilers installed in each flat.</p>   |



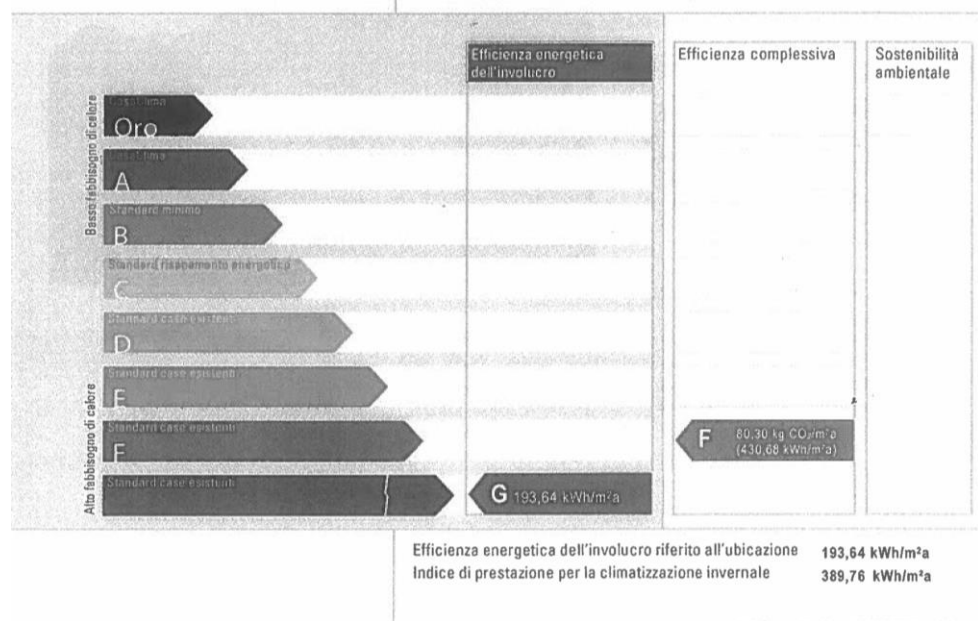
**Thermal image  
before  
refurbishment**



Images © Eurac



**Energy performance certificate**



Via Passeggiata dei Castani 33 Building A

**Other relevant technical aspects**


During the refurbishment works the tenants will remain in their own flats. For this reason, one of the goals of the design is to ensure the smaller impact on the residents' habits through in-depth study of building and security aspects.

All the interior works in the flats will be programmed with the residents by communicating their typology and duration.

Lastly, the replacement of the plants is scheduled in order to guarantee the least discomfort during the transition period.



## 2 – Refurbishment Concept

|                         |   |
|-------------------------|---|
| <b>Concept</b>          | <p>The project involves the realization of an envelope for the energy improvement of buildings and the rehabilitation of the moisture infiltration in the basement.</p> <p>Is foreseen a centralized heating system with a geothermal heating pump (characterized by two vertical loops with 15 holes 150mt deep) and solar thermal field on the rooftop, even if the solar production expected won't be so relevant. The project also includes the implementation of a controlled mechanical ventilation system and a 20kWp photovoltaic field on the roof.</p> <p>The need for a „slender“ construction site, in order to ensure the least impact on the site's inhabitants, and the goal of high performance energetic envelope have orientated the design team to foresee the use of prefabricated wall panels. Each one consists of boxes made of wood beams and wood agglomerated panels. These panels will cover the perimeter walls of the blocks from the first to the fourth floor.</p>  <p><i>Figure 1 - Images: © Studio Mellano Associati</i></p> <p>The panels will be fixed to the existing walls by reinforced steel supports, connected to the existing reinforced concrete slabs. Attention should be paid to the lateral alignment of the panels in order to ensure the correct alignment of the new façade and to avoid thermal bridges.</p> |
| <b>Energy Solutions</b> | <p>The project goal is a sharp reduction in the energy requirements for heating and domestic hot water production.</p>  |



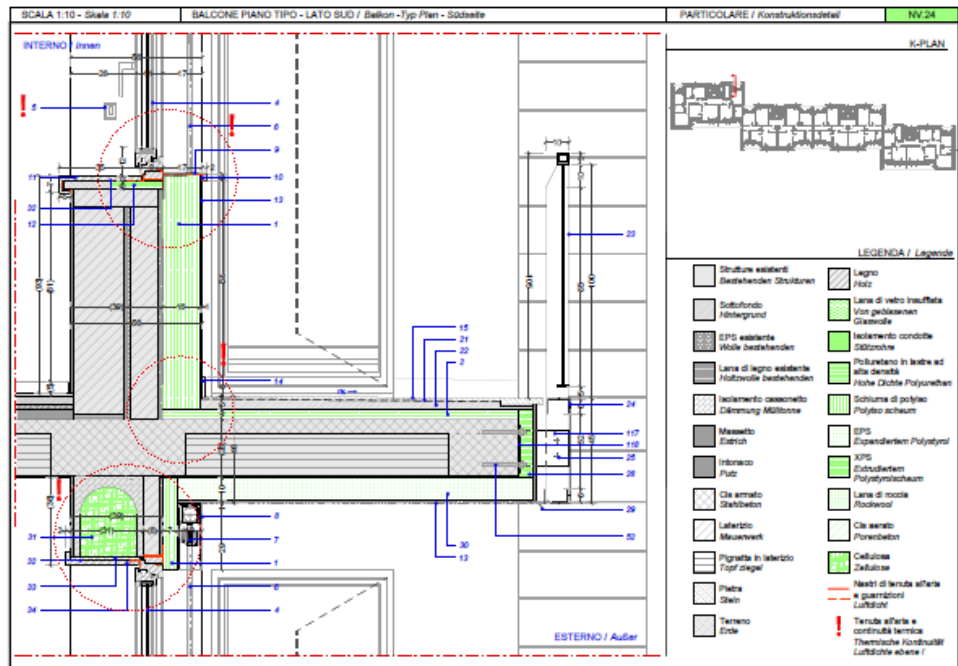
|                             |  |   |
|-----------------------------|--|---|
|                             | <p>The existing boilers and the entire gas network for domestic use will be dismissed. The project considers extensive use of the renewable sources (solar thermal and geothermal) in the implementation of a hydronic system.</p> <p>The solution reduce fossil energy needs and ensure low operative costs, and is based on a hybrid system that includes a gas-fired boiler for DHW production and a geothermal heat pump for heating.</p> <p>This solution covers more than 70% of the heating needs with renewable sources.</p> <p>The net final residual fossil energy required is 22.50 kWh/m<sup>2</sup>year.</p> <p>The construction envelope has been designed to achieve a high thermal performance, with an energy demand lower than the 15.7 kWh/m<sup>2</sup>year.</p> <p>The solar photovoltaic and solar thermal plants on the roof of the buildings and the design of the thermomechanical plants involved a careful analysis of the solutions that would allow the exploitation of an additional share of renewable energy through the use of a heat pump. In order to avoid the demolition of large partitions inside the housing, the executive project involves the creation of external cavities for the existing enclosure for the passage of the implant posts and the passages of the connection systems to the accommodation at the staircases. This design option also optimizes the transition from the existing system to the new centralized system without having to use transitory solutions</p> |   |
| <b>Performances Targets</b> | CasaClima A  |   |
|                             | Total Building Energy Use  | 22,52 kWh/m <sup>2</sup> yr                 |
|                             | Global efficiency  | 14,68 kg CO <sub>2</sub> /m <sup>2</sup> yr |
|                             | RES contribution   | 78%   |
| <b>Financing Model</b>      | -  |   |



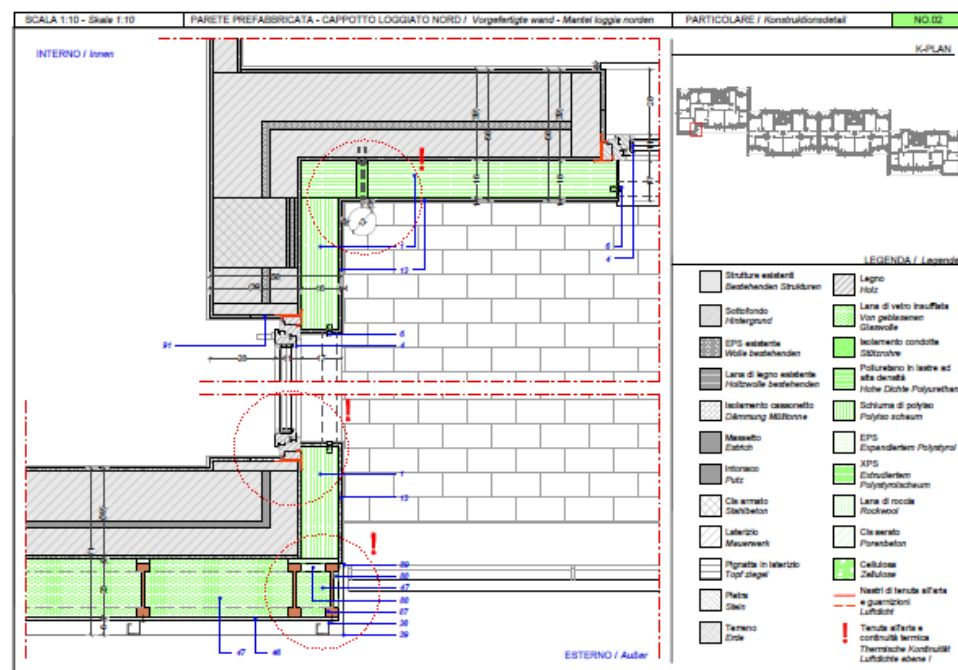


# Envelope details

## Balcony refurbishment (thermal bridge)



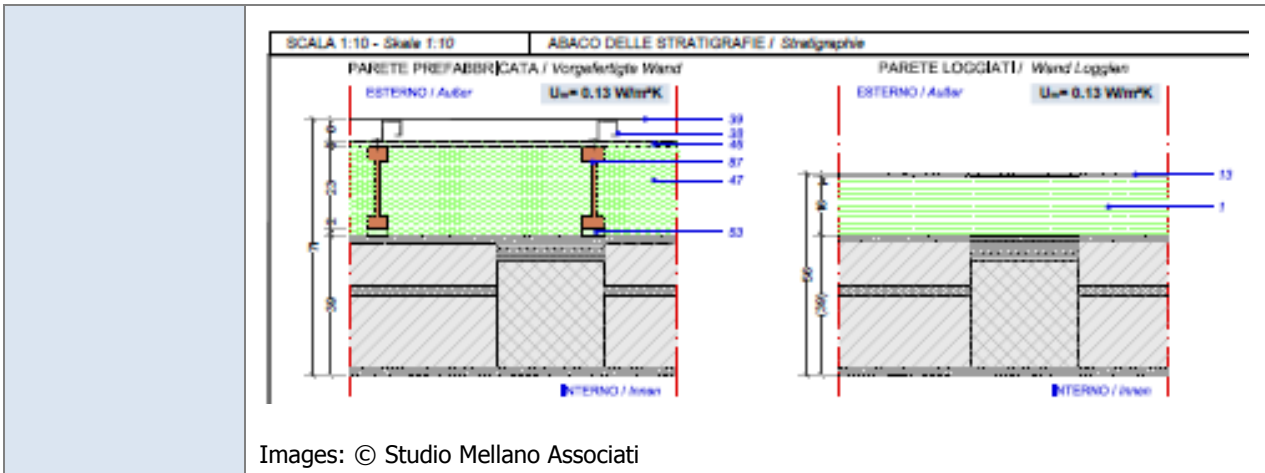
## Multifunctional Façade and wall section



## Wall section



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## Technical system

|                                       |   |
|---------------------------------------|---|
| <b>Mechanical ventilation</b>         | - |
| <b>Hot water distribution</b>         | - |
| <b>Electric renewable integration</b> |   |

Images: © Energytech Ingenieure Srl

