



ENERGY CONSERVATION, RENEWABLE ENERGY SOURCES AND COSTS

INTRODUCTION

In addition to a condition of absence of energy consumption for temperature conditioning, lighting and innovative electric household appliances, a building built on a new conception, can produce an excess energy, making it available to others.

If most of the buildings were built by this conception, we would have completely solved the problem of energy, pollution and indiscriminate exploitation of fossil fuels.

Energy conservation and renewables energy sources are undeniably the paths to which we have to turn with seriousness.

To date, many hybrid building solutions have been proposed, usually characterized by a traditional building system working with the new systems, such as those of insulation, solar collectors or solar cell panels, which installed without sufficient coordination produce unnecessary raises of the construction cost. The concerns are always inevitable.

One answer is an intelligent building using innovative materials that reduce the construction costs in comparison with the traditional hybrid construction.

The application of these technologies will be evident in the creation of a center of excellence in Lonato, in agreement with the Province of Brescia and the town council of Lonato.

BUILDING THE CURRENT SITUATION

By now it is known that the Italian buildings heritage is composed of a significant amount of unsold new buildings built with traditional construction, while the majority of towns and cities are built around ancient villages and old towns.

It becomes difficult to believe that these buildings protected by the Superintendency of Cultural Heritage, will be abandoned in favor of the new buildings that have no value added, not even of a noticeable energetic kind.

Here is clear in a short time the general attention will be catalyzed by the renovations of the old buildings.

Unfortunately there are no known technologies that permit to renovate an old building making it capable of zero energy consumption or low consumption, especially in the face of landscape protection laws. Then it will be very likely that many of these buildings will be recovered by traditional methods, losing in that way their future residential attractiveness.

CEERINO, THE IDEA, THE CHALLENGE

Aware of the energy problem of the urban historical heritage of our area, we have set ourselves the objective of intervening on a building with an average historical value by intervening on it with highly innovative insulation technologies and by providing it with a system for energy production from renewable sources, the whole while respecting the historical aspect of the building itself.

When we have presented the above project to the local government of Lonato del Garda, they offered us the free use (for 20 years) of an old building, (the dating of the building is not certain) that is located in the oldest site of the village, on the road perhaps more representative. The availability of this building was given on the condition to provide to its restoration with private resources.

The building is situated at the foot of the tower and since the last war this building was adapted as an electrical substation to serve the town. The facade has electrical insulators and bolts. The interior was completely plastered and modified in favor of specific plants installed inside.

The building, because of its recent use, does not have a connection to the town's water system and sewerage network.

The building has two floors, where the ground floor is the largest and the first floor is composed of a "tower" from which you can get a single environment.

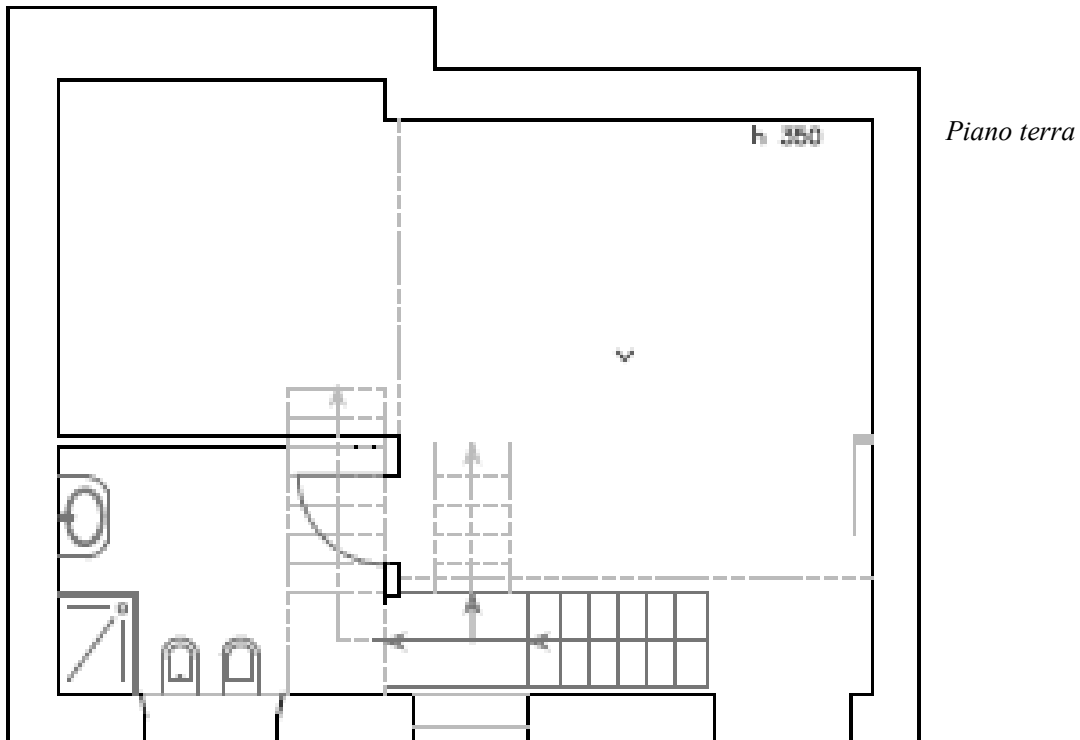
There are no toilets.

Currently the roof has leakage problems that create significant problems for other property below the house.

Then we proceeded to the implementation of a restoration's project according to the available spaces inside the building.



USE OF THE BUILDING

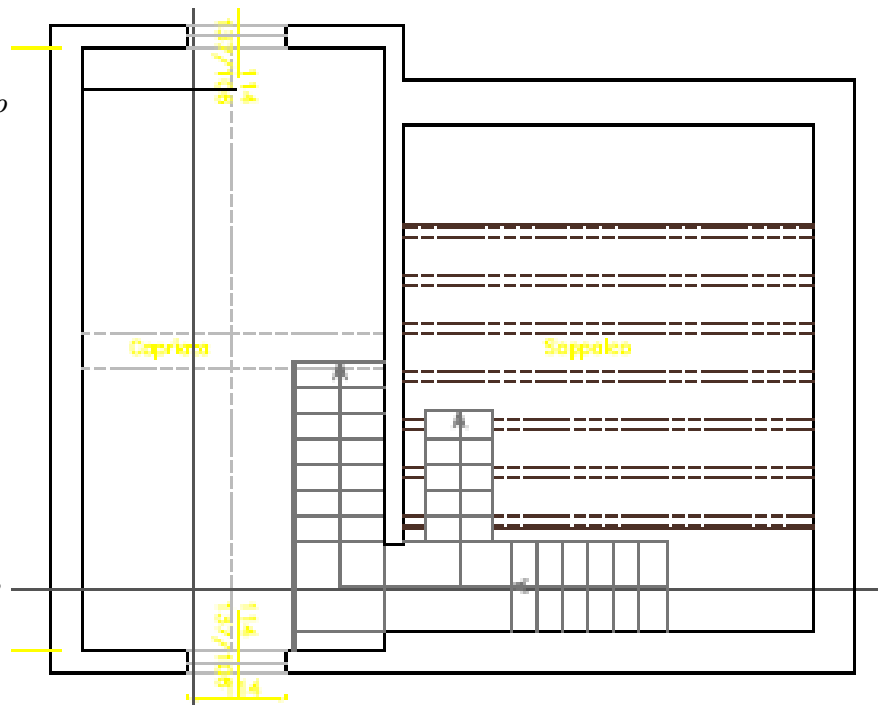


The ground floor includes a reception with a work station, a small room for meetings, presentations and courses, an area for a couple of desks and a little bathroom with no windows. Two windows provide light to the ground floor spaces and a staircase gives access to the upper floor.

Piano primo e soppalco

Above the conference room it will be build a mezzanine floor , suitable for use as a shelter for documentation, servers and printers.

The upper floor will be used as a meeting room and private office.



The current floor has some cracks used for the passage of cables and ladders; those will be maintained and frosted glass will be used to allow the passage of light to the bathroom and workstations below, taking advantage of the large amount of light entering from the two upper floor windows

TECHNOLOGY ADOPTED

Temperature Conditioning

An experimental solar collector system and a heat pump Mitsubishi (with a high CPU) will handle the temperature conditioning of the spaces by a system of tubing inside the floor (heating and cooling) and the production of hot water.



Bampi Srl Lonato, will realize the radiant floor system and will provide as well the material for the draining circuit.



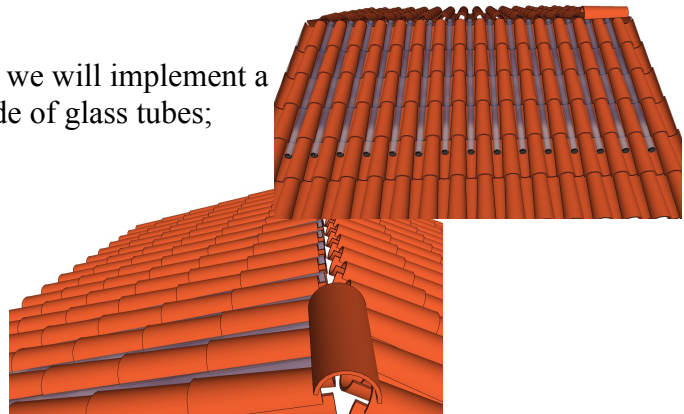
The installation of the hydraulic system will be handled by Termoidraulica Caldera of Brescia.

The heat produced by the heat pump and solar collector will be accumulated in an innovative system with paraffin using PCM (phase change materials), this system will reduce of about 25% the space used in comparison with the tanks normally used in traditional solar systems. This prototype will be realized by the CEER - Research Centre Lonato.



Renewables

The solar heat will be of an experimental type, we will implement a hot water generating system which will be made of glass tubes; those glass tubes system will be laying on the roof in a practically invisible way.



The company Scandinavian Design Srl Bovezzo will provide the stove WALL HWAM which will permit the use of wood more readily available and affordable.

The significant building insulation and high efficiency of the heater will lead to a very limited use of wood necessary to stoke the stove and as well as to a low frequency of stove loading.



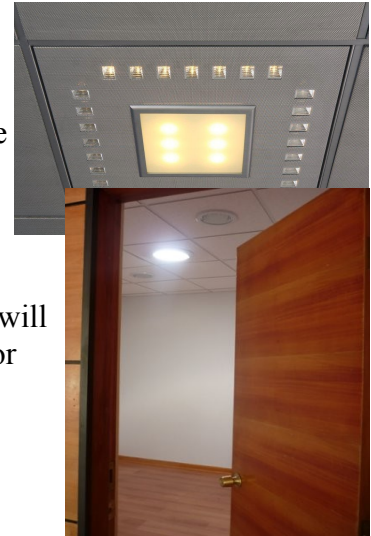
Lighting

Will be used a LED lighting system to reduce eyes stress and energy consumption. The LED allows the precise addressing of the light on the point to be illuminated, such as desks, tables etc..

The Italian Lighting Factory has made available its lighting fixtures.

The LED lighting system is not the only solution adopted: the Ceerino will make use of a special solar tube which will converge the natural outdoor light into the darkest room. All kind of waste will be banned.

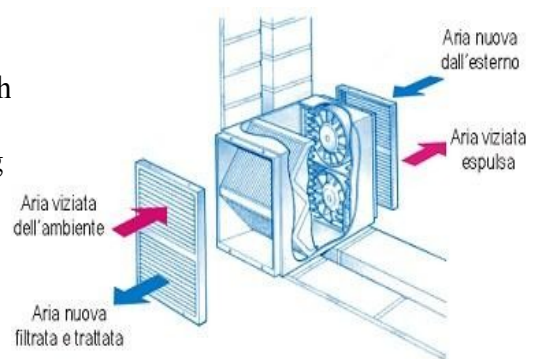
This system will be provided by Solarspot of Cocquio Trevisago (VA)



ENERGY SAVING

The energy saving will be done by a heat recuperator which will allow the replacement of the stale air without wasting the heat contained in it. In essence, the air exchange during cold weather will be not done through the open windows but through a device that will transfer the heat to the fresh and filtered air from the outside.

This exchanger will be made available by the Forclima Albignasego (PD)



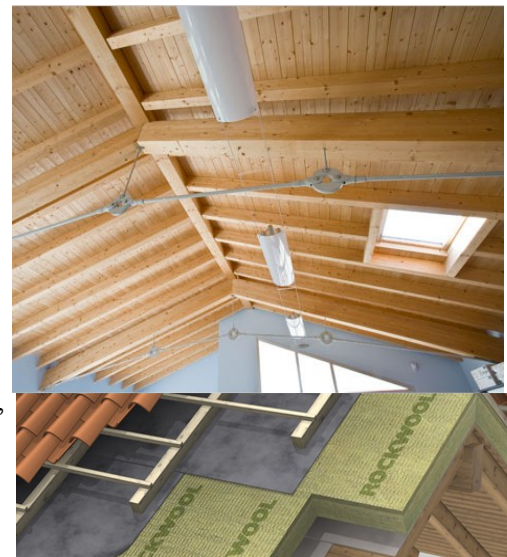
Roof and wall insulation:

The company CAMMI Wood will install the roof which will have high thermal performance and full correspondence to the more rigorous rules in the field of energy saving, where each component of insulation and roof is designed and matched for the best thermic and acustic performance.

Spaceloft ® is an insulation material (which provides the highest insulation R-value today possible) will allow to obtain the maximum energy efficiency in walls, floors, roofs, frames and windows.

Rockwool ecological insulation and Life Cycle Assessment:

The ceerino will be among the first buildings to use the innovative coupled insulation Rookwool / Aspen Aerogel, aiming at high performance with limited insulation thickness.



The vapor barriers and membranes Tyvek DuPont™ will ensure protection from degradation to the insulating materials and will avoid any unwanted infiltrations.

DuPont™ Tyvek®



Floor

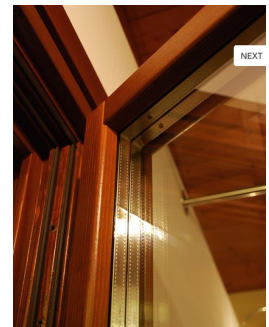
The Ceerino will test a particular finishing of the radiant heating floor which will be made of soapstone. Although the termic insulation will be particularly high and then limiting termic variations, the unpredictability of the presence of people inside the building will create sensitive termic changes. The presence of a floor with a high thermal inertia should be effective in stabilizing the internal temperature.



The floor in Soapstone and the granule for the construction of the screed will be provided by Succetti Granites Chiavenna (SO)

Fixtures

The windows and doors provided by the company Bocchio Serramenti Lonato will be of high performance in line with the objective of Ceerino. For those windows we plan a wooden frame with iron-color treated aluminum, in order to recover the original character.



Little recovery of rainwater

We will provide an internal place where to accumulate a certain amount of rainwater making it available to the toilet flush



Paintings

In addition to aesthetic value, the paintings have heat holding capacity, they are sanitizing and can act as emergency lighting.

These resins imprison tourmaline, silver, TO2, quarry ceramic and phosphorus.

Intervention by AT Marmoservice Milano , owned by a CEER researcher.



Electric Plant

The realization of the electrical plant will not require building works as it will be realized with Freelux groups without wires and without electricity by LPE Electronics.

Electricity distribution will be through the baseboard. These actions will make the realization faster, cheaper and editable.

Electrical systems will be carried out by the installer Giancarlo Dizioli.



THE ART OF THE VALUE-ADDED

The art must not be an exclusive luxury.

Art should be accessible to anyone and it should increase the value of the place where we live.

A beautiful and comfortable place is the keystone to be successful.

- The staircase

The staircase, together with other components such as the wood-burning stove, will add value to the building.

To access the upper floor we will create an singular staircase thanks to a special contribution from the company Carpenser Cellatica Srl.



Art has to become an integral part of modern architecture, which today is blinded by economic needs forgetting that beauty can be created with small things.

PURPOSE OF THE BUILDING

This building is a promotional showcase open daily to the public and attended by architects, installers, general public, public officials and by the media.

So each "exhibitor" participate with motivation to make the space more beautiful and innovative.

Therefore this space will be equally available to organizations and companies that have participated to its realization.

The association will coordinate the use of the building and the research, delivering innovative technologies to partner companies. It will manage all types of training involved and it will make them available to employees, engineers, architects, etc..

Frequent Press releases will be done to promote the initiative and to update the public of innovations done.

We will be able to organize shared campaigns with benefit for all at negligible economic impact.

It will be a source of pride and an example of the many applications that can be implemented to renovate a building in the area of Garda Lake.

Nothing has been "bought". Every company has employed its own resource in terms of materials and / or labor.

It will be the best that can be found.

Claudio Arivetti