



Palazzo Strozzi Mantova

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Glass glass Photovoltaic Panels roof integrated

Solar

What is the solution?

In 1910 the Banca Agricola Mantovana, now Banca Monte dei Paschi di Siena, decided to move its headquarters to Palazzo Strozzi, a prestigious building in the historic centre of Mantua. As happened to other historical buildings in Italy, on the occasion of its transformation into a bank, the courtyard of the palace became the branch hall thanks to the creation of a metal and glass roof that underwent the last modification in 1947, on the occasion of a radical enlargement of the Palace. In the mid-90s of the last century, the roof began to present extensive and worrying phenomena of degradation that worsened exponentially with the passage of time. This situation, together with the poor thermal insulation characteristics, the absolute absence of control of the sunlight penetrating through the glass roof and the poor architectural value of the building, led to the design of a new photovoltaic roof that, although with a formal appearance apparently out of context, would relate to the existing building making it clear the reading of its evolution over time. To achieve these objectives, a new "roofing system" was therefore designed and built, whose geometry derives from the reading and re-proposing, on a different scale, of the orthogonal mesh that characterizes the existing environment. This geometry, in the new roof, can be found from the minimum element, represented by the silicon cell that captures solar energy, square-shaped, to the larger scale identified by the overall structural mesh that supports the glazing.

Why does the solution work in terms of compatibility with conservation and technical aspects?

A roof capable of both saving and producing energy (15 kWp) has been realized, thanks to a capturing surface equal to about 130 square meters of Energy Glass "glass-glass" photovoltaic panels, with monocrystalline silicon cells. The new roof also makes it possible to reuse rainwater intercepted by all the glass surfaces. The latter is conveyed and collected in special tanks placed in the attic and then used, after a demineralisation and filtering treatment, for washing and automatic cleaning of the glass surfaces, to contribute to the cooling of the salon below, during periods of strong exposure to the sun, and to maintain the efficiency of the photovoltaic panels during the summer season. The roof can create, within the architectural organism, a "chimney" effect through the automatic opening of some vertical windows. It is therefore possible to obtain, at predetermined times of the day and without the aid of mechanical systems, a natural "recirculation" of the air in the rooms, with significant energy savings.

Description of the context:

The Palace was built, on pre-existing buildings, among the end of XVIII and beginning of XIX century , and from 1872 was the headquarters of the Banca Mutua Popolare di Mantova. A further radical renovation based on a project by architect Giovanni Giachi involved the former Strozzi property between 1910 and 1912 with the use of reinforced concrete, at the time of its new introduction in the building industry. Palazzo Strozzi is an example of eclecticism where elements of the 15th century Tuscany and others of Venetian origin are mixed. The main façade was made entirely of Botticino marble. It stands on the edge of the historical centre of Mantua. The main objective of the project was to create a system characterized by a very limited environmental impact and an extreme flexibility in the integration with the new solutions that technology will provide in the coming years in the field of energy saving and the exploitation of renewable energy. The new structure should not merely fulfil the role of protecting the Bank's salon below from atmospheric agents, but should be a real new element capable of producing and saving energy at the same time; it should have connotations that identify it as belonging to the city of Mantua; it should create environmental wellbeing and demonstrate, with its transparency, the Bank's willingness to be transparent to its customers. The latter had to

experience the new space no longer as a confined and protected area with respect to the external urban context, but as a sort of covered square, in the style of nineteenth-century city galleries.

Pros and cons of the solution:

Through transparency, light and energy from renewable sources, the bank's showroom has been transformed into a sort of financial centre in close relationship with the surrounding urban fabric. A covered space in the style of nineteenth-century galleries where the passing of the hours and the changing of the seasons is perceived in a natural way by those who operate and frequent the salon, to the benefit of their personal and environmental well-being. The project has been authorized by the protection bodies. Thus, a new page has been written, to some extent, in the "book of history" of the city of Mantua, where the Juvarra dome of the Basilica of St. Andrew soars up towards the sky and creates one inside. The new roof of Palazzo Strozzi reflects the sky with its glass surfaces and creates clean energy. For this reason, it can be seen as a symbol of history and modern technology that, together, summarize the certainty and commitment to a sustainable city and a clean environment.

Type of data available (level of information, simulation):

The load-bearing structure of the new roof, characterized by a strictly orthogonal geometry, is made with tubular steel profiles pre-tensioned by a system of Macalloy stainless steel elements and bars, which allowed the use of profiles with a very small section. In addition, the pre-tensioning was useful to control the operating arrow of the structure, once the heavy glazing of the roof has been installed. The secondary structure, made up of light Schüco thermal break aluminium profiles, has the function of containing the selective heat-insulating glazing and photovoltaic panels; moreover, it guarantees a perfect seal against water, wind and air pressure of the entire glass surface and totally eliminates its thermal dispersion.

Additional information about the solution:

Credits. Owner: Banca Monte dei Paschi di Siena, Architect: Franco Biondi (Paschi Gestioni Immobiliari S.p.A); Detailed Design: Armando Dalai; Structural design: Davide Vicentini

Are there any related publications or pictures of the solution?









