

A note on the sustainable approach of Davide Macullo, architect

by Marco Moro

Introduction

A great part of the European Alpine regions is strongly orienting its policies towards the horizon of a sustainable development. The search of a balance between the recent deep transformation of the traditional alpine rural economy and society and the delicate natural ecosystems of the Alps, is leading to a wide adoption of a range of environmental measures and policies, intended to reduce the impacts of human activities.

Green building is a central topic in this perspective. Over the last 15 years many initiatives have been successfully implemented in regions like Vorarlberg and Steyermark in Austria, Alto Adige/South Tyrol in Italy and a number of Swiss Cantons. A considerable success have been obtained by programs for the promotion of energy efficiency in building industry and the improvement of energy efficiency in the built environment. Today, programs like the Swiss Minergie or the south-tyrolean Klimahaus are fundamental factors of innovation even for the architectural culture.

Davide Macullo's approach to architectural design has grown up in this context. Its homeland, the Canton Ticino, has seen the development of a world-renown architectural school, represented at its best in the works by Mario Botta, Livio Vacchini, Luigi Snozzi and Aurelio Galfetti. There has been an emergence of a contemporary language that has not refused the dialogue with local building tradition and culture, and is deeply related to the landscape and the environment. A both global and local "contemporary tradition", able to absorb the new cultural and technological inputs provided by the emerging task of making environmentally sustainable our building activities (and our idea of comfort).

House in Muzzano, Ticino

The simple volume appears as a half-cube divided in four equal parts. The building's skin is made of a compact concrete+bricks envelope, except for the south-facing "quarter". This is a sort of "light box", a glazed volume enclosing an in-between space, a living area connecting the garden and the swimming pool to the more intimate interior spaces.

The house in Muzzano is designed adopting a range of passive solar strategies. The highly insulated envelope (concrete+insulation+bricks covering) protects the building on the sides less exposed to the sun. The south facing crystal cube of the greenhouse works as a microclimate control system and is a comfortable living area both in the cold and in the hot season. A sun-shading system is placed on the three glazed faces of the greenhouse - south and west façades and the roof - transforming the volume in a buffer-zone during the cold season and a in shadowed area that mitigates the overheating risk in summer. The brise-soleil elements placed on the vertical glazed envelope are automatically regulated, and so is the greenhouse's roof, built with industrial smoke extractors elements. The crystal cube's roof and façades can be completely opened to improve

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the natural ventilation of the interiors, while the sun shading system can be managed to optimize the natural lighting input.

The house in Muzzano shows at its best how a bioclimatic device like a greenhouse can be at the same time a physical and climatic sensible filter between the interiors and the surrounding environment, and an attractive living area. An architecture that is both a sensory and climatic device.

House in Ticino

An intelligent selection and coupling of building materials is a recurrent strategy in Davide Macullo's works, a strategy that increases its significance in a perspective of a more sustainable way to design and build our habitat. The single-family house in Ticino is a further example of this approach.

Wood and copper are unusual materials if linked to the current idea of an high-standard of living. In this work those materials are increased in value, utilizing them for their best sustainable features.

A double envelope contains and protects the interior spaces. The internal envelope is built with the wood-bricks Steko® system, a constructive technology which adds further "assets" to the renowned sustainable features of wood, a natural, renewable and healthy building material. The Steko system, utilized even in the internal partitions, is fully recyclable and reduces the time spent on site, with a corresponding reduction in noise, dust, site traffic and other environmental nuisances.

The external skin is made of a copper screen, another natural and fully recyclable building material that protects the wooden internal envelope from overheating. Standard prefabricated elements, like the Steko bricks or the copper external skin, are well suited to the simple and compact forms of a project that would reduce energy consumption. In the House in Ticino, all those features appear effectively combined with a high standard of living, defining a new conception of comfort.

This project has been awarded with the 2007 International Tecu Award for the use of copper in architecture.

Thalassotherapy in Spotorno, Italy

In the project for a Thalassotherapy on the Spotorno's seafront, in Liguria, Italy, it is possible to find some common elements of Davide Macullo approach to sustainable architecture.

The plan is developed parallel to the main road and the beach, maximizing the exposure to south, to the direct input of light and heat from the sun. Even in Spotorno, the bioclimatic strategies adopted are the result of an accurate balance between passive measures intended to increase solar gains and the effective and evocative design of the roof's sun-shading elements. The core of the passive solar strategies is the great natural stone wall, defining the great part of the southern front of the building. The natural stone is utilized for its positive thermal inertia, a decisive factor particularly to the control of heating in summer.

On the top of the building, a series of palm leaf-shaped elements assure the comfort conditions during the hot seasons, protecting from overheating the terrace-roof. As sustainable integration of

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the heating system a heat-pump plant is projected to be installed. The organic forms of the partition of the interior space are a clear evocation of the sea and its natural forms.

Housing in Maroggia, Ticino

The housing complex in Maroggia is projected to be built along the Lugano Lake's shore, close to the mouth of a river. The parcel is one of the last green areas in a densely built context.

Aimed to preserve the most of the green the project is focused on the idea of an higher density for the built environment as an indispensable feature for a sustainable building. The built volume is condensed in two elliptic three-storey buildings. The elliptical plan allow to optimize the ratio between the target of a volumetric compactness and the request for an adequate natural lighting input and exposure to the sun.

The relationship between the interior space and the natural elements of the context is modulated by double skin: a massive brick's external layer, and a fully glazed inner face.

The thickness of the exterior skin assures the passive solar gain and the mitigation of the impacts of daily thermal range, both in winter and in summer. The deep loggias, elements derived from the traditional architectural language of the Ticino, are the fundamental devices to prevent overheating in summer and to assure a sun-shading effect to an interiors space that's widely opened towards the striking view of the lake and the green of the surrounding garden.

A heat-pump system gives an important contribution to the limitation of energy consumption and use of fossil fuels.

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