SUSTAINABLE HOUSING IN THE PROVINCE OF BOLZANO ALTO ADIGE – ITALY – "THINKING IN TERMS OF A Co2 NEUTRAL CLIMATE"

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SUMMARY:

Today it is well known that to limit the increase in global temperatures and to save our planet from a climate disaster, it is necessary to make a substantial reduction of the Co2 produced, above all by the industrialised countries (through transport, industrial processes, heating, power stations, etc.).

In Denmark in December 2009 the United Nations World Congress on Climate Change was held, at the end of which the Copenhagen agreement was approved by 190 nations.

The commitments made aim at a net reduction of Co2 emissions which, as is known, are responsible for global warming.

At the moment in Europe 10 tons of Co2 per person are produced annually. In order to achieve neutral Co2 emissions, the objective is to reduce this to a minimum.

The mainstays of a strategy that aims to reduce Co2 emissions to a minimum are the use of renewable sources and energy saving.

In Italy, the provinces, municipalities and cities play an important role in implementing this strategy. We need only bear in mind that energy standards, the infrastructure for heating buildings, the construction of power stations for the production of energy from renewable sources, local transport, etc. depend directly on decisions taken at a local level.

The municipality of Bolzano, for example, has for some time been travelling this challenging but virtuous road, setting itself the target of achieving Co2 neutrality by 2030.

A thorough comprehensive study has analysed the total amount of Co2 emissions in the city, proposing new measures for reducing them to a minimum; these principally regard the sector of buildings and their relative infrastructure.

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At the recent summit in Durban in South Africa at the end of 2011, the representatives of 190 countries approved a package of initiatives for the fight against climate change.

This is "The Durban Platform", which contains a list of general political declarations of intent.

Unlike the Kyoto Protocol, this agreement was signed by some large countries such as India, China and the United States, which are responsible for a large part of total global Co2 emissions.

The countries of the European Union showed their determination to prevent the conference from failing and insisted on the commitment, taken at the climate change conference in Copenhagen in 2009, to limit the average warming of the atmosphere to a maximum of 2° C. above average pre-industrial temperatures.

Even if this objective is reached, it may not be enough. Scientific studies show that the consequences that can be attributed to an increase in temperatures even of only 2° C could represent the point at which climate change passes from being risky to very risky.

This is why it is necessary to significantly reduce the use of fossil fuels, using renewable sources of energy and saving energy instead.

In Italy, the Autonomous Province of Bolzano in the region of Alto Adige is certainly one of the areas that has been most attentive to the question of climate and environment, and one of the first to take action.

ENERGY STANDARD AND CLIMATE HOUSE CERTIFICATION:

In-depth studies show that buildings emit more than 30% of carbon emissions and consume about a half of global energy. The technologies for more energy – efficient buildings have already been available for some time, but are still not always applied today. Thanks to energy – saving refurbishment of existing buildings, it is possible to limit carbon dioxide emissions produced by heating and production of hot water for domestic use by up to 50%.

Already since 2002, the Autonomous Province of Bolzano has included technical specifications for energy saving in its building construction regulations. As a result, for the first time in Italy energy saving has become compulsory for new buildings. Compliance with minimum standards has been made obligatory, with stricter rules and regulations for energy saving than the ones previously in force.

Since June 2011, another step forward has been made by making it compulsory to comply with the minimum energy standard "Climate House B" for all new constructions; these obligations will not only apply to residential buildings but also to those used by shops, offices, hotels, etc.

These new regulations will make it possible to have a large number of new constructions with an energy requirement below 50 Kw/h or 5 liters per square meter, considerably reducing harmful emissions.

Those who construct buildings with the "Climate House A" will be able to make us of a supplementary volume bonus of 10% of the authorised volume.

Appropriate incentives and possible volume bonuses are used to encourage the reduction of energy consumption. For example, those who transform an old building into a building with the minimum energy standard "Climate House C" enjoy a volume bonus of 200 m^3.

This initiative allows a considerable reduction of Co2 emissions as well as a marked reduction in costs for energy needs.

CLIMATE HOUSE AGENCY (CASA CLIMA) AND ITS CATEGORIES:

This agency, which already came into existence in the 1980s, was established with the approval of the provincial government. It was inspired by the EU directive 91/2002 and took the Kyoto Protocol as a point of reference. Its aim is to improve new sustainably – constructed buildings by using the new technologies available to reduce the consumption of fossil fuels, thus reducing heating costs and Co2 emissions.

The Climate House Agency is an independent body free from external influences, and certifies buildings according to precise criteria and only after on-site checks during building.

After the necessary calculations and assessments, the buildings that have an annual heating requirement lower than 50 kilowatt hours per square meter can be placed in one of the following climate house categories:

1) **CLIMATE HOUSE GOLD :** Building with annual heating energy consumption below 10 kilowatt hours per square meter.

2) **CLIMATE HOUSE A :** Building with annual heating energy consumption below 30 kilowatt hours per square meter.

3) **CLIMATE HOUSE B :** Building with annual heating energy consumption below 50 kilowatt hours per square meter.

4) **CLIMATE HOUSE C** (minimum standard)**:** Building with annual heating energy consumption below 70 kilowatt hours per square meter.

5) **CLIMATE HOUSE D** (standard for existing houses)**:** Building with annual heating energy consumption below 90 kilowatt hours per square meter.

The lowest energy consumption is guaranteed by Climate House Gold**,** which requires 10 kilowatt hours per square meter annually. In practice, this can be ensured without an active heating system. Climate House Gold is also called "1-liter house", because each square meter requires 1 liter of oil or 1 cubic meter of gas annually.

Houses with annual heat consumption below 30 kilowatt hours per square meter come under the category "Climate House A", the so – called "3-liter house", because they require 3 liters of oil or 3 cubic meters of gas per square meter annually.

The Climate House certification rates buildings according to the energy efficiency of their envelope (energy requirement for heating), overall efficiency (envelope and systems with statement of Co2 emissions) and environmental sustainability.

The basic features of a Climate House are a high level of thermal insulation with very energy-efficient windows and doors, a compact hermetic structure, the absence of thermal bridges and the use of "clean" sources of energy such as solar energy (solar and photovoltaic panels), systems for recovering rainwater for the irrigation of green areas rather than for WC flushing, geothermal energy and close attention to systems and construction.

NEW SUSTAINABLE DISTRICT:

A cornerstone for a way of life that looks ahead to the future is the smart use of resources, of which energy is also a part. For this reason energy efficiency is the first and

most important future source of energy. It follows from this that we must improve the energy performance of our housing.

In the next few years, the city of Bolzano will see the start of an ambitious project for the building of a new innovative Co2 – neutral district, that is, one which respects the environment.

500 new flats will be built on a lot of 5 hectares. The district will have “Climate House A” buildings (instead of category B as required by law) and will guarantee standards of excellence in the filed of energy saving and efficiency, environmental protection and the quality of green areas.

The buildings, built in class A, will have green roofs, thick, well - insulated walls and windows of different sizes depending on the direction in which external walls face.

An ecological approach will be conferred by choices such as the retrieval of rainwater to re-use for irrigation, rather than for WC flushing, and the conservation of extensive permeable green surfaces, capable of producing advantageous effects on the microclimate.

Consequently innovative technical solutions will be applied, with the use of optimal enhancement and exploitation of bioclimatic conditions and the use of “clean” energy sources such as solar energy (solar and photovoltaic panels).

With regard to systems, solutions will be adopted for the reduction of energy consumption such as district heating, geothermal heat pumps, heating and cooling with radiant panels and a system of controlled ventilation with heat retrieval.

In the project large areas are dedicated to public and private green spaces, there is an internal network of cycle and pedestrians paths, and there are no roads for motor vehicles at surface level. These will have access to the various buildings by means of an underground garage.

All this will enable the district to achieve a status of Co2 neutrality. (In the calculations only Co2 emissions connected with living in the district have been considered. Transport, waste and residents’ consumption have not been taken into account.)

DISTRICT HEATING:

According to a recent study, in the city of Bolzano about 30% of Co2 emissions are produced by heating systems; this high figure shows that this is a very important area in which to intervene.

In Bolzano construction is in progress of a new modern thermal treatment plant, that is, an incinerator that retrieves and re-uses the heat produced.

The new ambitious plant will start functioning in the spring of 2013, and will burn non-recyclable waste, producing heat and electricity which will be used to heat and cool public and private buildings (hospitals, schools, offices, etc.) and to supply electricity to various consumers.

According to the experts, every year the thermal treatment plant will be able to burn up to 130,000 tonnes of local non-recyclable waste, will make it possible to close several landfills in the nearby valleys and will pollute a tenth less than the limits laid down by law. Above all, however, it will produce electricity for 3,000 families and heat for the heating of 5,500 flats.

The objective is therefore to considerably reduce emissions of Co2 and other pollutants into the atmosphere, shutting down about 3,500 large and small boilers run on gas or other fuels, and thus saving on heating and air – conditioning costs.

Thanks to the special attention given to the treatment of the fumes produced, current threshold values should be improved on: these will be far below the parameters set by European and national directives.

Particular attention has been taken with the architectural design of the facility: the whole complex is divided into three sections that blend in with the Bolzano skyline. The thermal treatment plant itself, composed of its machinery, pipes and chimney will be confined to the background.

A long building will cover the rest of the facility. The chimney will be situated at its south end; to the north, the station for unloading the waste and its waste bunker will be built in reinforced concrete; on the east side a façade of windows will cover the service building.

A site of 25,000 $m^{2\ is}$ available for construction of the plant, of which 7,600 m^2 will be used.

The consequences of global warming and the greenhouse effect constitute an increasingly serious threat to the future of the planet. I believe that through our daily work, we surveyors must take on a leading role in adopting the principles of sustainability and respect for the environment in construction, using renewable sources of energy to an ever greater

extent and building in a way that guarantees the maximum energy efficiency and the least possible pollution.

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