ACTIONS OF ENERGY RETROFIT AND NEW QUALITY OF HOUSING

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Summary

The scenario inherent to problems related to energy efficiency of buildings in recent years has passed the stage of "taking into account" the features emerging more and more towards the formulation of decision-making processes of offering intervention systems[1].

The objective of the study is the definition of an instrument of support for decision-making that configure the technical scenarios for energy retrofit interventions in existing public buildings in a Mediterranean climate.

Such an approach, allows the limiting of the risks of insufficient performance linked to improper interventions; and, the avoidance of excessive performance on the basis of the necessity to optimise the use of recourses, employing efficiency and efficacy strategies within the logic of interventions that can be defined as tailor-made[2].

The method aims to contribute to establish the relationship, between the phase of knowledge of the building to the intervention, the characteristics in which the subject of the intervention is inserted and the strategies to be carried out for improving energy performance.

The proposed method is structured in such a way as to indicate the modalities of assessment of the status of the existent and its residual performance in the light of the problems that will not be analysed separately from the context of the intervention.

In choosing the technical solution to adapt in intervening on the existent must also be considered, furthermore, the energy cost in the production phase. The existent, in fact, already encompasses a certain energy quantitative, defined as "latent energy"

To raise performance in key sustainable buildings and urban environment need to develop suitable tools for the articulation of policies and interventions in the insistence of codes and protocols useful for decision support for interventions aimed at urban sustainability, building and housing.

Keywords: Energetic Retrofit, Low Energy Building, Social Housing, Technical Code

[1] The research aims VKA2 "Retrofiting of Social Houses" program "Intelligent Energy – Europe 2003–2006" and the results of research conducted in several European countries, primarily under the "Rebuild", Research SHE Sustainable Housing Europe reveal that this theme are now part of the objectives of any policy instrument programmatic.

[2] Prof. Sergio Croce, on Seminar for the Research Doctorate in Technology of Architecture, DASTEC Department of the Architecture Faculty of Reggio Calabria, 2005.

1 Introduction

1.1 From living as a need to housing disadvantaged

The development of man and his activity is often considered from different points of view. Anthropology teaches us that living is proper to man, it was his first gesture. A long, but continuous process of awareness and harmonization with the cosmos.

For this reason, talk of "living" mean to call into question interpersonal relationships and social, points of view individual and collectives, elements of sharing and care of places and ways of living environment.

Today, on the one hand the profound and rapid changes of social equilibria that have undermined the habits and the other the economic difficulty that contaminated the building production output until it flows into real estate speculation, help to define the new limits of spatiality house.

The new emergency housing linked to social and economic changes of recent years showed the need to provide design solutions, technological and economic, valid for a question more and more urgent and complex.

In fact, in conjunction with a strong diversification of housing demand and an economic crisis that is affecting the entire European economy, we are witnessing a new phase characterized by the diversification of demand and variable horizons and needs more complex and complicated than those of the previous decades. And it is in response to this situation that has inevitably affected the lower classes of the market of the home, that the social housing policies have undergone a sea change.

The Ministerial Decree of 22 April 2008 defined the house of social housing as a "unit building used for residential use in permanent lease, destined to disadvantaged individuals and families who are not able to access the rental of accommodation in the free market. Is in consideration of opportunities like these that the construction industry should take up the challenge in a manner outlined by the processes of innovation that can actually result in the interventions of Social Housing or otherwise in the offer of services for communities located

2 The requirement of environmental quality of housing in action

The design project is now an important area of experimentation, of innovation for a live safe, comfortable and sustainable. The Housing is a key area of the design experience, not only because for each figure technique is the first confrontation with the profession and the client, but also because "design houses" means to enter responsibly in the heart of innovation and design technological innovation, in direct contact with the strategies and demands of the real estate market.

The paradigms that are shifting the translation of innovative processes in the construction industry have, therefore, ever more closely involved in the whole process of construction of social housing.

Is in fact very obvious as the processes of Housing have internalized innovative categories which involve both aspects functional that technological aspects of the building organism. The implications of this assumption is represented by new arrangements spatial, functional, technological and material in sector of building and urban in general, with natural repercussions on contemporary configuration of Cities.

An example reliable is relative to the current problems of safeguarding resources and of sustainability of the interventions. These, stress a control of transformation processes, requiring the presence of a technology most as a contribution ethical and innovative that as indifferent support or privileged referent. From here, intervention models at different scales, new and old housing types, use of new technologies and new materials considered in their life cycles, innovative financial solutions have thus become the design parameters for a timely response to new housing needs and for a improving the quality of life in constructive actions and in offering sevices of social matrix.

In line with all the programming strategic shared tools such as cards and protocols level internationally, and guidelines at community level, emphasis is now placed on the new quality housing and environmental context, both as part of the evolution of the dynamics demographic that affect the needs of users contemporary , both on the union with the principles of sustainability. For this a priority is to renew based on the most current standards the existing stock, or to build new residences according to the compliance indicated by the above mentioned instruments.

Similarly, it is known as the theme of environmental and energy performance of the building, including with regard to the interventions of social housing, has taken in recent years, a central role in the matter related to urban sustainability, establishing safe trajectories innovative . The possibility of orienting intervention of implementation and requalification buildings to draw attention to the problems of environmental compatibility requires that the processes of transformation of resources and how contain to design sufficient elements to minimize the impact of construction on the environment.

These requests have outlined additional categories and parameters that implement the principles and guide the interventions of Social Housing and the offer of services for the community in general. These three levels can be declined guide:

- Ecological principles: counter the dwindling resources and environmental degradation, create healthy environments;
- Resources: control sub-soil, water, air, raw materials and energy;
- Life cycle of the construction process: decisions based on the analysis and evaluation cycles services and products, such as: program, project, material acquisition, transportation, manufacturing and construction, management, disposal, recovery and disposal.

On the other hand is recognized as an additional parameter for the new additive processes of Housing the approach of the Energy Retrofit existing building. This can be completed through actions, both technological matrix that relate to the building system (housing and facilities, possibly to be considered integrated) and operational matters, or the appropriate use by users (which should now begin to be educated so appropriate). The overall strategies are conducted according to the diagnostic evaluation of actions ("energy audit"), for the elimination of waste ("energy saving") and, therefore, the upgrading of the building organisms in relation to the components of housing and engineering ("retrofit" energy).

The results of the more established studies in the field of construction property have highlighted the measures of improvement of environmental comfort and welfare conditions implemented over the last forty years that have a focused on technological equipment neglecting all information related to the context environmental and climate. Conversely, in

the past, the optimal exploitation of local resources guarantees maximum efficiency with a minimum expenditure of energy[3].

In order to conserve natural resources, to meet the needs of comfort and quality, the most favorable results are only considering the building as a body able to interact with all internal and external factors.

With regard to the interventions on the existing, these considerations encounter limitations related to their initial condition, in which the positioning, the orientation of the shape and the size of the building, as well as the techniques and construction technologies or tracking of openings are already defined.

In the light of the instructions given by the latest regulations, the research applied to the design of high performance components and energy in the development of strategies during aimed design time approach are today priority . These notions fact tend to favor significant savings in operating costs and produce at the same time an improvement energy efficiency and comfort of the existing buildings on a par with those of new construction. Everything corroborated by the latest data on energy consumption in the residential sector, which revealed that about 68% of energy consumption comes from heating buildings and the contribution related to the needs of cooling is however still underestimated. These high impacts on total consumption are mainly due to the poor quality of building envelopes.

3 Addresses in Europe

The scenario of the issues related to energy efficiency in buildings is oriented in recent years towards the formulation of process decision making to the offer of intervention systems. This aspect have increasingly involved the areas of scientific research, public administrations, of the production sector and of the professions.

Further reference can be considered the views of the various actions political and programmatic implemented at international and national levels, which are aimed at promoting the development of methodologies and operational strategies that achieve appropriate levels of environmental quality and energy both on an urban scale that at that building.

At scale International Among the references we can mention the project "INTEREB-Integrated Energy Retrofitting of Buildings" whose results were published in 2008. This project, in line with EU objectives in the field of rational use of energy (RUE) and in particular with the provisions of Directive 2002/91/EC on energy efficiency in buildings, was intended to define the procedures required to promotion of energy retrofits as part of the recovery of existing buildings, so as to align the energy performance of new regulatory parameters. The results of INTEREB are directed primarily to local governments, the methodology developed by the study is aimed at evaluating the potential for energy savings achievable in the building work.

The project "BRITA in Pubs" – Bringing Retrofit Innovation to Application in Public Buildings, co-funded by the European Commission within the Sixth Framework Programme (2000-2006), included in the EU ECO-BUILDINGS Programme, is configured as a starting point towards the development of short-term interventions that define the

[3] Peter Schmidt Bleek associated with the change of mode of construction with the use and production of large scale energy: Cfr. Schmidt, P. (1999), “The life cycle of building”, Proceedings of the International Conference Sharing Knowledge on Sustainable Building, Dicembre 1999, Bari, I.

modalities for the evaluation of energy efficiency and use of renewable through energy technologies integrated in the building.

Other important research activities have addressed the relationship between environmental quality efficiency of buildings, especially residential ones, and quality of life, investigating the subject's Housing as an opportunity to ensure social welfare. Among these it particularly useful as a basis of departure, the Programme of actions towards Factor 4 in existing social housings in Europe. The project, co-funded by the European Commission – Intelligent Energy Executive Agency, was completed in 2008.

Specifically, has investigated the issues related to social or reducing costs health care and improved quality of life, the economic environment or the reduction of management costs and the revaluation of the asset, and, finally, to the environmental field in terms Environmental reduction of emission of climate-altering gases and of air pollution.

To this end, it has been used "BREA" (Building Efficiency Retrofit Assessment), a tool to support decision making in pre-diagnosis to define strategic choices of energy improvements in the light of the "overall cost of energy.

At the national level, are numerous research activities and measures to address regulatory strategies oriented towards design and technological products that provide adequate levels of energy efficiency of buildings.

Among these, we report the BEEPS – Building Energy Performance Environment System, a program of the Ministry of the Environment and Department of Physics, University "La Sapienza" of Rome on the energy certification of existing buildings. The program is based on what is reported in the documents of the European Community:

- Working Party on National Environmental Policy, Policy Instruments for Environmental Sustainable Buildings, ENV / EPOC / WPNEP (2001).
- Proposal for a Directive of the European Parliament on the Energy Performance of Buildings ENER 135 ENV 547 CODEC 1139.

What also emerges more clearly from an analysis of the national context, is the adoption, by a growing number of Italian municipalities, of building regulations focused on environmental issues and energy. In particular, incentive an use of renewable sources, of measures aimed to optimize the thermal insulation of, and the improvement of sunshine and natural lighting of the interior is the basis of this context

The municipalities that have developed building regulations focused on sustainability are distributed throughout the peninsula, with a predominance in the center-north, with a particular concentration in Tuscany, Emilia Romagna and Lombardy

4 Methodology

4.1 Parameters for assessing performance envelope

The research follow one of the approaches that take as their reference a design to control environmental like those typological and technical-constructive, with the objective of achieving energy and environmental quality standards, at least to the level of values threshold indicated by the latest EU directives and regulations.

To this end it is of great importance the step of knowledge of the object of intervention and the boundary conditions which can influence, either positively or negatively, the behavior and construction of which the object may have in turn an influence.

The methodology used had the objective to contribute to relate the phase of building knowledge of the object to be operated, the characteristics of the broader context in which to insert the object of intervention and strategies to be implemented in order to improve energy performance. In the choice of the technical solution to be adopted in the intervention on the existing must be considered, in addition, the parameter energy cost in the production phase. The existing, in fact, already incorporates a certain quantity of energy, defined as latent energy. Such baggage energetic should not suffer excessive increases as a result of redevelopment energy oversized.

While it may be relatively easy to design a new building envelope that meets the indications and limitations of the law, that is not the case for intervention in the case of existing systems. The current legislation on the energy performance of building envelope systems requires that certain characteristics thermo-physical, more and more rigid.

The overall objective is to know the existing building in order to act on it in the most appropriate way possible. All through the elaboration of a code design supporting the chosen design and construction of the interventions, able to support the designer in the definition of practices that are characterized by efficiency and effectiveness, also in order to prevent over-sizing of the interventions in the light of current legislation.

The quality of a building in terms of energy efficiency depends, in particular, on the characteristics of the building envelope for which becomes very important to develop appropriate procedures and reliable tools for knowledge. The proposed Decision-Making Support Tool provides a system of weighting that involves all of the considered levels.

In accordance with the requests regarding the increased environmental responsibility of the dynamics governing the construction industry, the importance and the role of support systems for the actions which influence the environmental quality of the planet and the checks on energy processes must also be highlighted.

Directing studies towards the production and application of decision support systems which are reliable and easily transferable may facilitate checks on the general quality of the building sector and on the impact created by the latter, in such a way that from supporting efforts to promote the sustainability of human actions.

5 Conclusions

Aspects arising from the scenario sketched very briefly here, are important factors to be considered, but instrumental, in a process of urban renewal, whose fundamental purpose is to increase social cohesion. It seems like for the rehabilitation of the housing stock, aimed to raise performance in key sustainable buildings and urban environment need to develop suitable tools for the articulation of policies and interventions. The “technical guide scenarios” and local action plans identified by the study may indicate a direction for works on existing buildings aimed at the reduction of the intensity of the energetic and environmental impact on the construction sector, from which arise undeniable relapses on the quality of the urban environment. Finally, the definition of instruments intended to address public and private entities, broadly reflected in the insistence of codes and protocols (design and technology) useful for decision support for interventions aimed at urban sustainability, building and housing. For the purpose of redevelopment of the building, which aims to raise performance in a sustainable buildings and urban environment is required develop appropriate tools and criteria for the breakdown of the interventions

The local action plans and building regulations may dictate the line for all interventions on building existing and new construction aimed at reducing energy intensity and environmental impact of the construction industry with an undeniable impact on the quality of the urban environment.

One of the main challenges to which today the city is subjected is to achieve a balance between economic development and quality of life, which results in sustainable urban development. From here, therefore, the need for a global rethinking the urban realities that face problems of redevelopment and conversion together in a physical sense, productive and social.

Today's real estate market crisis is evidence of this trend change, and therefore also of the fact that the quality itself is no longer sought in the issues of growth and the satisfaction of housing needs.

The housing programs are not only a recognition of the emergence of these new topics, but are rather innovative tool for their solution.

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