

Energy planning in the Eastern Ligurian landscape

Ing. Franco Rocchi
Technical Director of Ambiente s.c.
e-mail: frocchi@ambientesc.it

Ing. Matteo Bertoneri
Head of Environmental Physics Division of Ambiente s.c.
e-mail: mbertoneri@ambientesc.it

ABSTRACT

Under the concept of sustainability the building rules have evolved, defining ways to build an energy-efficient cities, beyond the concept of building individually sustainable, and preserving the history, culture and landscape beauty contained in each country.

These principles were applied to the City of Sestri Levante, near Genoa, that spread along the coast in a only flat stretch, enriched by an old town full of buildings of considerable merit. The aim of our work was to find the right balance between inclusion in the urban context of the most innovative technologies available in the energy field and protecting the architecture of the place, starting from the identification of applicable techniques of bio-architecture and use of common renewable sources.

From the "Charter of European Cities & Towns Towards Sustainability (Aalborg, 1994) engagement (for the construction of buildings and settlements, according the criteria of sustainable building) has become a concrete goal for a growing number of municipalities, now enshrined in numerous national and regional legislative guidelines.

The pilot projects developed in our country and the European Commission's actions are shaping the very near future, where compliance with codes for energy efficiency and environmental compatibility will be required for residential construction.

The growing interest of the media indicates that these themes significantly affect the presence and competition in the market for housing providers, as part of a general spread of the quality certification procedures of "house" product. This effect is due to indications of the D.Lgs 192/2005 (and subsequent amendments), which, according to Directive 2002/91/EC, implementing and establishing the criteria, conditions and ways to improve the energy performance of buildings.

For example it is shown that about 30% of total energy consumption in our country are determined by the residential sector it is clear that action to promote energy efficiency and develop renewable energy in new buildings, old buildings and renovations means to contribute substantially to the reduction of human pressures on the environment.

Based on the foregoing, the drafting of the New Building Regulations of the City of Sestri Levante is the natural completion of this journey and the main tool through which to pursue concrete goals, starting from energy field, in the fight for optimizing the resources use in the municipal area.

This, however, should not be construed as merely complying with the laws and regulations of the Liguria region, but rather as an opportunity of:

- sensitization, information and training for citizenship;
- updating the "experts" on the techniques and technologies available today to build a sustainable,
- response to a growing demand for "environment" of the local community.



The approach "sustainable" implies, in fact, the introduction of change, (cultural first, in practices and behaviors then), forcing the various stakeholders of the construction process to learn languages and tools to communicate, work, make decisions in a truly integrated, multidisciplinary and multiscalar perspective.

In this sense, with the publication of LL.RR. 22/2007 and 16/2008 (and amendments), the Liguria Region aims to promote energy and environmental sustainability in the construction of buildings both public and private, in respect of EU law.

Consequently, municipalities should take (according to Art. 2, LR 16/2008) a new Building Regulations aimed at the resolution of issues arising from implementation of Directive 2002/91/EC and its subsequent amendments (D.Lgs.311/2006, L.296/2006, L.244/2007,D.Lgs. 115/2008), and also from the regional legislation currently in force (LR22/2007, R.R.1/2009, LR16/2008) - with reference to both existing and new buildings - provisions which are not reflected usually in the existing planning instruments and local regulations.

The need to act fast in disseminating sustainable building practices, both for new buildings and existing buildings, is a primary objective in the planning, town design and building project, of the municipal administration of Sestri Levante.

3) AREE TEMATICHE DI VALUTAZIONE																																																	
AREA A: ENERGIA																																																	
A.1 Classificazione dell'edificio – DPR 412/1993				Riservato all'ufficio																																													
<table border="1"> <tr> <td>Categoria di appartenenza edificio</td><td colspan="4" rowspan="4">Riservato all'ufficio</td></tr> </table>					Categoria di appartenenza edificio	Riservato all'ufficio																																											
Categoria di appartenenza edificio	Riservato all'ufficio																																																
A.2 Prestazione energetica dell'edificio																																																	
I requisiti minimi di prestazione energetica degli edifici devono essere calcolati secondo quanto disposto all'art. 4 e segg. del R.R. 22/2009, n. 1]																																																	
<table border="1"> <thead> <tr> <th></th><th>Valore limite richiesto</th><th>Valore calcolato</th><th>Voto attribuito</th><th>Riservato all'ufficio</th></tr> </thead> <tbody> <tr> <td>Trasmissione termica (U) piani opache</td><td></td><td></td><td></td><td></td></tr> <tr> <td>Trasmissione termica (U) superfici vetrate</td><td></td><td></td><td></td><td></td></tr> <tr> <td>Indice di prestazione energetica per la climatizzazione invernale (EP)</td><td></td><td></td><td></td><td></td></tr> <tr> <td>Prestazione di calore minima stagionale degli impianti per la climatizzazione invernale</td><td></td><td></td><td></td><td></td></tr> <tr> <td>Fabbisogno d'energia primaria per la produzione di acqua calda per usi igienici e sanitari</td><td></td><td></td><td></td><td></td></tr> <tr> <td>Impiego di energia primaria per la climatizzazione estiva</td><td></td><td></td><td></td><td></td></tr> <tr> <td>Fabbisogno di energia primaria per l'illuminazione artificiale</td><td></td><td></td><td></td><td></td></tr> <tr> <td colspan="4">TOTALE</td><td></td></tr> </tbody> </table>						Valore limite richiesto	Valore calcolato	Voto attribuito	Riservato all'ufficio	Trasmissione termica (U) piani opache					Trasmissione termica (U) superfici vetrate					Indice di prestazione energetica per la climatizzazione invernale (EP)					Prestazione di calore minima stagionale degli impianti per la climatizzazione invernale					Fabbisogno d'energia primaria per la produzione di acqua calda per usi igienici e sanitari					Impiego di energia primaria per la climatizzazione estiva					Fabbisogno di energia primaria per l'illuminazione artificiale					TOTALE				
	Valore limite richiesto	Valore calcolato	Voto attribuito	Riservato all'ufficio																																													
Trasmissione termica (U) piani opache																																																	
Trasmissione termica (U) superfici vetrate																																																	
Indice di prestazione energetica per la climatizzazione invernale (EP)																																																	
Prestazione di calore minima stagionale degli impianti per la climatizzazione invernale																																																	
Fabbisogno d'energia primaria per la produzione di acqua calda per usi igienici e sanitari																																																	
Impiego di energia primaria per la climatizzazione estiva																																																	
Fabbisogno di energia primaria per l'illuminazione artificiale																																																	
TOTALE																																																	
AREA B: IMPIANTISTICA																																																	
B.1 Impianto di riscaldamento																																																	
<table border="1"> <thead> <tr> <th>Impianto utilizzato – Caratteristiche generali</th><th>Prestazioni limite richieste</th><th>Prestazioni calcolate</th><th>Voto attribuito</th><th>Riservato all'ufficio</th></tr> </thead> <tbody> <tr> <td></td><td></td><td></td><td></td><td></td></tr> <tr> <td colspan="4">TOTALE</td><td></td></tr> </tbody> </table>					Impianto utilizzato – Caratteristiche generali	Prestazioni limite richieste	Prestazioni calcolate	Voto attribuito	Riservato all'ufficio						TOTALE																																		
Impianto utilizzato – Caratteristiche generali	Prestazioni limite richieste	Prestazioni calcolate	Voto attribuito	Riservato all'ufficio																																													
TOTALE																																																	
B.2 Impianti per la produzione di calore e/o energia																																																	
<table border="1"> <thead> <tr> <th>Impianto utilizzato – Caratteristiche generali</th><th>Prestazioni limite richieste</th><th>Prestazioni calcolate</th><th>Voto attributo</th><th>Riservato all'ufficio</th></tr> </thead> <tbody> <tr> <td>Impianto solare per acqua calda sanitaria caratteristiche</td><td></td><td></td><td></td><td></td></tr> <tr> <td>Impianto solare per il riscaldamento caratteristiche</td><td></td><td></td><td></td><td></td></tr> <tr> <td>Pompa di calore caratteristiche</td><td></td><td></td><td></td><td></td></tr> </tbody> </table>					Impianto utilizzato – Caratteristiche generali	Prestazioni limite richieste	Prestazioni calcolate	Voto attributo	Riservato all'ufficio	Impianto solare per acqua calda sanitaria caratteristiche					Impianto solare per il riscaldamento caratteristiche					Pompa di calore caratteristiche																													
Impianto utilizzato – Caratteristiche generali	Prestazioni limite richieste	Prestazioni calcolate	Voto attributo	Riservato all'ufficio																																													
Impianto solare per acqua calda sanitaria caratteristiche																																																	
Impianto solare per il riscaldamento caratteristiche																																																	
Pompa di calore caratteristiche																																																	

So it is hoped that this work provides answers to the demands of environmental sustainability in the construction industry, guiding the choices of design for new settlements and restructuring and becoming an easy and quick tools to use.

At the operational level the task was carried out through the following phases:

1. Initially an analysis of the regulations currently in force at the regional level in the field of building and territory government. The necessary knowledge of these documents is analyzed in an optical cross-sectoral (environment, urban planning, engineering) in order to highlight not only all the information which was not compliant with current legislation, but also and above all, all factors capable of triggering, at local level, virtuous process in the energy sector.
2. Then a review of the most advanced experiences in the field throughout the national territory, national and local (with particular reference to the City of Genoa), in order to identify the most interesting ideas and the more established and feasible solutions at the local level. Appropriate technical assessment sheets have been developed in order to provide the municipal administration of a unique tool for the evaluation of actions undertaken in compliance, by assigning a score and a corresponding incentive to the building.
3. Preparation of a technical document annexed to the New Building Regulation, entitled "Attachment legislation, containing a survey of existing legislation, cited in the regulation in order to offer to professionals, municipal administration, but also to citizenship , a technical easily understandable document, describing requirements on regulatory and on techniques of sustainable design provided by law.
4. Preparation of the document in draft form to be submitted at the town administration, and participation in technical meetings with the representatives responsible in order to provide explanations and clarifications on the choices made and alternatives. Definition of elements of strict economic value, which, above all, the quantitative definition of incentives to be paid to actions undertaken in respect of the same regulation.
5. In particular, assessing the environmental sustainability of buildings shall be arranged in a system based on the principles of the international Green Building challenge method (GBC), and focused on the use of specific sheets. The validity of the method G.B.C. compared to other energy and environmental assessment methods developed by various countries (England, Holland, Austria) lies in the flexibility and adaptability to different climatic and environmental conditions. The system features through the weights assignment can be adjusted to the requirements on the characteristics of each regional context, in relation to their climatic conditions, giving different weight to emerging issues. The approach therefore requires an examination of the building performance in relation to various issues to be examined, called "evaluation areas", which will cover the major sensitive issues, namely:
 - environmental quality of outdoor spaces,
 - conservation of resources,

- environmental Impact,
 - the quality of the indoor environment,
 - the quality of the service,
 - the quality of management,
 - transport.
6. The scoring is located within a range of values (from -2 to +5), where 0 represents the value of the score or the standard of comparison (benchmark), which is the current construction practice, in compliance laws or regulations. This system aims to become the method of objective measurement for assessing the eco-efficiency of a building construction and emerges as a tool for the allocation of incentives in regional acts.
7. In evaluating, the proposed energy interventions were evaluated according to their degree of integration architecture. For this reason it was built a dedicated map to locate, in the historical town of Sestri Levante, various types of buildings of architectural beauty and landscape value. The areas of most landscape, cultural, historic value and the buildings representative of the culture and traditions have been identified. This identification is the key step for the integration of energy technology in the City of Sestri Levante. The synergy between integration into the landscape and the use of renewable energy has been obtained through a specific evaluation system. This system weighs each action energy as a function of its location on the territory, ensuring a better score to the solution that best matches with historical and cultural protection virtuous consumption. The use of renewable sources and energy conservation become a strategy compatible with the protection and exaltation of places.

CONCLUSION

Living in a house that respects human health and the environment is an urgent social objective, which anyone can contribute in a direct and decisive. From sustainable designing to ecological building, from conscious consumer to the responsibility purchasing: information, practical advice and opportunities to live better and save have been included in the New Building Sustainable Regulations of Sestri Levante. The local energy policies are essential for a real sustainable development of the long promoted a program of local government. With our work, the actions required in respect of the state of the art technology and cost effectiveness have been defined. These interventions were found to be :

- shared by citizens, but also from players such as manufacturers, designers, companies, suppliers;
- supported by accompanying measures to be effective (training and information at all levels, technical support, targeted incentives);
- monitored (verification of the implementation of interventions, energy accounting Simplified);
- inserted in a process (action of continuous improvement).