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Abitare Mediterraneo

Integrated approach of a sustainable building management in Mediterranean context: think tanks network sharing an open platform to integrate technological and architectural innovation for low energy building

Antonella Trombadore¹

Abstract. *Abitare Mediterraneo* proposes an integrated management action to stimulate the participation of major stakeholders in the built environment revitalization process, fostering the objectives of sustainable project. As open platform of knowledge, the continuous updating of technologies and procedures will redefine a quality-based methodology for integrated conservation of existing buildings: new models and standards of indoor comfort in hot/cold season and a more aware management of the available energy resources.

Keyword: Integrated management approach, Process stakeholder participation, Energy Assessment, Innovation enhancement

1. Mediterranean sustainable vision: 5 ideas to share

ABITARE MEDITERRANEO *Sustainable technological Innovation for mediterranean cities* is a research project funded by the Tuscany Region in CREO POR FESR 2007-2013, led by University of Florence with the main involvement of prof. Marco Sala as scientific coordination and Antonella Trombadore as project manager, developed in collaboration with the and 12 Tuscan companies, in order to create an integrated dynamic management system to increase building energy efficiency: a common platform to

¹Università degli Studi di Firenze – Dipartimento di Architettura, via S. Niccolò 93, 50125 Firenze antonella.trombadore@unifi.it

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share knowledge, stimulating the improvement of environmental performance of the building, competitiveness and innovation.

After the promulgation of Energy Performance of Building 2002/91/CE each European Country has to adopt local and national regulations to guarantee high efficient buildings, using appropriated policy in order to consider local climate condition.

This means that it is necessary, in South Mediterranean area, think about winter and summer conditions, trying to support strong collaboration to avoid the copy of North European energy efficiency solutions, giving character to appropriated solutions in Energy efficient Buildings

The political strategy of *Abitare mediterraneo*, driving the selection of common criteria and content, aimed to combine environmental with cultural sustainability of Mediterranean habitat, in order to attribute a strong identity to the architecture traditions and to improve economic, productive, social and regional development.



fig.1 Examples of environmental and cultural sustainability in Mediterranean towns

Five principles underlie the *Memorandum of Understanding of Abitare mediterraneo*, to retrieve and innovate the traditional principles of construction and increase the level of environmental and architectural quality of the interventions of new construction and redevelopment.

1. *Architecture and Climate condition.* The Mediterranean climatic condition requires building appropriate solutions: the problem of energy consumption for summer comfort can not be solved by following the logical construction of Northern Europe. To reduce energy cost, it is necessary to define innovative strategies in the building, which is strongly related to climatic and cultural characteristics.

2. *Inclusiveness and Change.* The fast and dynamic evolution of social and demographic structure of the population of the Mediterranean area suggests a change, that determines the need for new models of urban spaces and residential use, with typological and technological innovations to support new social and intercultural issues.

3. *Identity and Competitiveness.* The Mediterranean ecosystems and environmental assets are based on the knowledge of the art of living, the management of the landscape, the ability to stimulate cooperation on issues of sustainable development, for development of regional identity. And 'on architectural elements and cultural climate in which the distinctive scientific subjects, companies and governments should aim to boost competitiveness at international level.

4. *Urban Transformation and Environmental Quality.* Forced transition to a sustainable city of strategic importance to revitalize the area. To manage the population growth in the Mediterranean, the resulting increase in energy consumption and increased demand for comfort, it is necessary for the construction market provides appropriate solutions to new social needs and more environmentally friendly technologies.

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fig.2 examples of deep urban transformation

fig.3 innovation of the traditional design principles

5. *Innovation and Tradition.* The Mediterranean architectural traditions of the past, full of potential and interesting cultural influences, represent an important heritage of civilization and it is from these that we must be inspired to develop new building components, high energy performance. There is the need to recover and innovate traditional design principles and increase the level of environmental and architectural quality of the interventions of building retrofitting and new construction .



fig.4 Solar radiation and climatic condition in European context

fig. 5 Integrated action to valorize architectural traditions with strong identity

The *Memorandum of Understanding* is shared by all those who work in construction and in particular from 6 categories of stakeholder, involved in the Open System: Manufacturers, Designers, Builders, Public Administration, Building Manager and Private Clients. Through a mechanism for broad participation, for each category are defined as specific technical requirements, type design and related skills and experiences, giving priority to the exploitation of those in qualification schemes in use, if compatible with the requirements of the Mediterranean context.

2. The *Think Tank* international network

One of the goals of Abitare mediterraneo project is to create an *international network of Centre of Expertise as Think Tank* on sustainable architecture in the Mediterranean area capable of actively involving all the actors who are involved in various capacities along the building process, in the open system of qualification and recognition that allows for the testing of new tools procedural, regulatory and economic-financial actions stimulating other innovative building solutions, as well as the diffusion of knowledge and best practices for energy efficiency, in building life cycle and its components, for retrofitting, new construction and re-functionalization in the Mediterranean context.

Besides, the '*think tank*' Network fosters the exchange of experience and learning local authorities in the field of Innovative concept design and technologies for low energy building in Mediterranean Area, supporting the preparation and application of common legislative measures to improve the practical implementation of sustainable energy policies at local level, based on stakeholders participation.

There are 6 categories of recipients, potentially involved: by producers of raw materials to the purchaser of the building system manufacturers, designers, builders, public administration, building managers and private clients. Through a mechanism for broad participation, for each category are defined as specific technical

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requirements, type design and related skills and experiences, giving priority to the exploitation of those in qualification schemes in use, if compatible with the requirements of the context Mediterranean.

Particular attention is given to the definition of tools and methods of intervention on existing buildings, according to a sustainable approach to the problem of reducing energy consumption and environmental compatibility of products and manufacturing processes. Innovation and the environmental quality of building components and procedures for design and implementation of restoration and new constructions are promoted from the local context and architecture of Tuscany, which has all the environmental characteristics and specificity of the Mediterranean microclimate zone.

The *Abitaremediterraneo think tank Network* permits a close correlation between the need for innovation in enterprises located in territory of settlement of the Centre and the services that it is capable of delivering. Besides, through the learning of local authorities in the field of Innovative concept design and technologies for low energy building in Mediterranean area, the networking activities stimulate the improvement of "market penetration" of new products, that foreshadow the impact of the Centre on all the land areas that have specialized technology and production and a demand for innovation-related services that the Centre provides.

2. The *interactive platform*

Designed as a multimedia platform for the integration of technological innovation, the web portal *Abitaremediterraneo* (www.abitaremediterraneo.eu) becomes a network structure able to document and disseminate the development of processes, projects, innovative products and components, allowing different types of users to choose personalized navigation paths. A session of the website is dedicated to sharing the abacus of innovative solutions that allows testing of products, components and technological systems more efficient in terms of energy saving in relation to environmental characteristics of the Mediterranean. The focus for one hand is the

development of a new model of building component catalogue, aiming towards high-quality innovation with environmental and indoor comfort as main added values: for the other hand the demonstration of flexible integration of technological innovation, architectural and energy sustainability during the retrofitting and new building processes.

A special session is dedicated to the *DataBase*. It is a library designed to be easily accessible by non-technical users to become interactive tool for projects solutions evaluation. Interacting on the platform, the designer will have the opportunity to simulate scenarios of technological integration of building systems and components, choosing from a wide range of technology solutions, structured data sheets with three-dimensional images and construction details, with information on temperature-humidity performance , acoustic, ACL and will be able to assess the economic viability as a function of energy-environmental performance of final configurations.



fig.6 The website special session dedicated to the DataBase

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blocchi di laterizio con termointonaco La soluzione tecnica proposta si basa sulla combinazione di una muratura massiva in blocchi di laterizio e un intonaco performante termoisolante. In particolare la muratura viene realizzata tramite bl... Vedi i dettagli >>	
2. Involucro (chiusura) > 2.01 Chiusure verticali > 2.01.b Pareti portanti > blocchi di laterizio con termointonaco VAI ALLA SCHEDA	
Blocchi di laterizio ventilata in cotto La soluzione tecnica proposta si basa sulla combinazione di una muratura massiva in blocchi di laterizio e una ventilazione esterna, realizzata attraverso un sistema di aggancio a montanti sui quali v... Vedi i dettagli >>	
2. Involucro (chiusura) > 2.01 Chiusure verticali > 2.01.b Pareti portanti > Blocchi di laterizio ventilata in cotto VAI ALLA SCHEDA	
Parete in blocchi di c/c ventilata in cotto La soluzione tecnica proposta si basa sulla combinazione di una parete massiva in blocchi in calcestruzzo vibrocompressi e una parete ventilata esterna, realizzata con un sistema di aggancio a montant... Vedi i dettagli >>	
2. Involucro (chiusura) > 2.01 Chiusure verticali > 2.01.b Pareti portanti > Parete in blocchi di c/c ventilata in cotto VAI ALLA SCHEDA	
retrofitting - Facciata ventilata e cappotto Il sistema costruttivo proposto si basa sull'installazione di una facciata ventilata con isolamento a cappotto in Eps con gafite su una muratura esistente, al fine di migliorare le prestazioni energ... Vedi i dettagli >>	
2. Involucro (chiusura) > 2.01 Chiusure verticali > 2.01.b Pareti portanti > retrofitting - Facciata ventilata e cappotto VAI ALLA SCHEDA	

fig.7 The database "icons" guided research

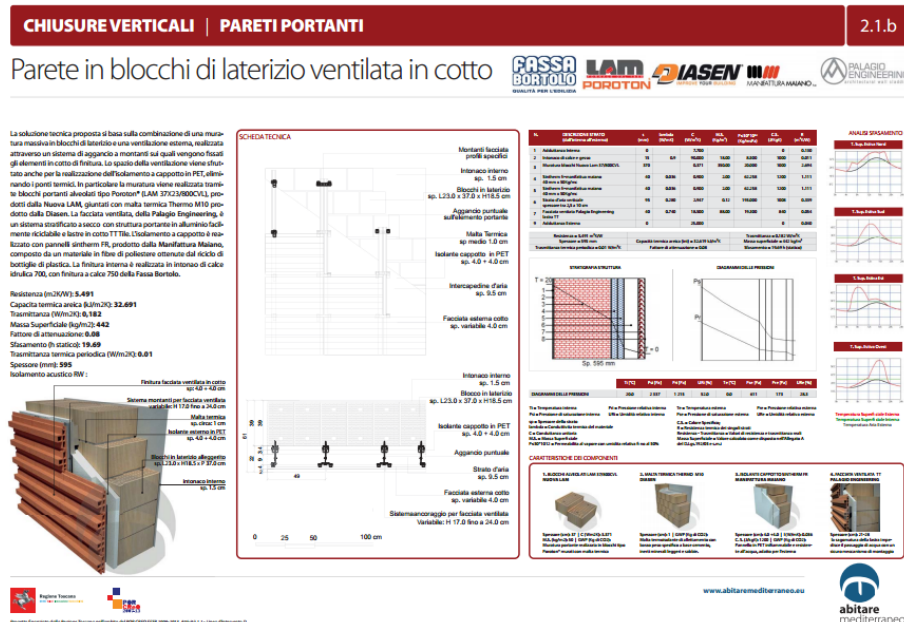


fig.8 The database, example of technological systems of façade, with analysis of energy and thermal performance

3. The Test Cell for management and testing of performance

One of the best result of Abitaremediterraneo project is the executive planning and realization of *Test Cell*, the settlement of software and international protocols, installation of measurement tools for energetic measurement strategy and the testing and verification phase of product and technology solutions advanced, realized by firms to reduce fuel consumption.

The performance analysis is carried out in an energy technology laboratory with advanced equipment: the Test Cell.

Inside the structure, which has a swivel base that makes it possible to carry out the analysis for the different orientations, will be performed spot or continuous monitoring mode of innovative components and their assemblies in different integrated systems.

By comparing different technology solutions, the Test Cell offers companies the opportunity to test strategies and integrated

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manufacturing solutions, not only related to the thermo-shrinkage behavior of individual building components, but also to study the interaction and integration more components.



fig.9, 10, 11 High Technological laboratory of energy performance, simulation and monitoring of real thermodynamic behavior of technological systems.



fig 10



fig 11

Besides the research group is involved in Energetic performances' evaluation and Testing of prototypes/products:

- Assemblage and testing of the prototypes in integrated systems and evaluation of the energetic performances
- assemblage and Quality Testing of the project target
- Evaluation of Thermo-Hygrometric and Energetic performances to integrate the new components in case studies, such as new construction or retrofitting and upgrading of building in Tuscany

4. Dissemination and Training Centre

A documentation center has been implemented as *Reference Point* at the Dissemination and Training Technological Center in Lucca, for the diffusion of know-how aimed to the enterprises interested in pushing further towards an innovative production in terms of energy efficiency in the building sector.



fig. 12, fig. 13 The documentation center in Lucca

The permanent exhibition promotes awareness and dissemination of a new building culture and to put in direct contact with the various

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actors of the construction process. Inside it has set up a space dedicated to the Tuscan producers, where they will be exposed building components selected on the basis of quality and consistency with the themes of Mediterranean Living research. Each building component or system will be presented through a sample product with attached brochure illustration, components, technical performance, item specifications, certification and dealers / applicators.



fig. 13

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