

## **La Carta Abitare Mediterraneo** **Condivisione di un sistema aperto di qualificazione e valorizzazione dell’innovazione**

### **Sustainable innovation in Mediterranean Basin** **Sharing an Open System to integrate technological and architectural innovation for low energy building**

keywords

**Energy Assessment, Product Innovation, Process stakeholder participation,  
Energy saving, innovation enhancement, envelope energy performance**

Autors

**Marco Sala<sup>1</sup>, Antonella Trombadore<sup>2</sup>,**

<sup>1</sup>Università degli studi di Firenze, TAED, San Niccolò 93, Firenze 50125, Italy, [marco\\_sala@unifi.it](mailto:marco_sala@unifi.it)

<sup>2</sup>Università degli studi di Firenze, TAED, San Niccolò 93, Firenze 50125, Italy, [antonella.trombadore@unifi.it](mailto:antonella.trombadore@unifi.it)

#### **Abstract**

The international Agreement on common criteria of “Abitare Mediterraneo” is a strategic tool to stimulate the participation of major stakeholders in the process of transforming the built environment and to share the objectives of sustainable housing project, focusing on the building life cycle and its components, for retrofitting, new construction and re-functionalization in the Mediterranean context.

ABITARE MEDITERRANEO is a research project funded by the Tuscany Region, developed in collaboration with the University of Florence and 12 Tuscan companies, to create an open system as a platform of knowledge that promotes the improvement of environmental performance of the building as well as, provides participants with a key competitive tool in the promotion.

The goal is to create a Centre of Expertise on sustainable architecture in the Mediterranean area increasing of competitiveness in the building sector by fostering the synergic collaboration between university research and regional enterprises, and by stimulating experimentation and continuous innovation in an OPEN SYSTEM: continuous updating of criteria and procedures in order to re-define a quality-based methodology for integrated conservation of existing buildings; defining new building models able to meet changing customers profiles, rising standards of indoor comfort in hot and cold season and the necessity of a more aware management of the available energy resources.

**Keywords:** Energy Saving, Energy Assessment, Product Innovation, Process stakeholder participation, Energy saving, innovation enhancement, envelope energy performance

#### **1. Introduction**

ABITARE MEDITERRANEO \_ Sustainable technological Innovation for Housing is a research project funded by the Tuscany Region in CREO POR FESR 2007-2013, developed in collaboration with the University of Florence and 12 Tuscan companies, to create an open system as a platform of shared knowledge that promotes the improvement of environmental performance of the building.

The goal is to create an international Centre of Expertise 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 stimuli 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.

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 Charter ABITARE MEDITERRANEO 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. Mediterranean Approach: 5 ideas to share

*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.

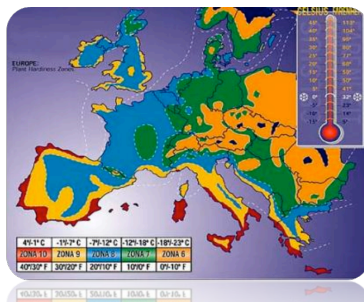
*Inclusiveness and Change* \_\_ the fast and dynamic evolution of social and demographic structure of the population of the Mediterranean area suggests a change, that determines the need for new models of urban spaces and residential use, with typological and technological innovations to support new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

*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.

*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.

*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 .

From these principles underlie the MEDITERRANEAN LIVING SYSTEM, 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.



*Examples of Environmental and Cultural Sustainability of Mediterranean habitat and integrated action to valorize architectural traditions with strong identity.*

### 3. Target

There are 6 categories of recipients, potentially involved, be involved in the Open System Mediterranean Living, 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 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.

### 4. Team

The research team, involving departments of the University of Florence TAED 4 of Architectural Technology and Design, Department of Architectural DPA, CREATE Energy, SAYS Department of Civil and Environmental Engineering, in collaboration with SSSA Pisa, accompanies the partner companies in creating new products, the definition of application scenarios, stimulating competitiveness and innovation. The project leader is prof. Mark Hall, flanked by the Coordination Committee, prof. Bologna and Prof. Roberto. Maria Chiara Torricelli and technical reference arch. Antonella Trombadore.

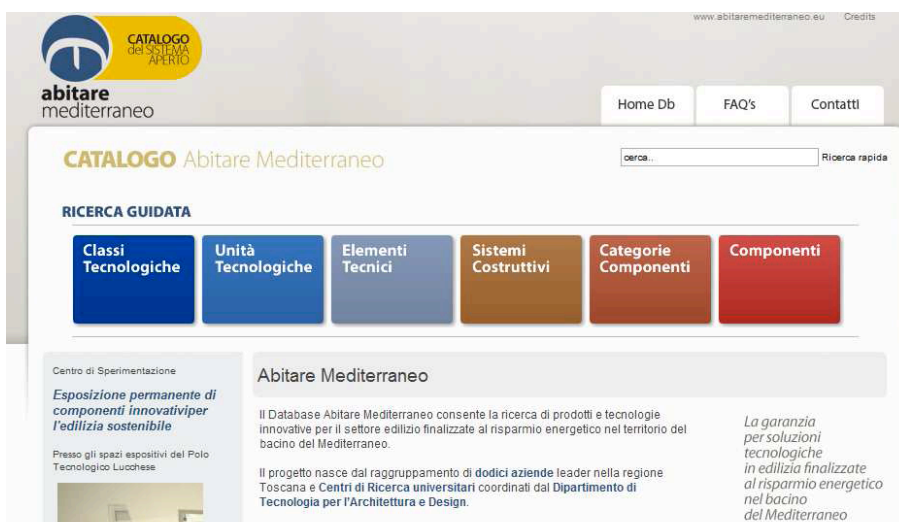
### 5. Project results

#### 5.1 WEBSITE

Designed as a multimedia platform for the integration of technological innovation, the web portal Abitaremediterraneo (www.abitaremediterraneo.eu) it 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 portal is dedicated to sharing the catalog of the open system that allows testing of products, components and technological systems more efficient in terms of energy saving in relation to environmental characteristics of the Mediterranean.

#### 5.2 DATABASE OF OPEN SYSTEM

It '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.



**Figure 1** Database : Survey and comparative analysis of sustainable typological and architectural solutions, compatible with tuscan building.

**Figure 2** Evaluation of existing products performances in terms of energetic efficiency and structuring of the products ABACUS

**Figure 3** Energetic performances analysis of the systems in commerce



in the different configurations and conditions of operation

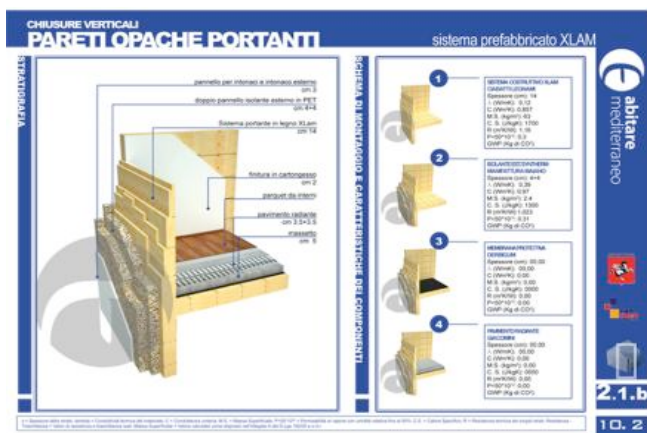


Figure 2

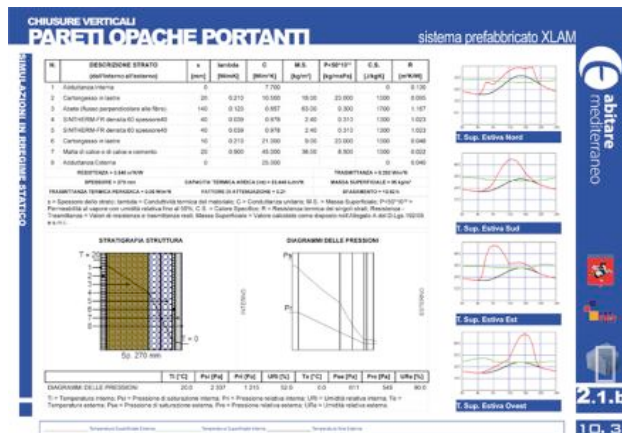


Figure 3

### 5.3 THE TEST CELL

One of the best result is the Executive planning and realization of TEST-CELL, the settlement of softwares 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. The Test Cell, by comparing different technology solutions, offers companies the opportunity to test strategies and integrated manufacturing solutions, not only related to the thermo-shrinkage behavior of individual building components, but also to study the interaction and integration more components.

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 for control the target of project
- 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



**Figure 4** High Technological laboratory for verification of energy performance, simulation and monitoring of real thermodynamic behavior of technological systems, installed on the test-cell configurations according to the project.

#### 5.4 DISSEMINATION AND TRAINING CENTER

To promote awareness and dissemination of a new building culture and to put in direct contact with the various actors of the construction process has been structured at the Dissemination and Training Technological Center in Lucca. 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 research Living Mediterranean. 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.



**Figure 5** The Dissemination and Training Centre in Lucca. Internal views of showroom with innovative products and systems.

#### References

- Bradbury D. *Mediterranean Modern* Thames & Hudson, London 2006
- Gambardella C. *La lezione dell'architettura mediterranea*. in V. Gangemi, (a cura di) "L' Ambiente risanato. La bioarchitettura per la qualità della vita." *Editoriale Scientifiche Italiane, Napoli, 1994*
- Giovannini M., Colistra D. (a cura di) *Spazi e culture del Mediterraneo. Architetture e luoghi del Mediterraneo. Storia, misura, analisi per la gestione dei processi modificativi. Edizioni Kappa Roma, 2006*
- Sala M., a cura di, *I percorsi della progettazione per la sostenibilità ambientale*, Alinea editrice, Florence, (2004)
- Sala M., a cura di, *100..Tesi sostenibili*, Alinea editrice, Florence, (2010)
- A.Trombadore, M. Sala, L. Nelli, *Schermature Solari*, Alinea Editrice Firenze 2000/2008