



Sustainable
Construction
in Rural and Fragile Areas
for Energy efficiency

FINAL TECHNICAL REPORT



Project results



Project cofinanced by



INDEX

1.	General introduction: project goals and work methodology	<i>pag 4</i>
2.	Overview on the legal framework in Partner Countries and highlights on SCORE Case Studies as first elements for confrontation	<i>pag 5</i>
	2.1. The results: “Survey of MED level regulations” and “e-volume Guide of best practices”	<i>pag 6</i>
3.	The work of local partners and focus groups and international meetings	<i>pag 8</i>
	3.1. Data on the results	<i>pag 9</i>
4.	The SCORE Matrix: a model for the international evaluation of sustainable technologies applied to existing buildings	<i>pag 10</i>
	4.1. Results: “Transferable audit and evaluation model” and “Model of cost-benefit analysis”	<i>pag 11</i>
5.	Guidelines for integrated territorial planning	<i>pag 12</i>
	5.1. The Documentation about the Results	<i>pag 22</i>
6.	The “Bio-construction Action Plan”	<i>pag 23</i>
	6.1. The Transnational “Bio-construction Action Plan” Organized By Themes	<i>pag 23</i>
	6.1.1. The Tables of the Transnational “Bio-construction Action Plan”	<i>pag 26</i>
	6.2. The “Bio-construction Action Plans” of the Different Partners, Organized by Country	<i>pag 56</i>
	6.2.1. The National Tables of the “Bio-construction Action Plans”	<i>pag 63</i>
7.	Suggestions and Criteria Shared for a “MED Bio-Housing Quality Certificate”	<i>pag 93</i>
8.	Perspectives for the future	<i>pag 101</i>

Enclosure

Awareness raising actions and Local Capitalisation Plans



1. General introduction: project goals and work methodology

The project SCORE, “Sustainable COstruction in Rural and fragile areas for energy Efficiency”, a European project with a three-years scope and financed under the European MED Programme, saw the Province of Savona as main coordinator together with ten partners from seven different countries: Cyprus, France, Greece, Italy, Portugal, Slovenia, Spain (see the website Homepage, www.scoremed.eu, for a complete list of all the partners involved).

The province of Savona developed this project based on previous experiences of territorial management aimed at adopting sustainable development strategies: i.e. its Territorial Plan for Coordination is a guide to Municipal Town Plans and includes a Strategic Environmental Assessment (one of the first cases of implementation in Italy of the Directive 2001/42/CE on planning) and a specific document called “*Indirizzi per l’architettura bioclimatica e la bioedilizia*” (Directions for bioclimatic architecture and green building).

The other *partners* involved – regional agencies for energy, chambers of commerce and their relevant bodies – all come from previous research experiences in the field of environmental sustainability.

The main goal of the project SCORE is to promote a sustainable approach to the planning and implementation of construction activities and urban and building renovation, thus demonstrating how this approach harmonises with high-quality landscapes in the participant countries and may, however, represent an important element to reinforce a specific identity of the Mediterranean territory in coastal and rural areas. These areas are of great interest for their history, culture, landscape and nature, but are also extremely fragile if we consider the possible impact of human activities and the creation of infrastructures and residential, touristic and production sites, but also the impact of ports and agricultural activities.

Through the exchange of information among different national partners sharing similar territorial features, SCORE aims at recording, selecting, organising and spreading the knowledge of good practices which are common to the partners involved, when dealing with issues such as the architectural integration of technologies and systems for energy production out of renewable sources, the reduction of polluting emissions, the protection of the environment and the health of the population.

The exchange of information among different countries is indeed considered a key element to promote research on sustainable development in the fields of architecture and urban planning and it may effectively affect different local realities, thus contributing to the development of new skills and economic and production activities, while also reducing the environmental impact of construction

on the territory.

The Project is not intended to simply call the attention on well-known sustainable strategies for construction design and building activities, but aims at assessing the best methods for an effective implementation of the said strategies, with reference to the building tradition and the local legal and productive framework, with an eye to the continuous education of operators and companies.

Focusing on local development and environmental issues, which are by nature of public relevance, the project SCORE is not intended, however, for direct application with the different local stakeholders of the building sector and the citizens who want to protect the environment and its resources or, better, with the associations who represent their claims. Indeed, the Project is based, on the one hand, on the profitable exchange of knowledge among the participant countries and on the other hand on organising local *focus groups* aimed at creating a *stakeholders* network in the respective territories, which may in turn contribute to effectively identifying the best practices for sustainable development and promote their implementation.

An effective tool both for international exchange and for involving different local stakeholders is obviously the Internet; the project has therefore a website, www.scoremed.eu, which is one of the intended results of the Project itself and effectively presents SCORE and its initiatives.

The present Report will refer to the contents of this websites, which contains, in its different sections, the results obtained during project development. The present memorandum, on the contrary, mainly aims at presenting its philosophy and working procedures and to highlight the final results of previous work, with particular reference to the development of: a “Transferable audit and evaluation model”, a “Model of cost-benefit analysis”, “Guidelines for integrated territorial planning”, shared indications and criteria for a “MED bio-housing quality certificate”, “Bio-construction Action Plans” – classified both by participant country and logically, by comparing the use of systems and technologies for sustainable planning in MED areas at international level, “Awareness raising actions”.

(for a general overview of the project SCORE, see the “What is SCORE?” section at the project website; <http://www.scoremed.eu/page.php?ID=SCORE>).



2. Overview on the legal framework in Partner Countries and highlights on SCORE Case Studies as first elements for confrontation



One of the case studies that were examined: Integration of innovative photovoltaic systems on the agricultural greenhouses of CerSAA in Albenga (SV).

One of the first steps while working within the SCORE project was the identification by the different *Partners*, of the legal framework applicable to the project at national and local level, in order to compare it with other countries. If, generally, the framework of European Directives ensures a certain uniformity of the law in different countries, local implementation regulations for the same laws may vary significantly, thus providing a different effectiveness and flexibility for territorial management tools. Since these regulations are a key node for disseminating technologies and systems for the planning and construction of sustainable buildings, it is important to compare the impact they may have on the different territories where they apply in order to assess the need for amendments or integrations; the same is true also if we consider that SCORE *partners* are public entities with decisional power, if not direct competence, in the drafting of these regulations. Another important action implemented by the different *partners* in order to compare the best results achieved at local level by current norms and regulations was the identification of case studies to highlight the best local practices concerning the architectural integration of sustainable technologies and systems.

Several *Case Studies* were identified, included in a special section of the website and classified according to specific keywords. They mainly refer to building complexes and existing buildings - in the different territories of the *partner* countries involved - where particular relevance is given to factors such as: the adoption of bioclimatic strategies (for the natural climatic control of solar radiation and wind exposure for passive heating and cooling), the integration of particular installations (thermal-solar, photovoltaic, geothermal plants or biomasses), the adoption of solutions to reduce energy consumption or, again, the use of natural materials (no oil derivatives, low energy content), management strategies for environmental

resources, correct integration with the existing natural and anthropic context.

The project also covers case studies of a different nature concerning, for instance, specific didactic experiences on sustainability for future designers based on *learning by doing approach*, or local environmental certification systems for buildings.

This presentation of the different case studies is articulated in several cards that describe and critically analyse the studies, highlighting the transfer potential of the adopted methodologies and strategies; the latter being, clearly, a key element within the scope of the SCORE project.

The research and sharing of the *case studies* allowed the different *partners* not only to gain knowledge of interesting urban and construction activities in similar areas of other countries, but also to discover some situations of great interest within their own territory that were still relatively unknown and which deserved, however, to be promoted due to their innovative features.

This led to discover an unexpected situation, mainly in connection to the heterogeneity of the experiences that were analysed and which referred to settlements of various sizes (from single houses to entire districts); to buildings with different destination for use (housing, tourism, production), in different contexts (urban areas, ports, agricultural areas, mountains), newly built or resulting from the renovation of existing buildings, both modern or with an historical value.

The analysis and comparison of local norms and regulations, together with the case studies, lead to the identification of the main components, elements or construction materials, of solutions for plant engineering, of design strategies and technological systems that should become the focus for future phases of the project with regard to different possible implementation cases (ex-novo or on existing buildings) available in the respective territories.



2.1. The results: “Survey of MED level regulations” and “e-volume Guide of best practices”

“Survey of MED level regulations”

With regard to the corpus of directives, norms and regulations, currently available at community level and in the different territories of the participant partners and concerning the integration at an architectural and urban level of systems and components for energy-saving, power production from renewable sources and, more in general, the environmental sustainability of buildings, relevant documents are included in the “Regulation” section of the SCORE website (<http://www.scoremed.eu/regulations.php>).

In particular, the following documents are available:

- Legislation Framework - European, Italian and Local regulations
- Notes on Regulations - Province of Savona - Notes on Regulations
- Regulatory Monitoring in France - The French Report
- Bio-construction Regulation in Slovenia - Survey on MED level regulation - national level
- Legislation Framework Spain - European, Spanish and

- Andalusia Regional Regulations
- Legislation Framework Portugal - Portuguese legislation regarding energy efficiency in building and sustainable construction
- Legislation Framework Greece - Fostering innovative energy-efficient and sustainable construction standards in fragile coastal and rural areas (Kefalonia and Ithaki S.A)
- Moving Towards Energy Efficient Buildings in Cyprus

These documents can be downloaded from the website in PDF format.

e-volume Guide of best practices

All cards concerning the case-studies are included in the section of the score website “Case Studies” (http://www.scoremed.eu/case_studies.php) and classified according to keywords into different sections.

Below you will find a list of all the case-studies considered in this project with a short description (see the website for an overview of the documents concerning the best practices).



Terminal Costa Cruises, Savona (Italy). Rooftop photovoltaic in harbour area.



Passive House Dionisi, Cogoleto (Genova, Italy). First “passive house” in Liguria, energy self-sufficient.



Piazzale Moroni quarter, Savona (Italy). Refitting of public housing.



Experience learning by doing, Genova (Italy). The teaching of the sustainable approach to the project.



Double purpose greenhouse, Albenga (Savona, Italy). Photovoltaic solutions on farming greenhouse.



Farm holiday renovation, “Centro Anidra”, Borzonasca (Genova, Italy). Use of materials / technologies from local traditions and renewable energy.



Mountain hut on “Monte Penna”, Aveto Valley Regional Park (Genova, Italy). Renovation toward tourist accommodation of mountain hut.



“Pesce Rosso” smart house, Castiglione Chiavarese (Genova, Italy). Restructuring of abandoned rural home.



26 Social housing, Sevilla (Spain).
Modern social housing following the examples of the traditional Andalusia domestic architecture.



Offices of CRIEPPAM, Manosque, Alpes-de-Haute-Provence (France).
Renovation with natural and recyclable materials.



Abengoa Headquarters "Campus Palmas Altas", Sevilla (Spain).
"Palmas Altas Campus" in Seville, is the first business park dedicated to innovation in Andalusia.



Parc eco-habitat, Saint Symphorien sur Coise, Lyon (France).
Public Building Green Construction.



Hotel Monte Malaga , Malaga (Spain).
Example of sustainable construction.



Monastery of Vaugneray, Lyon (France).
Eco refurbishment of a monastery into housing.



Heineken Brewery , Sevilla (Spain).
Energy optimization in industrial building.



Arbois Technical Platform, Arbois, Franche-Comté (France).
Technology park in a process of sustainable development.



Wellness Telecom – WeLight, (Spain).
Energy optimization and efficient management of public lighting.



Mazan Community Hall, Vaucluse, Provence-Alpes-Côt d'Azur (France).
The new Mazan community centre is a project that meets climatic (sun, wind, rain) and cultural needs.



Wellness Telecom – WeSave, (Spain).
Energy control and management platform for all types of buildings.



Aquatic center, Tarare, Lyon (France).
Aquaval, optimization of an aquatic center.



Environmental certification scheme developed in INTERREG MED-ECO Quartiers, (France).



Showroom GEVO, Limassol (Cyprus).
Environmentally friendly building



Redevelopment of Meeting Room, Montaulieu, Drôme Provençale (France).



Ayii Anargyri Natural Healing Spa Resort (Cyprus).



Bioclimatic house in Sami, Kefalonia (Greece). The house is one of the very few Ecological/Bioclimatic buildings on the island.



Regina dell'Acqua resort, Skala, Kefalonia (Greece). Five star hotel constructed according to the rules of sustainable building.



Private house in Ialissos (Greece). Sustainable building.



Private house in Asgourou (Greece). Sustainable building.



Hotel "La Marquise"(Greece). Complex hotel with smart energy management system.



Évora Inov city, Smart Energy Living (Portugal).



Smart house, Martjanci, Lea (Slovenie). XVIII century old building renovated with bioclimatic criteria.

3. The work of local partners and focus groups and international meetings

In the identification of case studies and of the issues connected to the implementation of norms and regulations by different stakeholders in the building process (designers, builders, suppliers of raw materials, building systems and plants, resellers and engineers working with these systems) a fundamental role was played by local focus groups. These are indeed a series of meetings - in the form of conferences, roundtables and workshops - organised within the SCORE project. These *focus groups* were held locally by different SCORE partners and involved the above-mentioned stakeholders of the construction sector and the associations representing them (professional orders, trade associations) together with local authorities, training and research institutes, universities and environmental associations in order to provide a positive opportunity for confrontation.

The *focus groups* meetings concentrated on presenting SCORE and its several phases of development, thus providing, for instance, the above-mentioned possibility to identify some case-studies, still unknown to the SCORE partners, but also to point out specific issues common interest highlighted by the SCORE project.

The province of Savona, for instance, through a series of interviews with market operators and trade associations within the SCORE project could highlight some communication issues among manufacturer, designers

and installers on the one hand and local authorities on the other with regard to the interpretation of some legal requirements for promoting photovoltaic systems integrated into architectural structures in Liguria. The latter is one of the regions with the lower number of photovoltaic installations in a country that, in the last few years, became a world leader in this branch (according to the "Rapporto statistico 2011 - Fotovoltaico" of the GSE, the Energy Service Management of the Ministry for Economy and Finance, published on the website www.gse.it, Italy is the second nation in the world for installed capacity). Difficulties mainly concerned the lack of communication between operators. Therefore, one of the SCORE focuses of the Province of Savona concentrate on this topic. As reported on the website of the project, in February 2012 the Province of Savona hosted a meeting by the title of "III Focus Group - Il fotovoltaico integrato: opportunità e difficoltà nella diffusione dell'applicazione in Liguria" (III Focus Group - Integrated Photovoltaic: opportunities and difficulties in spreading the application in Liguria), in the form of a roundtable. Among the participants there were representatives of the Faculty of Architecture in Genoa; of CeRSAA ("Centro Regionale di Sperimentazione e Assistenza Agricola" - Regional Center for Research and Agricultural Support, because of the prospective integration of photovoltaic solutions



on greenhouses and agricultural land); of the Order of Architects in Savona; of Legambiente Liguria and of the manufacturer of photovoltaic modules and experts of the province and municipal authorities. The meeting was extremely useful to start setting up municipal strategies to tackle relevant problems.

The *focus groups* represented an opportunity not only for abstract speculation on the possibilities of integrating sustainable systems and technologies on buildings in the different territories of interest, but they also represented the opportunity to effectively face specific problems and analyse the limits to the dissemination of these systems and technologies and find the best possible solutions. The creation of a network of stakeholders with shared interests and competences achieved through the *focus groups* is also a fundamental element for disseminating project results.

In parallel to local meetings, the different *partners*, benefited from repeated opportunities of international exchange, thanks to ongoing correspondence, the website and, above all, a number of meetings - the so-called *Steering Committee*. During these meetings, they developed work and communication methodologies,

paid on-site visits concerning the most interesting case-studies, shared training experiences and the results of the *focus groups*, thus creating a network of networks, which is strategic in order to successfully develop the right *governance* strategies on the projects themes.



3.1. Data on the results

Specific documents concerning the initiatives of the *focus groups* and *Steering Committees* are available on the SCORE website at the homepage (<http://www.scoremed.eu/>). Video clips and reports of the meetings are also available.

These documents were used to setup the SCORE Matrix cards that will be described in the following paragraph.



Moments of the meeting among representatives of the different Partner countries within the IV Steering Committee. From the top: visit to a manufacturer of photovoltaic panels in Liguria; bottom left: training opportunity at the Engineering Faculty in Savona; bottom right: meeting of the partners at the Province of Savona.



4. The SCORE *Matrix*: a model for the international evaluation of sustainable technologies applied to existing buildings

The analysis of norms and case-studies, like the local *focus groups*, allowed each SCORE partner to perform a first selection of the building systems and technologies with high energy and environmental efficiency that are already in use or potentially available or which may be suitable for development and diffusion in their own territory of reference, while taking into account the historical-environmental value and fragile landscape of coastal and rural areas.

After highlighting these systems and technologies, it was necessary to develop a tool (defined as “eco-construction tool” in the project) that the operators of the local network could easily use and navigate. At the same time, this should represent an effective model for the assessment, comparison and transfer of information among different *partners*.

This process leads to the development of the so-called “Matrixes”, as defined in the project. Matrixes are developed by each *partner* based on a common scheme to ensure a constant confrontation with each other.

The common scheme of the *Matrix* and the different possible systems and applicable technologies open the

way to possible application conditions.

These systems and technologies are: aggregation and exposure systems of the settlements for natural climatic control; passive solar Systems; thermal solar systems; photovoltaic systems; mini-micro wind-power systems; biomasses; geothermal systems, shading devices, natural ventilation; natural lighting; automatic control systems (smart buildings); coating systems (hyper-insulation and use of phase-change materials, PCM); eco-friendly materials; use of vegetation for microclimatic control; water management.

The possible applications are: new constructions; renovation of recent buildings; recovery/renovation of historical buildings; ex-novo activities in historical contexts.

The various systems and technologies are cross-evaluated in each matrix together with possible implementations (i.e.: passive solar systems for the refitting of recent buildings). Each partner then worked on specific projects containing analysis and proposals on the most-relevant cross-points.

These documents, available for download from the

Matrix - Evaluation model to assess the feasibility, sustainability and transferability of energy efficiency practices in MED territories.

ITALY GREECE SPAIN FRANCE SLOVENE CYPRUS PORTUGAL

THEMES
This matrix is an eco-construction tool aimed to allow local planners and building practitioners to use criteria to make energy-efficient choices rebuild, conversion & renovation/retrofitting.

DECLINATIONS
New constructions
Requalifications of recent buildings
Renovation and refit works of historical buildings
Works "ex novo" in historical contexts

Theme	Italy	Greece	Spain	France	Slovene	Cyprus	Portugal
Aggregation/exposure for micro-climatic control	Green	Grey	Grey	Green			
Passive solar	Green	Green	Grey	Green			
Solar thermal collector	Grey	Grey	Green	Green			
Photovoltaic	Grey	Grey	Green	Green			
Small wind turbine	Green	Green	Grey	Green			
Biomass	Green	Grey	Green	Grey			
Geothermic	Green	Grey	Green	Grey			
Different system of renewable energy	Grey	Grey	Grey	Grey			
Sun screen control	Grey	Grey	Grey	Grey			
Natural areation	Green	Grey	Grey	Grey			
Natural lighting	Grey	Grey	Grey	Grey			
Automatic control system	Green	Grey	Grey	Green			
Involucre (insulation, mass, PCM)	Green	Green	Green	Grey			
System (heating, conditioner)	Grey	Grey	Grey	Grey			
Eco-compatible materials	Green	Green	Green	Green			
Microclimatic and environmental control through vegetation	Green	Green	Grey	Green			
Water resource (rain collection, etc)	Grey	Grey	Grey	Grey			

The SCORE project is co-financed by the European Regional Development Fund in the framework of the MED Programme - Privacy policy - Contact

A SCORE Matrix form the project website (Italian Matrix)



project website (starting from the *Matrix*) in the language of each *partner* (for better understanding by local network operators) and an abstract in English (for international comparison) have been organised as follows:

- Short description of the system and technology with reference to the specific context and the state of implementation considered case by case.
- Reference to case-studies, relevant norms and regulations, with their possible critical evaluation in the annex;
- Evaluation of the relations with the local building history;
- Strengths and advantages of the relevant system and technology, with reference to the specific context and nations in relation to the following aspects: Resource consumption reduction; reduction of the environmental burden; improvement of the quality of the internal environment; economical aspects; management; other factors;
- Weaknesses/disadvantages of the relevant system and technology in relation to the following aspects: issues related to the architectural integration, cultural differences (connected to the landscape perception of mainstream culture in the local context), differences in the legal framework (linked to local norms and to the presence of bureaucratic issues and similar); technical difficulties for installation/assembly linked to the local production context (lack of manufacturers, supply difficulties, economic and environmental difficulties transport costs, lack of engineers with suitable qualification, etc.); other factors;
- Proposals to overcome the above-mentioned weaknesses, also with reference to the results of the *focus groups*, to case-studies, to the solutions already implemented by other *partners*.

The English abstract of each document is organised according to the following scheme:

- Definition of guidelines according to the strengths and weaknesses highlighted in the system/technology and to the proposed solutions.
- Indications to develop an action plan ("*Bio-construction Action Plan*") to effectively implement the proposed solutions, also by means of further research programmes and pilot projects;
- Indications for developing an environmental quality certification, applicable in the partner countries involved, making reference to the possible weaknesses highlighted in the existing models of environmental certification for the relevant system and technology

The comparison of the elements highlighted for each system/technology and for the different applications thanks to the information provided to the *Matrixes* by various *partners* will allow to define the guidelines for action plans and quality certifications. These plans and certifications could then be considered at local level and, therefore, be implemented by single *partners* (also adapting the solutions described in the *Matrix* by other participants). Moreover, they can be used to define which

actions are common to two or more partners, with the possibility to adopt common action strategies.

4.1. Results: "Transferable audit and evaluation model" and "Model of cost-benefit analysis"

Besides ensuring the processing of the "*Bio-construction Action Plans*" which should be later presented in the present report, the matrix system represents, for MED reference countries, a real "*Transferable audit and evaluation model*", that is, an evaluation model to determine the real feasibility and transfer possibilities for sustainable strategies and integrated systems to promote energy efficiency in recent and historical buildings and settlements.

The structure of a *Matrix* allows to evaluate the various systems of technologies, plants, constructions and action strategies. It also allows a comparison among different versions of the same systems and strategies as applied on the same territory - with regard to specific production activities, legal frameworks and local actions - against the systems and the strategies used in other countries. The model is flexible, subject to updates and adaptable to different contexts.

All the *Matrixes* by the different countries, once integrated with the respective *cards* in the native language and the English *abstract*, become therefore an "*eco-construction tool*", that is a real and tangible tool for those who work, with different tasks and roles, in the fields of planning, design, construction and building management.

The *Matrix* as a tool can be used, indeed, by the different stakeholders (planners, builders, manufacturers, suppliers, entrepreneurs, local authorities and their technical departments, users and trade associations) to understand the real advantages and possible critical issues linked to the implementation of strategies and innovative technologies and plants.

It is therefore possible, on the one hand, to make the best decisions during the planning and implementation phase and, on the other hand, to highlight effective strategies (local and international) to face any critical issue that may arise.

This "model of cost-benefit analysis" originating from the use of the *Matrix* system may significantly help the development of a suitable approach at environmental, economic, social and aesthetic-perceptive level, for effective energy-related actions with regard to new construction works and the requalification of buildings, urban areas and territories in MED countries, both with immediate operative feedbacks and through the development of suitable operative bases in the near future. *Matrix* documents are available on the SCORE website beginning with page <http://www.scoremed.eu/themes.php>.



5. Guidelines for integrated territorial planning

The analysis of the different *cards* and of the abstracts prepared for the matrixes of the partners from different countries allowed to set up the “*Guidelines for integrated territorial planning*”, which are also summarised in a special section in each abstract.

These *Guidelines* highlight the conditions of local areas in order to point out specific lines of actions based on the issues recorded. The *Guidelines* represent the starting point for drafting the *Bio-construction action plans* presented below.

GUIDELINES - ITALY

The aim was to present an overview of the main themes and critical points concerning the territory of Liguria, going from settlement rates to aspects concerning bioclimatic architectural criteria, the use of equipment with renewable energy sources, innovative construction system and eco-friendly materials.

As in other countries, the gap between implemented praxis and the opportunities of better energy efficiency is still wide. The lack of a new approach to construction projects and actions, both for new buildings and for renovation activities is quite evident.

A change in the approach is however beginning, although it is made more difficult by the old legal framework, the level of specific competence of the engineers and technicians involved, the level of awareness of end-users and, finally, a system of incentives and norms that even brought to some distortions in the past, focusing on some fields while ignoring many others.

As for settlements, that is, the type of building aggregates for microclimatic well-being, we can retrace some important elements in the traditional architecture that may indeed bring direct advantages, according to the specific features of an area:

- Reduction of energy consumption by maximising the use of renewable sources;
- Reduction of land exploitation;
- Reduction of the environmental impact due to new buildings;
- The social benefits arising from the possibility to easily identify common areas for leisure and socialisation.

The difficulties found in disseminating the solutions according to the criteria of aggregation/exposure are mainly related to cultural resistance arising from the models of a single-family home or aggregations of this model (private garden, private access etc.) and affects the norms and regulations on urban planning, which sometimes may even be an obstacle to these solutions. The passive solar systems most commonly in use, that is technologies to regulate the heat transfer between the inside and the outside of a building by exploiting solar radiations, are solar greenhouses and Trombe walls. They have the advantage of reducing heating needs. Besides, they are easily implementable in new buildings and are also extremely flexible and non-standardised.

They are therefore deployable on a case-by-case basis and may represent an element for refitting existing buildings, also as far as aesthetics and landscape integration are concerned.

The main obstacles to their adoption arise from cultural factors and from the legal framework. Information and training for engineers and users on the functions of passive systems is still insufficient and the law usually provides no real options to use the volumes of greenhouses as “technical volumes”.

Besides, since the sun is not a constant energy source, the estimated energy output is calculated with complex systems that are not immediately available to designers. In the case of solar greenhouses, for instance, the surfaces cannot be covered with carpets. Even if solar systems are simple, they need special fittings, with specific windows and valves that are not so common on the national and regional market. These systems are often unknown on the local construction market.

Solar heating systems convert solar energy to thermal energy by increasing the temperature of the heat-carrying fluid to obtain hot water for sanitary use or heating. The market offers a number of systems with different costs and performances.

Through the integration of a solar heating system in the building, it is then possible to reduce energy consumption for hot water production and home heating.

The countries of the Mediterranean area have high levels of solar exposure. Taking into account the EU Directives, national and regional norms and regulations, they are adopting measures to increase the use of systems based on renewable resources. In Liguria, it is compulsory to cover 50% of the hot water consumption for sanitary use with a solar heating system.

The use of these systems provides for a decrease in polluting emissions from fossil sources. Its main weakness, however, lies in the difficulty of integration in the architecture, especially in historical buildings, because of the problems related to the installation of tanks in natural convection plants.

In this sense, there seems to be a lack of suitable criteria at a national and regional level, even if efforts have been made of late to define suitable parameters for the integration of solar heating systems and photovoltaic systems. It is necessary to promote these systems in the MED Area, especially for home heating and for the tourism sector.

Photovoltaic technology is one of the systems based on renewable energies that received more financing in Italy and it is therefore one of the commonest (the ENEA report “Renewable sources 2010” describes a significant growth of this compartment, in particular since 2005, making Italy one of the leading countries as for installed power). The increase in demand spread the knowledge about this technology and reduced the cultural resistance to its widespread diffusion. This resistance was linked



to the issue of its architectural integration (i.e. annex 4 and 2 of the MD dated 5 May 2011). In this sense, “thin film” products (amorphous silicon, copper indium selenide CIS) are an extremely interesting solution. MED countries represent a perfect geographical area for the large scale implementation of photovoltaic systems in the building sector. There are no particular obstacles to their integration in the architectural structure of new buildings, whereas such integration is difficult when dealing with the renovation of historical buildings or landscapes of special interest. National/regional laws and local regulations in this field appear to be insufficient even if some attempts were indeed made, as indicated in the cards and their annexes.

This implies a sort of gap and several bureaucratic constraints by public employees, thus slowing down the implementation of photovoltaic solutions. Regulations should provide precise but flexible indications, with diagrams, tables and lists of criteria, in order to direct the project towards the integration of context-compatible photovoltaic systems in the architecture while avoiding to set legal limitations for materials, forms, colours etc.

An important contribution to the improvement of regulations could come from professional associations and associations of manufacturers. Moreover, it is important to underline particular application examples like ports and agricultural buildings, as highlighted by some of the case-studies (Savona, Albenga).

Some of these indications are in line with the evaluations by the engineers of Ferrania Solis, gathered during an interesting interview, which is also included on the cards about photovoltaic systems in the Italian *matrixes*. The critical issues in the discussion on photovoltaic systems in the region Liguria comes from local norms and regulations, which are often too complex, confused and disproportionate compared to the size of the actual installations. The possible solution is a proposal for a regional and local policy, free from the influence of lobbies “and focused on defining precise and clear rules, with a suitable balance between the different situations and the size of the applications”.

Small **wind turbines**, that is, systems based on the transformation of kinetic energy into mechanical energy, use a wind-power generator to produce electricity.

Although we lack a formal definition for this kind of systems, they can be classified in two categories according to size and nominal power: microwind turbines (with a nominal power up to 20 kW and a rotor diameter up to 8 m) and mini wind turbines (with a nominal power of 20-200 kW and a rotor diameter between 8 and 20 m). Some authors mention small wind turbine with a nominal power up to 1 kW and a diameter below 1,5 m. Small wind turbines produce energy mainly for home and residential appliances and can be used both within an autonomous supply system and within a network. Nowadays the market offers a wide range of small wind turbines according to the orientation (horizontal or vertical) and the number and shape of the blades.

Due to their climate, MED countries represent a good

area for the use of wind power in buildings.

Mini and micro turbines, in particular, are suitable for installation even in urban areas: they are small, they operate at low wind speed and they are designed to minimise the noise originating from the moving blades.

Notwithstanding the advantages of exploiting local wind energy in a city, the visual impact is one of the main obstacles to the development of small-sized wind turbines.

On a small scale, the physical characteristics of wind turbines (i.e. shape, size and colour) may affect the architectural profile of the single building. On a wider scale, the deployment and number of wind turbines may affect the typical layout of a landscape. Other cultural factors, like lack of information on wind-power systems and their low level of acceptance by local authorities and their environmental departments represent a strong limitation to an integrated development of micro turbines in buildings. Lack of transparency in local regulations on mini and micro wind turbines jeopardise a widespread adoption of these technologies.

Although Italy enforced the EU directives on environmental protection and on the promotion of energy production from renewable sources in its national law, local norms may often be in conflict with the need to preserve the local heritage. In particular, there are no design guidelines to clearly define a line of action in case of existing buildings or new construction activities in an historical environment. This implies a sort of gap and bureaucratic resistance by civil servants that often limit or completely block the application of mini and micro wind-power systems.

Taking into account the above-mentioned problems, the use of wind-power systems at local level could be supported through:

- The adoption of planning guidelines that could translate in a wider use of this kind of systems
- The processing of local data on wind (through monitoring programmes etc.) to verify the presence of suitable wind sources in the area and the development of systems to support planning decisions,
- A research on sociological and cultural factors that influence the integration of wind turbines within the local context.

The use of **biomasses** can be potentially applied to a wide range of plants, from home heating appliances to district heating, including the co-generation of energy through combustion or gasification processes.

Although this technology is quite popular in other parts of Italy, it finds no significant application in Liguria notwithstanding a wide forest area.

No particular problems were highlighted with regard to home heating, especially in isolated, rural or mountain areas (as demonstrated in the case-studies).

The use of biomasses could however increase in scale thanks to:

- The possibility to build suitable local storage facilities by updating local norms on urban planning and landscaping.



- The recognition of the use of biomasses in the energy certification system of the region Liguria “Celeste”, a software based on regional norms that still doesn’t value the use of boilers on biomass fuel;
- small-sized pellet packages to easily manage fuel storage, sourcing and use.

The analysis of heating systems from 1 to 10 Mwt and technical evaluations by expert engineers lead to the identification of a few issues that jeopardise the widespread use of biomass heating systems, that is:

- Lack of information and involvement of the local population in order to overcome prejudice on their environmental impact;
- Lack of specific qualification for the designers in charge of planning heating systems;
- Lack of considerations of environmental resources and the presence of forestry holdings;
- Lack of guidelines to develop public tenders for biomass heating systems.

A core element of this strategy is represented by the creation of infrastructures to:

- Manage the relationship between power plants and local providers,
- Reinforce the supply chain thanks to local company in order to stabilise the demand and to select timber according to the different destinations of use (fuel, carpentry, construction etc.)
- To facilitate the organization of biomass resulting from maintenance activities in public parks and private gardens.

For an economically viable use of our forests, we must review national and local forestry regulations. Nowadays we still assimilate forestry activities (forest roads, wood hauling) to construction activities, thus creating the main problem in the implementation practice.

The use of **geothermal** heat pumps is not very common in Liguria, although the system is absolutely compatible with the historical heritage of this area as it only affects the subsoil. Initial investment costs can be recovered within 7 years, in average, and should be weighted against very low operative costs and a long lifecycle.

The low presence of these systems is mainly due to lack of competence in the sector by engineers and building companies and the absence of specific incentives both nationally, regionally or locally.

A particular case is represented by the region Lombardia, with the drafting of guidelines concerning geothermal systems, whereas Liguria also presents some good practices originating from the awareness about this theme. Interest on this topic is also demonstrated by the activities of the technical Department of INPS (Istituto Nazionale di Previdenza Sociale - national welfare Institute) concerning renovation actions in European areas and on historical buildings.

These examples highlight some critical aspects originating from building site conditions (the possibility

to occupy public space, access conditions etc.), the availability of Italian companies and suppliers to provide conformity certifications and warranties as found in nearby countries (Switzerland) for the same activities and at the same price. Moreover, the procedures and competencies needed to obtain construction and landscaping permits are not clear.

The strategies to activate systems for **natural ventilation** in order to improve the airflow inside buildings are based on two different sources:

- The airflow generated by the difference in temperature (between the outside and inside of the building, between two different parts of the building, between two different levels). Windows are therefore located both at low and high level (i.e. staircase, roof, etc.) in order to increase such a flow,
- Difference in pressure due to the speed of the wind on facades. This aspect is taken into account to plan the size and position of the openings, in the articulation of the internal distribution system and while planning for appliances to regulate the airflow.

Besides improving the air quality and thermal comfort, it is therefore possible to provide a passive solution for air cooling needs in summer while avoiding to deploy energy-consuming systems. In Liguria and Italy in general, although passive systems are part of the local construction tradition, they are still scarcely known and used in today’s current practice.

The aspects of architectural integration with regard to building envelope and living space still require a deeper understanding. Italian regulations required to verify the size of the perforations compared to the surface of the interiors. This mainly mathematical check, however, is not sufficient to set up a natural room ventilation, which may create a pleasant microclimate, as suggested by European directives.

Technical implementation issues for natural ventilation systems can be connected to a lack of availability of the analytical tools required by designers (local wind maps, surveys, user-friendly software, etc.).

Similarly, to the previous topic, **natural lighting** is often used in passive contributions to improve the microclimate performance of buildings and to improve the quality of living.

The project on natural lighting takes into account the daylight lighting factor, the internal diffusion of light and the relationship between the inside and outside of buildings. It is a part of the project still to be implemented in current procedures, although in the past it was an important element of the construction culture.

The current availability of low-E glass compared to the past allows to plan for wider transparent surfaces while maintaining a good level of thermal insulation of the building, although problems related to the quality of the lighting area still remains.

Difficulties remain also with regard to the interpretation of historical contexts and types according to landscaping



regulations and with regard to the level of specific skills acquired by the engineers.

Good practices in this sector are common only for particular types of buildings, such as museums, schools and churches, where the quality of light has always been a main feature.

It is advisable to raise awareness on the aspects related to natural lighting through their implementation in case of public construction activities, also through the scheduling of public tenders, and more in general through the definition of construction criteria, the inclusion of this theme into local regulations and suitable education for engineers and future designers.

Automatic control systems, are construction technological solutions commonly referred to as “home automation” or “building automation”. Automation may include centralised controls for lighting, HVAC (heating, ventilation and air conditioning), home appliances and other services in order to provide better comfort, safety, convenience and, above all, energy efficiency and energy saving.

Among the direct advantages linked to the implementation of such solutions there are:

the decrease in the consumption of energy by optimising the management of electronic appliances, especially if installed on large buildings like offices, malls, companies, industries, etc.

the reduction of the environmental impact;

other advantages: better quality of living, improved safety (fire protection, gas protection etc.), user-friendly management and flexibility in case of later modifications.

The analysis of the difficulties found in Liguria and Italy in the dissemination of this kind of solutions highlighted in particular the presence of:

- significant difficulties in the implementation on a smaller scale, in homes and apartments. It is easier for end-users to directly manage building elements and appliances with better results.
- lack of specific education for engineers and designers.
- cultural resistance by end-users, who are not ready to invest on innovative tools due to a lack of feedback on installed systems and feedback from the manufactures.

As for the **building enclosure**, there is the need to combine high-tech materials in stratigraphic representations, which may provide high performances on the thermal-hygrometric control by means of solutions based on past experiences that ensure the presence of a useful thermal mass in Mediterranean climates.

To direct the planning activity towards effective scenarios for sustainability at national and regional level, we must face several critical issues concerning:

- regulations (inconsistencies, lack of coherence and delays in the enforcement of European Directives, lack of attention to the life and production cycle of materials, lack of incentives for the use of recycled materials).
- technical training and competences (lack of specific qualification for most technical and institutional operators).

- cultural awareness (lack of confidence and information by economic stakeholders, as demonstrated by the widespread unfounded belief that quality of living and energy saving imply a significant increase of construction costs).
- local production (energy-efficient buildings are not difficult to build but they require innovative products and solutions which are not always available on the local market, lack of correct information on the real investment costs related to the use of innovative coating materials, such as phase changing materials (PCM), thin thermal-reflecting insulation systems, special glasses, ecologic construction systems and, in particular, wood frame systems, XLAM cross laminated timber panels).

The following initiatives may help to increase the diffusion of new ecologically efficient construction systems:

- optimise the use of natural and recycled materials.
- Act on national policies to promote integration, construction and new generation technologies for exploiting resources, when acting at local level in order to promote new planning methods based on more flexibility. For instance, providing for new housing opportunities (i.e. standardised timber products) which could be potentially used on different sites, for a different number of users and lifestyles, require the cooperation of designers and entrepreneurs. At the same time, the cooperation among different sectors in order to achieve quality housing requires to identify new goals and working practices to face new unconventional challenges.
- Education and continuous training on innovative technologies, though theory learning and practice on building sites, for public and private stakeholders.
- Specific education and training in schools to face renovation needs with specific bio-ecological platforms in case of obsolete buildings.

As for **eco-friendly materials**, it appears evident that energy costs were not taken into account (“grey” or embedded energy) together with health problems of the population that may affect welfare expenses.

According to current regulations, manufacturers are not compelled to give detailed indication on the production process and on the components of their materials. It is therefore difficult to have clear information on materials that are really co-friendly.

Ecologic materials are those who require low energy consumption and generate a minimum amount of waste in all phases of their life, production, use and, finally, disposal once their life cycle is ended.

They are made of natural components, are biodegradable and easy to recycle as, for instance, wood fibre, cork, cotton, linen, wool and timber for insulation.

Quality and prices are often connected to the place of origin of these materials. Good materials at reasonable prices can be found sometimes in Austria, Germany and other European countries.

A fundamental date in the path to sustainability is the



year 2020. By this year, according to the EU Directive, all public buildings and new buildings should be self-sufficient in terms of energy consumption.

This goal cannot be reached without a progressive change in the construction approach both for new constructions and for existing buildings that should be progressively refitted.

At national and international level there are several problems/constraints connected to the production, distribution and supply of sustainable materials:

- the presence of important manufacturers and suppliers of construction materials in Liguria is clearly below average compared to other Italian regions;
- local construction norms usually provide no incentives or discounts for energy-efficient homes; such incentives could be provided in the form of discounts on planning fees, increase in usable floor area, provisions to include compulsory quotas for sustainable constructions with specific financial incentives;
- current law is not fully in force at the moment because of issues connected to a lack of correspondence between local conditions and the performances required by national norms;
- at the moment, the limited availability of ecological materials on local markets and the costs related to sourcing from other regions act as a deterrent to the use of ecological solutions.

In order to achieve a wider presence of new constructions, the refitting of existing buildings, the recovery/refurbishment of historical buildings and the promotion of activities based on the use of sustainable materials, with regard to the constraints and issues described above, the following initiatives may prove useful:

- local supply of raw materials and finished products to reduce transport costs and environmental impact;
- provide incentives for the manufacturers of raw materials and semi finished products in order to help them adapt their production to the requirements of a growing “sustainable market”
- fundamental role of coordination and networking by national and regional institutions which represent the intermediate position between European Directives and municipal regulations;
- the correct implementation of norms and regulations may foster significant changes in the construction sector:
 - renew and qualify the companies that provide a better protection for their employees thanks to specific skills;
 - increasing the education offer on ecological materials may ensure quality products for a better protection of private and public customers in order to achieve a sustainable development to improve the territory;
 - a “pact” with virtuous manufacturers to promote experiences on research, innovation, professional training, workers and consumers protection, qualification and promotion of the most ecologically sensitive companies.

The use of **vegetation** can be an effective tool to control environmental conditions and the microclimate inside and outside buildings. There are different systems for coverings and vertical green (see the relevant cards) which are now available and should find a wider application.

The integration of green facades and green roofs implies a decrease in energy consumption and a possible improvement of the thermal behaviour of the building enclosure. On the large-scale, the use of vegetation allows to reduce the phenomena of urban heat islands that is responsible for lack of comfort and consequently for the high demand of air conditioning; this aspect is particularly important in the Mediterranean climate.

Vegetation contributes to improve the air quality, absorbing fine particles and polluting gases (CO₂, NO₂ and SO₂) with positive effects on the quality of interiors. The difficulty of integrating green vertical and horizontal systems within buildings depends on different factors.

These difficulties may arise from the limited use of green systems, from prejudice against the high cost of maintenance, lack of clarity in the norms, lack of perception of real benefits on the microclimate and the environment and insufficient knowledge of the parameters for the selection of suitable vegetable species.

The limited use of the strategies is also connected to the absence of financial support programmes. Local regulations do not provide specific indications when dealing with historical contexts, thus leaving a wide discretionality in the interpretation by the controlling authorities.

The local diffusion of green building enclosures in order to control environmental and microclimate conditions, while taking into account the above-mentioned weaknesses, could be implemented thanks to the following actions:

- based on the experience of different European cities, the adoption of support programs and specific regulations could allow an increase in the use of green vertical and horizontal systems in Liguria;
- the introduction, within the local norms and guidelines, of themes related to the effects of green vertical and horizontal systems with regard to the environmental/microclimate control and an improvement of the performances of existing building enclosures may lead to a better reception during the planning process;
- the development of a UNI norm and of guidelines or Layman reports for green vertical systems may reduce errors and show real maintenance needs and the advantages provided by different systems to the microclimate and the environment;
- the development of a database of vegetable species suitable for Liguria could be an effective tool for the planning process of green systems;
- finally, we could mention the importance of further research, monitoring and experimental studies in order to evaluate the environmental and microclimate effects still to be quantified on the Mediterranean climate.



GUIDELINES - CYPRUS

The partner from Cyprus concentrated on new constructions and on the renovation of recent buildings through the in-depth analysis of aspects related to mini and **micro wind turbines**, building enclosures, environmentally friendly materials, climate control and vegetation.

As for the use of micro-wind turbines, the system is not very common in Cyprus mainly due to lack of information; doubts remain on the effective opportunity to implement small scale systems. There are problems to obtain authorisations.

Wind energy combined with solar energy could provide a reliable solution to meet energy requirements.

The government of Cyprus is not giving financial incentives for the installation of wind turbines.

Building **insulation**, if adequately combined with the presence of shading devices and **ventilation systems ensures optimum conditions to reduce energy consumption**.

The attention to summer solar radiations avoids the overheating of internal rooms.

With regard to **eco-friendly materials**, we underline the goal, common to public and industrial development policies, to include the production cycle and product life-cycles among the requirements for construction materials, beside technical performance and profitability, that is, to eco-friendly parameters.

The indications deal with the development of evaluation tools for assessing the performance of construction materials that should be both user-friendly and include ecologic parameters (energy costs and transport costs, natural, biodegradable or reusable components, absence of dangerous emissions, etc.).

The use of **plant varieties** for controlling microclimate and environmental conditions is not very common even in high energy efficient buildings. The causes depend on two factors: widespread prejudice considering vegetation to be dangerous to wall structures, scarce dissemination of pilot projects that may lead to a practical verification of relevant hypothesis.

Vegetation is dangerous for wall structures only if the building is abandoned. Vice versa, a green covering, even directly attaching to the wall, will protect the plaster from acid rain, keep the wall dry and, contrary to common belief, it compensates temperature differences inside constructive structures.

A green covering creates a favourable microclimate, reduces wind effects and filters sunlight.

One of the main contributions of vegetation is related to solar radiation. The presence of arbours made of plants with short-lived leaves protects the building from the direct sunlight in summer and ensures solar radiation in winter.

A good combination of local plants could provide for interesting visual and landscaping results.

GUIDELINES - FRANCE

The work of our French partners concentrate on a different approach in the use of ecologic, environmentally friendly and energy efficient construction systems.

It deals with construction systems but also with housing habits. In this kind of buildings, the end users have the responsibility to correctly manage the house, in particular with regard to insolation, ventilation and the use of systems to regulate microclimate performances on the building.

The French partners extended the analysis to the technical sectors of designers, builders and installation engineers. Nowadays we are faced with hundreds of professionals involved in the construction process: masons, plasterers and painters, ironwork fitters, heating engineers etc. However, construction activities which aim to use renewable energies, both passively and with active systems, *require the acquisition of complex skills*. For instance, it is important that doors and windows manufacturers understand how and where to install them according to the solar radiation and the shading devices of the building.

As underlined also by the Italian team following comments by some stakeholders, installations too require a new approach: renewable sources provide solutions to the average needs and can be integrated with "artificial" systems, electric systems etc. in order to cope with peak requirements both in summer and in winter. A new integrated approach is required.

Following this line of reasoning, an increase in education offers for the operators is however advisable with regard to the use of new ecologic materials.

The French group points out that the *acquisition of presently unavailable standards and certifications* is necessary to effectively promote the diffusion of construction technique based on tradition and verified through innovative procedures. The certification of straw or clay structures *for seismic and fire resistance* is a fundamental step in order to validate their application. If no such certification is provided, it is impossible to stipulate any insurance contract on these buildings, thus clearly jeopardising the possibility to implement these ancient and low-cost technologies.

They highlight how nowadays planning efforts concentrate mainly in the drafting of building plans in order to ensure full compliance to town planning and building requirements. However, this appears insufficient when deploying innovative techniques, since such a project needs a detailed operative assessment with a step-by-step follow-up on the building site. A large number of manuals is available, although *there is no possibility to acquire detailed information on solutions to the problems originating from the use of particular construction techniques and materials* (characteristics of the materials, composition, assembly, weathering, solutions to improve the main elements of a building, such as corners, openings, grounding, intersections, installations etc).

From this point of view, both engineers and workers have no adequate training.

The use of **biomass** in France is widespread but it does



not comply with the later updates of the regulation. It does not allow, for instance, for covered storage rooms or supports the creation of ecologically effective local supply chains.

Provisions are made for *heat recovery from household water* (bathing and washing) and from industrial waters. These aspects need further examination and could effectively influence energy saving patterns.

When considering applicable norms, there is a clear need to compensate a cultural gap, in particular because French certifications (i.e. HQE) are based on *descriptive, architectural and performance-independent considerations, while technical norms promote the use of mechanised installations and not the adoption of bioclimatic construction criteria.*

GUIDELINES - GREECE

The themes developed by the Greek partners in their matrix cards with indications for the bio-construction action plan and the indications for evaluation systems, apart from photovoltaic systems, *can all be referred to bioclimatic construction criteria.* They concern: the adoption of passive solar systems, the use of solar heating systems, ventilation and natural lighting, the building envelope, eco-friendly materials, microclimate and environmental control with the use of vegetation.

This contribution also corresponds to the cultural attention that Greece is devoting to this sector. In this sense, a significant role is played by the *drafting by the Hellenic Technical Committee of a specific guide for the construction of bioclimatic buildings*, to respond to the energy efficiency requirements set by national law, according to the dir. 2002/91 CE.

Construction techniques with bioclimatic characteristics in Greece are strongly based on local constructive traditions and on construction practice in rural and more fragile areas.

As for the use of passive solar systems for accumulating heat inside houses, it is important to underline the attention to the correct orientation of buildings with regard to the exposure and site characteristics, climate characteristic, both for planning and construction. The importance of a *correct management of passive systems by the inhabitants* in order to ensure their successful application should be underlined as well.

The use of solar heating systems is highly common in Greece, a leading country for this kind of technology. Such dissemination can be further promoted by operating in the direction of *architectural integration* as in the case of big hotels, and the diffusion of maintenance contracts to maintain the efficiency of the systems.

As for photovoltaic systems, these are used and economically viable especially for large residential buildings or large hotels. Although they are well-known and popular, although being important for the chance to accumulate energy in areas with a limited access to networks and although there are incentives for contributing energy to the grid, there remain weaknesses in the process, especially when it comes to obtaining authorisations.

In this sense, the main suppliers and installers are the most effective target group also to reduce the authorization times.

In the case of natural ventilation, the focus is on the possibility to eliminate the need for air conditioning in MED areas through the use of convections created by different temperature and air density.

The regulation makes reference to the number of openings, while good practice is described in detail in the *guidelines for planning bioclimatic buildings drafted by the CTE and concerns also their location and positioning and the presence of ventilation openings.*

Natural lighting affects the energy consumption of buildings, which normally absorbs 10 -20 % of total energy needs. A good natural lighting improves living comfort, the perceived level of well-being and visual appeal of the rooms and is an important aspect also for the qualification of commercial, study and working environments.

A good natural lighting is easier to obtain in new buildings. In the case of the *building envelope*, a lot of attention is given to thermal insulation systems that may greatly affect the energy consumption of the buildings. 70% of this consumption arise from the balance of internal temperature.

The choice of materials and systems must be adequately weighted by the experts according to the constructive and climatic features and the destination of the specific building.

Attention is given also to the use of *materials defined as ecologic and eco-friendly* because of their characteristics of biodegradability, recyclability, non-toxicity and energy production costs. The use of these materials improves the total energy balance of the system and improves the general health conditions, to reduce emission in the atmosphere, and the health conditions in confined areas for the absence of toxic components.

Vegetation in historical building is used in courtyards, and in the internal patios of private homes. In Greece, it was used in construction activities since the 80s and 90s of the last century in order to improve the environmental conditions and to refurbish entire urban areas (Thessaloniki, Athens). Recent applications highlighted the possibility to improve microclimate behaviours of single buildings and reduce the energy consumption for summer cooling.

Today we have a wide range of plant varieties for different use, to decorate balcony and terraces. There are also effective solutions for climbing plants for facades and green turf for coverings.

The selection of plant varieties should be made by respecting the compatibility with the local ecosystem, water requirements, resistance to pollutants and it implies the presence of experts in this sector.

The CTE guide analytically shows the use of vegetation as a tool to control the quantity of air and solar radiation as a factor to keep a constant temperature of the building.



GUIDELINES - PORTUGAL

In Portugal, different initiatives are leading to the development of interesting applications. The Solar XXI building in Lisbon, the seat of the National Laboratory of Engineering and Geology can be considered as a reference. This building, the most famous bioclimatic building in Portugal, contains systems developed to use solar and photovoltaic energy together with passive cooling and heating systems, natural lighting and ventilation systems, thus creating a useful reference for later projects.

Notwithstanding the economic crisis, the country managed to pass from 17% to 45% of energy production from renewable sources (wind, hydroelectric, photovoltaic or wave energy) in only 5 years. A huge solar power plant was built in 2009. At the moment, the country is discussing **ecologic energy plans** as a tool to support a way out of the economic crisis by reducing energy costs and supporting the production from renewable sources.

40% of the country deficit is represented by fossil fuel import costs. Thanks to important power plant projects (wind farm in Alto Minho, the solar plant in Moura and the power plant in Aguçadora that will produce wave energy from the ocean), Portugal inverted the trend and managed to schedule the shutdown of conventional plants by 2020 once 60% of national the energy needs are covered by renewable sources.

For decades, Portugal generated electricity with hydroelectric power plants. The new programmes are based on combining wind power and hydroelectric power: wind power plants pump water upwards during the night - when wind is stronger - and let it flow down during the day to produce electricity when energy demand is higher.

Portugal is so committed to the development of a *national network to recharge electric cars* to the point that this year the police decided to use electric cars for service.

Moreover, in the last few years that project MOBI.E was in the experimental phase (operating phase since 2011) in order to develop hardware and software solutions to support electric vehicles recharging services.

To support this large energy shift in the country, Portugal invested in technology too. These investments proved widely successful in time and did not worsen exiting conditions in the move from one system to another. Meanwhile they also contributed to building up a market that absorbs 100.000 operators.

In Portugal, the National Society for Energy Transmission, Redes Energeticas Nacionais or REN, uses sophisticated models for weather forecasts, in particular with regard to wind recovery, and software to determine the amount of energy generated by different renewable sources. Victor Baptista, managing director of REN, recognised that such changes require significant skills, decision-making capacities and flexibility which are needed to avoid black-out issues. The results were positive and Energias de Portugal, the larger energy provider in the country, exported its technology to America, where its American branch, Horizon Wind Energy, has built and manages

wind parks in Iowa and Texas.

(sources: Portugal technical team website: qualenergia.it, puntogreen.it, ecoo.it, guerrecontro.altervista.org, passive-on.org, in3act.com, <http://blog.premioarchitettura.it>).

GUIDELINES - SLOVENIA

The Slovenian partner analysed refurbishment and new construction activities in historical context, with reference to the case-study about a "Smart House".

The themes under examination included photovoltaic plants, biomass heating systems, geothermal heat pumps, the control system for microclimate conditions in buildings, automatic air conditioning, the building envelope and eco-friendly material.

As for the energy produced from **solar sources**, building a photovoltaic plant requires investors to provide all electrical supplies for converting continuous current into alternate current, the possibility to contribute energy to the grid, agreements with land owners for network obligations and a suitable set of authorization procedures. Building photovoltaic plants at present requires overcoming nine steps concerning construction permits, installation permits, authorizations to connect to the grid, agreements on operating modalities and contracts for energy supply and sale. These steps may be extremely different than common procedures for the modality and integration of the process depending on the different energy providers involved. The lack of transparency and clarity on the necessary steps and the lack of well-defined implementation times are some of the main obstacles to the development of innovative technologies.

The "Smart House" analysed in this case study uses solar energy to obtain hot water which is then used for heating and sanitary systems. The water in the tank is heated at low-temperature by means of a heat pump and, at peak times and when demand increases, by means of an additional remote heating system on biomass fuel.

The automatic central control station of the system distributes supplementary heat, obtained through a remote wood splinters heating system, to the primary school, the post office, the parish house, the church and the parsonage.

The boiler on biomass fuel is designed for systems equipped with automatic dosing of the fuel (only natural wood splinters) and to maximise the efficiency of the heat exchange. It is equipped with different safety devices and designed for easy maintenance and cleaning. There are two 1000 Lt heat accumulators and a storage room for fuel. The distribution network is underground and it is made of insulated pipes. It has a system to detect possible spills and a remote pumping system. The boiler is equipped with a central panel with functions for setup and lambda control.

At present, the main obstacle for the use of **biomass heating systems** is connected to the high costs and insufficient knowledge associated with this technology. An additional cost is given by the need to have suitable storage space for fuel. Moreover, the return on investment takes too long to be competitive when compared to



traditional fossil fuel.

The “smart house” analysed in this study, beside using a district heating system, also has geothermal water-water heat pumps and solar panels for hot water production, it benefits from the presence of underground waters at 14°C and reaches extremely high efficiency levels of energy exchange. These systems are combined with low temperature heating systems like floor and wall heating. According to the season, this system may be used for cooling, for home air conditioning during the summer, by providing input water at a temperature > 18°C, above the dew point, to avoid water condensation.

The main obstacle to a widespread use of the system is represented by the initial investment costs when compared to other systems. The fact that performance in time is better and maintenance and handling costs are definitely lower is not enough. The situation could only change with specific grants to support the initial investment.

The central control system is an automatic system for controlling and managing the installations inside a building. It networks different devices. The communication between the user and the main system within a “smart house” is a two way communication system. The users define the performances, the main units of the different devices detect and transfer to the main central station all monitoring and evaluation data later used to modify the initial settings. Heating system, cooling system and heat pumps can be managed thanks to a special software that is used also to measure the energy consumption. Heating and cooling systems (geothermal, biomass fuel etc.) can be operated automatically or manually. The automatic switch between different modes is controlled according to the external temperature. End users input temperature reference settings.

The historical analysis of environmental and energy consumption data is useful for the design and management of a passive house.

The possibility to use open control devices which may communicate the one with the other, or the possibility for manufacturing company to install control devices in order to communicate with the central station and manage single referral units for different installations is another important element.

This case study is an example of renovation of an old building and is important as far as historical heritage, energy efficiency in the use of renewable sources and natural insulation materials are concerned.

In order to maintain the external layout of this monument, the choice fell internal wall insulation. Only local natural materials were used in the refurbishment of this building. Straw and clay are two materials that share a long history of use in the construction sector. Other materials used in this case: Reed grating, wood, sawdust, hemp, cellulose, coconut fibre. The walls were insulated with a clay plaster combined with reed grating panels to further improvement of the, however still good, thermal insulation properties of the clay. The heat transmission rate is 0,455 W / sqm. A K below the limit of 0.600 W / sqm. The roof insulation was made with cellulose and

wood fibre panels. The heat transmission rate is 0.123 W / sqm. m K < 0.250 W / sqm. m K legal limit.

The local norms are considered suitable to direct attention towards the passive behaviour of buildings. The choice to combine refitting aspects and the recovery of traditional construction techniques with bio architecture and energy efficiency is also interesting.

Buildings with a good insulation have low energy needs for heating requirements. A bad **natural ventilation** impacts on the perceived comfort level and may lead to moulds setting on the walls. In this case, controlled mechanical ventilation should be used together with high-performance heat recovery devices.

Controlled mechanical ventilation systems drive preheated air in the rooms and remove it from kitchen and bathrooms. Heat recovery systems allow to reduce energy consumption and contribute to the qualification of installations.

They must include:

- Heat exchangers with wide surfaces, at least 20 sqm every 100 m³ / h of flow rate.
 - extremely low energy consumption to start ventilation fans (from 0,24 to 0,30 Wh/ m³ of inflated air)
 - Noiseless devices
 - A heat exchanger to recover heat and regulate humidity levels, thus improving winter performances
- Energy recovery also implies water condensation on the heat exchanger, improving conductivity.

The level of information on the possibilities offered by those systems is still very low.



GUIDELINES - SPAIN

In its contribution, Spain focused on aspects of general importance that could be used to effectively achieve better global results through:

- the *reduction of environmental impact and the reuse of water*
- the *promotion of bioclimatic criteria* based on the Mediterranean construction tradition which improves the perceived comfort by focusing on the reduction of energy needs related to home installations.
- increasing the use of largely available *natural renewable resources* on the Mediterranean coastal areas.

The technical team from Andalusia highlighted some aspects *linked to global ecological evaluations that could improve the environmental sustainability of settlement systems and reduce anthropic pressure*. In particular, they underline the considerations on the use of water in the Mediterranean area and the possibility of **water recycling** with the recovery of used sanitary water and rain water. Reference is made also to the **use of biomass**, intended here as industrial, agricultural and gardening waste.

Spanish engineers highlighted a prominent aspect in the evaluation of the ecological value of the construction product which is nested in the analysis of the life-cycle of materials, by including also production energy costs, transport costs and the cost for disposing used materials in the energy measurements .

The Spanish engineers highlighted a theme which is common to all the Mediterranean countries: the bioclimatic character of rural and spontaneous architecture.

The use of natural ventilation and lighting systems and the use of plant varieties, all come from tradition.

Solar heating systems are also quite common and they count for two thirds of the demand for hot water for sanitary and industrial use. These systems use a simple and durable technology but they suffer from a difficult integration into the architecture of buildings and are struggling to find a widespread application in summer cooling systems.

Spain is the third global provider of **wind power**, but this technology is far from reaching its maximum deployment due to the lack of small plants that could respond to the needs of rural areas, islands and mountain settlements where access to network infrastructures is indeed difficult.

The problems for a widespread application originating from the visual impact of this system can be overcome when considering the context and by suitable planning with regard to size, height, type of turbine and materials. Plans should also consider possible interferences related to noise, vibration transmission, and interaction with electromagnetic fields.

Planning should also include the main physical and environmental data: wind speed, air density, direction of the main flows, natural or artificial barriers, etc.

The process for authorization may require complex procedures, designed for large-scale projects, and may

be detrimental to small installations.

The cost of the environmental assessments required to start planning contributes to the amount of the investment for 2000-6000€/Kw installed and affects repayment times, in particular for small installations.

Energy production from wind power sources, moreover, is not included within the framework of institutional tools, which refer almost exclusively to solar heating and photovoltaic systems.

In the **Biomass** sector we find a wide range of different biodegradable products, waste from agricultural activities and garden maintenance, industrial waste, fishery waste etc. If properly processed, these materials provide a valuable fuel.

The wide presence of activities connected to the production of green waste in Andalusia make the exploitation of biomass fuel a profitable solution for this territory. The reuse of waste products minimises the global environmental impact and reduces CO2 emissions.

The use of biomass may lead to very high performances, is a permanent source of fuel originating from an existing process and is independent from climate conditions.

Its use in agriculture and the consequent creation of new markets is another interesting aspect. The production of biomass from forestry activities reduces the risks of ecological disruption and fire.

The use of this technology implies the need to have large storage volumes, usually unavailable in urban areas.

In rural areas, it is important not to trigger competition dynamics which may be in conflict with agricultural activities.

A deterrent to the use of these systems is represented by installation and maintenance costs, by the impact on end-user behaviours and by the need to make use of specialised personnel.



5.1. The Documentation about the Results

All the Cards and Abstract are easily accessible on the SCORE web site by opening the “page” of the Matrixes and then clicking on the Matrix of the Country of interest, as mentioned earlier.

The different national Matrixes display some dark green squares which correspond to the themes and the topics developed by each partner country. The dark green squares lead to a page displaying the abstract, and allowing to “download” a pdf files with the card in the native language.

It should be noticed that the themes developed in each national Matrix were selected freely. This allowed to better emphasize the state of the art as to the use of a system or of a technology in the reference country or at least to the attention paid to them (in the sense that the cards that were developed in the different national contexts are evidently those more information were found about or those of greater interest). The free draft of the Matrixes in addition allowed to emphasize immediately any common approaches and any differences among the various countries as to the themes taken into account.

The list of all the cards drafted by all the different countries follows.

Province of Savona (Italy)

1A-D Aggregation/exposure for micro-climatic control
2A-B-D Passive solar
3C-D Solar thermal collector
4C-D Photovoltaic
5A-B-D Small wind turbine
6A-C Biomass
7A-C Geothermic
10A Natural aeration
11A-C Natural lighting
12A-D Automatic control system
13A-B-C Enclosure (insulation, mass, PCM)
15A-B-C-D Eco-compatible materials
16A-B-D Microclimatic and environmental control through vegetation

Regional Agency for Energy of the Dodecanese (Greece)

Development Company of Cephalonia and Ithaca (Greece)

2A Passive solar
3A Solar thermal collector
4B Photovoltaic
10A Natural aeration
11A Natural lighting
13A Involucre (insulation, mass, PCM)
15A Eco-compatible materials
16A Microclimatic and environmental control through vegetation

Chamber of Commerce, Industry and Maritime of Seville (Spain)

3A-B Solar thermal collector
5A-C Small wind turbine
6A-D Biomass
7A Geothermic
10A-B Natural aeration
11A-B-D Natural lighting
13A Involucre (insulation, mass, PCM)
16A-B Microclimatic and environmental control through vegetation
17A Water resource (rain collection, etc)

Neopolis” Training Center of the Chamber of Commerce and Industry of the Drôme Department (France)

Chamber of Arts and Crafts of the Rhône, headquarters in Lyon (France)

Chamber of Commerce of Marseilles (France)

1A Aggregation/exposure for micro-climatic control
2A-C Passive solar
3A-C Solar thermal collector
4A-C Photovoltaic
6C Biomass
9A-C Sun screen control
11A-C Natural lighting
12A Automatic control system
13A-C Enclosure (insulation, mass, PCM)
14B-C System (heating, conditioner)
15A-C Eco-compatible materials
16A Microclimatic and environmental control through vegetation
17A-C Water resource (rain collection, etc)

Local Agency for Energy of Pomurje - LEA (Slovenia)

4C-D Photovoltaic
6C-D Biomass
7C-D Geothermic
11C-D Natural lighting
12C-D Automatic control system
13C-D Enclosure (insulation, mass, PCM)
14C-D System (heating, conditioner)
15C-D Eco-compatible materials

Chamber of Commerce and Industry of Cyprus (Cyprus)

5A-B Small wind turbine
13A Enclosure (insulation, mass, PCM)
15A-B Eco-compatible materials
16A-B Microclimatic and environmental control through vegetation

Regional Agency for Energy for Center and South Alentejo (Portugal)

Documents on passive solar and biomass.



6. The “Bio-construction Action Plan”

As mentioned earlier, the *Matrixes* drafted by the different Partner Countries include *cards* in the native language together with *abstracts* in English. These abstracts, are organized in specific sections and more particularly deal with various themes (for instance, passive solar, photovoltaics, biomass etc.) and include their application (New Constructions, Refit Works of Recent Buildings, Renovation and refit works of historical buildings and Works ex novo in historical contexts), as well as solar thermal energy for setting up an action plan, the “*Bio-construction Action Plan*,” whose aim is to lay the foundations for concretely implementing the solutions suggested in the cards, through additional research programs and pilot projects.

The collected information were then analyzed and compared for drafting “*Bio-construction Action Plans*.” The information were compared in two types of tables presented in the following paragraphs.

The first type of table groups the information by theme. This allows to know the specificities of each country about each theme dealt with, the problems singled out and the suggested proposals. Above all though, it allows for a fruitful exchange of information between the partners which can be useful both for availing itself of the experience gained in the other countries, to find particularly effective solutions and to assess the opportunity to start common actions on a transnational and European level.

The second type of tables groups the information by country. They are truthful “*Bio-construction Action Plans*” which single out actions for the development of a sustainable approach in architecture and territorial planning in the MED areas of reference, according to the analysis (on technologies, their strength, their problems, their solutions, the regulations, the case studies etc.) carried out through drafting the *Cards* within the *Matrix*. The tables, as it shall be seen, contain information about

the proposal for sustainable development actions which take into account both the possible local, national, transnational or European scale of the actions and the subjects which shall be more actively involved in them. The choice to use tables result, like all other decisions about how to organize the work presentation on the web site, from the need to immediately clarify the complex framework of each partner’s actions and the actions shared by two or more partners.

6.1. The Transnational “Bio-construction Action Plan” Organized By Themes

As explained above, the first tables presented in the following paragraphs are organized by themes providing information of transnational character. The content of the table shall be summarized as follows for each theme, while the table shall be consulted in order to know in details the actions of the Partners about the different topics dealt with. The data shown in the table are taken from the *abstract* included in the *Matrixes* of the different Countries, which can be accessed by “clicking” on the dark green squares. The table also evidently contains summaries about what is contained in the *abstracts* in the section “*Indication for the Bio-Construction Action Plan*.”

AGGREGATION/EXPOSURE FOR MICRO-CLIMATIC CONTROL

About this theme, only two countries (Italy and France) suggest possible actions. On the one hand, they are local actions intending to promote solutions for building settlements by aggregating buildings with “core” solutions and others as well. Such solutions are considered to be more easily integrated in the territorial context of reference



Some pages of the *cards* in the original language drafted for the *Matrix* of the SCORE partners.



and therefore they are more manageable from a natural microclimatic control point of view. On the other hand, it is important to promote a greater awareness among the designers as well as about the relation to the context, within a design approach which is sustainable and more aware of the typical and local resources. On this account, a greater homogeneity of the software dedicated to bioclimatic design is useful. To this purpose, transnational and European research could be carried out. The above-mentioned local actions require normative and regulatory integration as well as promotion, which could be carried out by Local Administrations with modest resources. The transnational actions should avail themselves to research funds, although the economic intervention of software developers and producers for the building industry is necessary.

PASSIVE SOLAR

The attitude of the various countries about this theme differs, thus making their proposals inhomogeneous. For instance, Greece believes that it is useful to have demonstrative and dissemination projects about the necessary technological know-how for designing passive solar systems, while on the other, Italy deems it appropriate to analyze the existing properties, especially in the decayed peripheral contexts, in order to carry out large scale interventions. The first action suggested a proposal about the SCORE project, by selecting interesting case studies and innovative technologies in order to exchange know how among the different partners. Other projects of the same kind may be of great importance. As to the second possible action, the necessary economic resources are high; nonetheless these studies are indispensable to assess where it is more appropriate to intervene and the energy rehabilitation of large real estates may even have very positive results and allows to amortize the costs relatively quickly (allowing moreover to protect the resource made of the same buildings whose extensive demolition would be unsustainable). There may be different ways to perform large scale analysis of the existing buildings; operations of that kind were already started within the *Smartcity* initiative, nonetheless it is deemed currently more complex to resort to European projects funds. Rather, incentives could be offered to managing entities as tax relief or allowing them to have volumetric increases (for instance the solar greenhouses themselves), obliging them though to extensive energy rehabilitation works. Several countries such as France and Italy feel the need to have common calculation and software tools to study the passive solar systems which, actually, are not by nature system based and therefore they are less “reliable” than other energy production systems based on renewable resources. The creation of calculation and software systems can be of transnational or European nature, as already mentioned above.

SOLAR THERMAL COLLECTOR

The actions suggested about this theme share some interesting points. Different countries detect, although in

a slightly different manner, the need to have a normative and regulatory framework of reference which is more appropriate and which takes into account also the architectural integration problems and allows in addition better (faster and more constant) funding. About this point, the common interest is evident and it can be meaningful to start projects on a European level which – like SCORE – compare different national realities. Italy and France are also interested in integrating the solar thermal in tourist resorts which are considered as particularly suitable for hot water supply. This issue would deserve a more thorough analysis in transnational projects if not in European ones. Many MED territories are particularly suitable for tourism and conjugating energy conscious policies for sustainable tourism could be a particularly interesting strategy for the development of this sector. The problems linked to the safe installation of the systems on the building roofs are of a local scale, although they are not less important for this reason.

PHOTOVOLTAICS

About photovoltaics, the different partners singled out different possible actions about the following: panel design, availability of environmental analysis and dedicated software and the particular nature of the type of production of the panels that can meaningfully guarantee employment. The shared identification of areas where to install the photovoltaic systems is particularly important: for instance the port areas (Italy) or the agricultural ones (Italy, Greece). The analysis of a potential development of this technology in an extra-urban framework is a theme of great interest, even according to what can be inferred by reading the cards. At the same time, shared proposals are singled out about defining the rules both of the energy market and the streamlining of the bureaucratic course as well as architectural integration. As to the regulatory apparatus, a substantial difference emerges among the different countries and therefore structuring super national orientations seems complex.

SMALL WIND TURBINE

The technologies of the mini and micro wind power are still poorly used, as to other production systems from renewable resources (not necessarily better); this is also true for the different partners which dealt with the topic. The substantially homogeneous situations deriving from the poor dissemination of this type of system solutions leads to single out similar actions. They essentially concern landscape and integration problems, finding environmental data (wind regime), defining a normative and regulatory framework on this subject and suitable incentives. Besides the individual and important aspects, in the light of the poor development of this promising technology and the substantial homogeneity of situations found in the MED countries, the theme of the mini and micro-wind power seems strategic for starting specific lines of research on a European or transnational level. In other terms, since the research and the applications are still insufficiently developed, it is more urgent, but also easier to harmonize right away shared work, funding and



landscape integration models etc...

BIOMASS

As to this topic, the issues touched on by the various partners are different and no special transnational common actions are proposed. The proposed strategies include: updating the forest and city planning norms and certification systems which do not take into account the energy production from biomass; research and training, risks for the forests and risk of pollution. Among the emphasized aspects, the need to draft protocols for the correct management of the large biomass systems seems to be particularly meaningful while going beyond the local level, activating management processes on a large scale, able to involve different actors.

GEO THERMICS

As to this type of systems, the situation is similar to the mini and micro wind power. The problems in fact are similar and concern: training, monitoring of existing systems, definition of regulations, research. Similarly to the mini and micro wind power sector, even geothermal energy seems to be a promising research and development sector on a transnational level. Still on a transnational level, policies are suggested in order to foster opening the market and competition among the different manufacturers.

SUN SCREEN CONTROL

The theme involved only the French partners of the SCORE project which provided an orientation about research, technical training and users' information, extension of the range of interventions already successfully started in France.

NATURAL AERATION

Various interesting suggestions were presented. In addition to the need to collect local environmental data and pilot interventions adopting very meaningful natural aeration strategies shared by several countries shall be promoted. It is also necessary to intervene on a regulatory level in order to foster the strategies, for instance, by making the hourly air exchanges less binding, since it is difficult to constantly guarantee them for certain uses through natural aeration. Another relevant issue, mentioned in the proposals of the various countries, is creating calculation software, perhaps a simplified one, which is however able to provide preliminary evaluations. This shared need could be studied on a transnational and European level, by involving universities, research centers and software developers and producers.

NATURAL LIGHTING

Several proposals were made on this theme about developing dedicated software, defining norms and regulations and making demonstrative interventions on social or public buildings. Nonetheless, the most interesting aspect is the shared need to start specific training programs for the technicians. On this account, in the light of the convergence of interests, international

programs are deemed as useful.

AUTOMATIC CONTROL SYSTEM

This theme is particularly innovative above all as to software applications for micro-climatic and environmental control. Therefore, transnational research is needed on this theme, in order to harmonize the different automatic management systems to integrate and implement them.

ENCLOSURE (INSULATION, MASS, PCM)

About this theme, many proposals were made about knowledge and development of innovative materials, research and training, financial incentives. Several countries share the opinion that it is necessary to have data banks on the obtained results in order to demonstrate the possibility of an economic return (for instance from thermal insulation strategies).

SYSTEM (HEATING, CONDITIONER)

As to the system solutions of greater interest, attention is paid to heat recovery systems through water and air. Training projects on the dissemination of knowledge about these systems seem possible and important, while also involving the producers.

ECO-COMPATIBLE MATERIALS

Two main strategies of action can be identified as of this theme. The first one (set up on the basis of Italy's, Greece's and France's suggestions) focuses on training, information, creation of data banks, while involving suppliers and distributors, which could be useful to define, on a European level, more harmonized and comparable product labels on a European level. The second strategy (Slovenia, Cyprus) aims instead at improving the incentive systems.

MICROCLIMATIC AND ENVIRONMENTAL CONTROL THROUGH VEGETATION

As to this theme, there are very interesting proposals about training, normative reorganization, drafting technical standards, implementing pilot projects and operational test to assess benefits and risks. Databases about the types of employable plants with their possible effect on the micro-climatic and environmental control are needed. It is also important to assess the potential interface of these databases with the energy certification software. If the shared interest for the creation of databases could imply common actions in the framework of transnational research projects, it is also true that the databases for the vegetation normally have a value as to the plants in the specific area of reference. Therefore, it would be necessary to start transnational projects in order to define the structure of the database in order then to implement the contents with investigations on a local scale.

WATER RESOURCE (RAIN COLLECTION, ETC)

The proposals about this theme entail information through conferences and meetings devoted to this theme and the definition of special tariffs.



6.1.1. The Tables of the Transnational “Bio-construction Action Plan”

Country	Theme				Action scale				Participants						
	Aggregation/exposure for micro-climatic control	Requalification of recent buildings	Renovation and refit works of historical buildings	Works "ex novo" in historical contexts	Local	National	Transnational	European	Public Administration / Managing Authorities	Universities / Educational Bodies	Designers (Associations of)	Builders / Technicians	Producers / Distributors	Users / Owners / Property Managers	Other (specify)
Italy	Achieve regulatory orientation on a territorial scale able to guide the drafting of local master plans to the introduction of incentives (eg. volumetric prizes) for those who build on the basis of aggregate criteria or adopting solutions for the correct environmental relation to micro-climatic control.			Achieve regulatory orientation on a territorial scale able to guide the drafting of local master plans to the introduction of incentives (eg. volumetric prizes) for those who build on the basis of aggregate criteria or adopting solutions for the correct environmental relation to micro-climatic control.	X	X	X		X	X	X				
	Promotion of studies aimed at finding solutions that would facilitate the recovery works of buildings with such criteria, that are often neglected (e.g. incentive solutions for the expansion of existing "nuclei").			Promotion of studies aimed at finding solutions that would facilitate the recovery works of buildings with such criteria, that are often neglected (e.g. incentive solutions for the expansion of existing "nuclei").	X	X	X		X	X				X	
Greece	Promotion of public awareness initiatives (eg. tenders, educational projects, conferences or education for citizenship) concerning issues of public welfare, energy saving and environmental protection, encouraging an attitude of sharing rather than the current tendency towards isolation and the exclusive use of spaces.				X			X							
Spain															



Country	Theme				Action scales				Participants							
	Aggregation/exposure for micro-climatic control	Requalification of recent buildings	Renovation and refit works of historical buildings	Works "ex novo" in historical contexts	Local	National	Transnational	European	Public Administration / Managing Authorities / Bodies	Universities / Educational Bodies	Designers (Associations of)	Builders / Technicians	Producers / Distributors	Users / Owners / Property Managers	Other (specify)	
France	D i f f u s e a c o m m o n computerised method for bio-climatic design (e.g. software), considering the recent national regulations for building energy management.	Requalification of recent buildings	Renovation and refit works of historical buildings	Works "ex novo" in historical contexts		X		X	X	X		X				
Slovenia																
Cyprus																
Portugal																



Country	Theme		Action scale				Participants								
	New constructions	Requalification of recent buildings	Renovation and retrofit works of historical buildings	Works “ex novo” in historical contexts	Local	National	Transnational	European	Public Administration / Managing Authorities	Universities / Educational Bodies	Designers (associations of)	Builders / Technicians	Producers / Distributors	Users / Owners / Property Managers	Other (specify)
Italy	Projects focused on environmental data collection at a local scale aimed at providing effective synthetic tools for the design and evaluation of passive solar power systems.			Projects focused on environmental data collection at a local scale aimed at providing effective synthetic tools for the design and evaluation of passive solar power systems.	X		X		X	X	X				
	Projects aimed at the production of simplified software for the preliminary evaluation of solar heat gain for the winter heating of indoor environments, which could be used also by non-skilled designers.			Projects aimed at the production of simplified software for the preliminary evaluation of solar heat gain for the winter heating of indoor environments, which could be used also by non-skilled designers.		X		X		X	X		X		
	Projects for normative/regulatory structure adjustment, especially at a local level (e.g. local construction regulations) aimed at facilitating the architectural integration of passive solar power systems. Such facilitations would particularly be referred to sun-facing walls (Trombe wall) and greenhouses, considering them as “technical volumes” and not liveable. This could also boost the correct management of maintenance (for example producing easy operating manuals for the users).				*	X				X					
	Projects for the correct methodological outline, the promotion of energy analysis campaigns for existing buildings, with specific focus on suburbs and public real estates. This analysis campaign could enable the identification of intervention areas, costs and incisive financial action for the restructuring of large urban areas.				X										



Country	Theme			Action scale				Participants						
	New constructions	Requalification of recent buildings	Renovation and refit works of historical buildings	Local	National	Transnational	European	Public Administration / Managing Authorities	Universities / Educational Bodies	Designers (Associations of)	Builders / Technicians	Producers / Distributors	Users / Owners / Property Managers	Other (specify)
Greece	Projects focused on demonstrating the areas that best fulfill the requirements concerning weather conditions in order to apply the rules of passive solar power systems.		Works "ex novo" in historical contexts	X	X	X	X	X	X	X				
	Projects for the dissemination of the impact that the implementation of passive solar applications may have on residential and public buildings. Moreover, since the rational operation of these buildings will determine the success of the systems, these activities should also include seminars, workshops and guidelines on the maintenance and use of the applied techniques.				X	X	X	X	X	X				
Spain	Projects aimed at collecting or creating tools, weather data archives and regulations that could provide the constructors with valuable information on weather conditions and regulations of the areas in which passive solar systems could be applied as well as an evaluation check that would calculate the building's behavior after the application of the interventions.			X				X		X	X			



Country	Theme			Action scale				Participants						
	New constructions	Requalification of recent buildings	Renovation and retrofit works of historical buildings	Local	National	Transnational	European	Public Administration / Managing Authorities	Universities / Educational Bodies	Designers (associations of)	Builders / Technicians	Producers / Distributors	Users / Owners / Property Managers	Other (specify)
France	Common computer tools would have to be used to focus on bio-climatism in the initial stage of the project. This would contribute towards not increasing costs in to significantly during this phase where budget is usually really controlled. European programs would be interesting to implement to increase awareness on these topics. Software already exists but is not sufficiently used.	Requalification of recent buildings	Renovation and retrofit works of historical buildings	Works "ex novo" in historical contexts	X	X			X					
	Common computer tools would have to be used to focus on bio-climatism in the initial stage of the project. This would contribute towards not increasing costs in to significantly during this phase where budget is usually really controlled. European programs would be interesting to implement to increase awareness on these topics. Software already exists but is not sufficiently used.	Requalification of recent buildings	Renovation and retrofit works of historical buildings	Works "ex novo" in historical contexts		X				X				
	Common computer tools would have to be used to focus on bio-climatism in the initial stage of the project. This would contribute towards not increasing costs in to significantly during this phase where budget is usually really controlled. European programs would be interesting to implement to increase awareness on these topics. Software already exists but is not sufficiently used.	Requalification of recent buildings	Renovation and retrofit works of historical buildings	Works "ex novo" in historical contexts			X					X		
Slovenia														
Cyprus														
Portugal														



Country		Theme			Action scale				Participants						
Solar heating systems		Renovation and retrofit of buildings	New constructions	Works "ex novo" in historical contexts	Local	National	Transnational	European	Public Administration / Managing Authorities	Universities / Educational Bodies	Designers (Associations of)	Builders / Technicians	Producers / Distributors	Users / Owners / Property Managers	Other (specify)
Italy		Requalification of recent buildings		Works "ex novo" in historical contexts	X	X	X		X	X	X		X		
			Projects for the reorganization of rules and regulations, especially at a local level, aimed at providing indications based on performance that are precise but flexible, with specific reference to dealing with the issues of architectural integration of solar heating systems.		X	X	X	X	X	X	X		X		
			Projects for studying and promoting solutions for the architectural integration of solar heating systems in the tourism sector (seaside resorts, vacation homes, etc.), with the specific aim of deciding how to provide incentives to promote the demand for solar heating systems.		X	X		X	X	X			X		
Greece			Projects aimed at facilitating the integration of solar heating systems designed for natural, forced, or mixed circulation with respect to several aspects: placing of tanks, new fitting solutions to limit the risks to workers and consequently the safety costs; solutions capable of combining other types of renewable energy (micro-generation).		X				X						
		Projects focused on demonstrating the areas that best fulfill the requirements concerning weather conditions in order to install solar heating systems.													
		Projects for the dissemination of the impact that the installation of solar heating systems would have on homes, hotels and public buildings.			X				X				X		
	Projects aimed at collecting or creating tools, weather data archives and regulations that could provide the constructors with valuable information on weather conditions and regulations of the areas where solar heating systems could be installed as well as an evaluation check that would calculate energy consumption and savings after the application of the intervention.				X	X			X	X	X		X		



Country	Theme			Action scale				Participants					
	New constructions	Renovation and refit works of historical buildings	Renovation and refit works of historical buildings	Local	National	Transnational	European	Public Administration / Managing Authorities / Bodies	Designers (Associations of)	Builders / Technicians	Producers / Distributors	Users / Owners / Property Managers	Other (specify)
Spain	New constructions	Renovation and refit works of historical buildings	Works "ex novo" in historical contexts		X								
	Establish a fast and stable subventions program to avoid uncertainty in the market for lack of clarity in investment terms.				X	X	X	X		X			
	Promote research programs for the optimization of solar thermal systems, applied to the generation of hot water and heating, and especially to the development of new applications such as cooling.				X	X	X	X			X		
France	Development of a catalog of solutions and systems that facilitates the architectural integration of the equipment used.			X	X	X		X	X				
	Hotels that have important needs for hot water should always have resource to this kind of technology. Any solutions using solar energy should be encouraged.		Hotels that have significant demand for hot water should always have access to this kind of technology. Any solutions using solar energy should be encouraged.		X	X		X	X			X	
	Incentives should be implemented for all new projects or major renovations.		Incentives should be implemented for all new projects or major renovations.		X	X		X					
Slovenia	Projects to disseminate the principle of solar cooling or financial aid would develop this promising technology in the Mediterranean region.		Projects to disseminate the principle of solar cooling or financial aid would develop this promising technology in the Mediterranean region.		X	X		X	X		X		
Cyprus													
Portugal													



Country	Theme		Action scale				Participants								
	New constructions	Requalification of recent buildings	Renovation and refit works of historical buildings	Works "ex novo" in historical contexts	Local	National	Transnational	European	Public Administration / Managing Authorities	Universities / Educational Bodies	Designers (Associations of)	Builders / Technicians	Producers / Distributors	Users / Owners / Property Managers	Other (specify)
Italy			Projects for studying and promoting solutions for the architectural integration of photovoltaic systems, both on agricultural land (e.g. greenhouses) and industrial areas such as ports and harbours or road infrastructures (e.g. railways, highways etc.); these projects will be used to find areas for the installation of photovoltaic systems for users (organized into purchase pools) who have trouble installing photovoltaic systems in city centers or in areas with high property values or multi-storey buildings.		X	X			X	X				X	
			Projects for the reorganization of rules and regulations, especially at a local level, aimed at providing indications based on performance that are precise but flexible (such as diagrams, tables or lists of criteria), with a specific focus on the issues involved in the architectural integration of photovoltaic systems.		X	X			X	X					
			Projects for productive innovation specifically focused on aesthetic quality (design of panels), new fitting solutions able to limit the risks to workers and consequently the safety costs, and solutions capable of combining other type of renewable energy (micro-generation).		X	X			X	X				X	
Greece		Projects focused on the best practices regarding the installation of photovoltaic systems in homes, public buildings and areas, hotels etc., including financial and energy data, aiming at promoting this technique by showing its advantages and prospects.													
		Projects aimed at developing tools and software for the calculation of the existing solar capacity in different areas and propose precise installations according to the needs of each individual building.			X	X							X		
		Projects that propose different types of photovoltaic installations which respect the architectural character of rural and fragile areas as well as their rules and regulations.			X	X	X								



Country	Theme			Action scale				Participants						
	New constructions	Requalification of recent buildings	Renovation and refit works of historical buildings	Local	National	Transnational	European	Public Administration / Managing Authorities	Universities / Educational Bodies	Designers (Associations of)	Builders / Technicians	Producers / Distributors	Users / Owners / Property Managers	Other (specify)
Spain	Conditions must still be implemented in order to not distort existing buildings or new ones and especially not take over space (farmland) to install these panels.		Works "ex novo" in historical contexts	X	X	X		X						
France	Even if most of the cells (the basic component of photovoltaic technology) are manufactured outside Europe, this sector is a major source of employment: researchers to increase yields, industrialists to turn them into panels and especially fitters and maintenance personnel are always from the country of installation. 78% of the cost of solar energy is used to create jobs locally.			X	X	X		X			X			U N I O N S
Slovenia			Introduction of clear and transparent rules for all electricity distribution companies could have positive effects not only on rapid photovoltaic development in Slovenia, but also connection to the grid for business and private purposes.	X	X	X		X			X			
			There is a need to simplify the national authorization procedure (currently involving 9 steps).	X	X	X		X			X			
			There are also differences in the actual cost of connection.	X	X	X		X			X			
			There are also differences in waiting periods for obtaining the necessary documentation. Certain electricity companies do release all consents, contracts and certificates in the longest time period allowed, while for other companies, the waiting period is significantly shorter.	X	X	X		X			X			
Cyprus														
Portugal														



Country	Theme			Action scale				Participants						
	Small wind turbine	Renovation and retrofit works of historical buildings	Works "ex novo" in historical contexts	Local	National	Transnational	European	Public Administration / Managing Authorities	Universities / Educational Bodies	Designers (Associations of)	Builders / Technicians	Producers / Distributors	Users / Owners / Property Managers	Other (specify)
Italy	New constructions	Requalification of recent buildings		X	X	X		X	X			X		
	Projects aimed at highlighting potentialities and critical aspects of building-integrated wind turbines aimed at the development of guidelines, with specific focus on the safeguarding of historical buildings and landscape features and to sociological and cultural aspects.			X	X	X		X	X					
	Projects for increasing environmental data collection at a local scale aimed at providing effective tools for the designing of wind systems and urban planning. *			X	X	X		X	X					
	Projects focused on reorganizing rules and regulations, especially at a local level (for example, municipal regulations and urban planning tools), aimed at providing indications based on performance that are precise but flexible, specifically focusing on the issues of architectural integration of wind systems (useful for design processes in a local urban context).			X	X	X		X	X					
Greece	Projects for the reorganization of the incentives program to promote mini and micro wind turbines, not only through financial contributions but also with other facilities (for example, the authorization process could be simplified or given the right to increase the number of energy efficient buildings). **		**	X	X	X		X	X					
Spain	Projects for research programs concerning wind and currents conditions in specific areas of the Mediterranean. Production of air flow maps and documentation freely accessible to final users and installers.	Projects for research programs concerning wind and currents conditions in specific areas of the Mediterranean. Production of air flow maps and documentation freely accessible to final users and installers.		X	X	X		X	X					
	Projects for normative/regulatory structure adjustment or enacting new specific laws, especially at regional level, aimed at facilitating the licensing procedures, and thus the exploitation of wind resources.	Projects for normative/regulatory structure adjustment or enacting new specific laws, especially at regional level, aimed at facilitating the licensing procedures, and thus the exploitation of wind resources.		X	X	X		X	X					



Country	Theme			Action scale				Participants						
	New constructions	Requalification of recent buildings	Renovation and refit works of historical buildings	Local	National	Transnational	European	Public Administration / Managing Authorities	Universities / Educational Bodies	Designers (associations of)	Builders / Technicians	Producers / Distributors	Users / Owners / Property Managers	Other (specify)
France														
Slovenia														
Cyprus		Public utilities must also manage the political considerations of how to market the new energy, in some cases allowing customers to pay an additional fee for energy from renewable sources such as small wind turbines.			X			X						
		The Cypriot government should give some incentives for those who install small wind turbines in their homes, perhaps tax exemption for the money they spend building the house or even low bank interest rates on loans. People will thus have more motivation to install small wind turbines.			X			X						
		Inform people about the benefits (environmental, low long-term costs) of wind energy , and perhaps some programmes on television, distribution of leaflets, etc.			X			X	X				X	
Portugal														



Country	Theme			Action scale				Participants							
	New constructions	Requalification of recent buildings	Renovation and refit works of historical buildings	Works "ex novo" in historical contexts	Local	National	Transnational	European	Public Administration / Managing Authorities	Universities / Educational Bodies	Designers (Associations of)	Builders / Technicians	Producers / Distributors	Users / Owners / Property Managers	Other (specify)
Italy	Realize pilot systems and apply them in relevant contexts, such as agriculture (for example greenhouses, carpentry, etc.) and inland valleys for heating and producing electricity.		Realize pilot systems and apply them in relevant contexts, such as agriculture (for example greenhouses, carpentry, etc.) and inland valleys for heating and producing electricity.		X	X	X		X			X	X		
	Create local events involving all the stakeholders		Create local events involving all the stakeholders		X				X			X	X		
	Realize infrastructures (areas and management) to strengthen the timber sector and increase the ecological use of waste vegetable products		Realize infrastructures (areas and management) to strengthen the timber sector and increase the ecological use of waste vegetable products		X	X	X		X				X	X	
	Update urban planning systems to stimulate the diffusion of these projects (awards for areas and compatible uses)		Update urban planning systems to stimulate the diffusion of these projects (awards for areas and compatible uses)		X	X			X						
	Revise the national and local forestry regulations.		Revise the national and local forestry regulations.		X	X			X						
	Adapt the so called Celeste system (a specific software used by Liguria Region for energy certification) to include the use of biomass boilers.		Adapt the so called Celeste system (a specific software used by Liguria Region for energy certification) to include the use of biomass boilers.		X				X						
Greece															
	Projects for education and research programs concerning biomass energy which would help in the progress of alternatives to the energy/food conflict and increase the performance of the equipment used.		Projects for education and research programs concerning biomass energy which would help in the progress of alternatives to the energy/food conflict and increase the performance of the equipment used.		X	X			X					X	
Spain															
	Projects for education and research programs concerning biomass energy which would help in the progress of alternatives to the energy/food conflict and increase the performance of the equipment used.		Projects for education and research programs concerning biomass energy which would help in the progress of alternatives to the energy/food conflict and increase the performance of the equipment used.		X	X			X					X	



Country	Theme Biomass			Action scale				Participants							
	New constructions	Requalification of recent buildings	Renovation and refit works of historical buildings	Works "ex novo" in historical contexts	Local	National	Transnational	European	Public Administration / Managing Authorities	Universities / Educational Bodies	Designers (Associations of)	Builders / Technicians	Producers / Distributors	Users / Owners / Property Managers	Other (specify)
France	To reduce hazards linked to wood procurement and storage, local wood processing industries should be developed, especially in areas where forests are abundant.				X	X			X				X	X	
	Regulations capable of improving pollution control due to the use of wood as an energy source. (More efficient combustion systems and filters)				X	X			X				X		
Slovenia				The reasons for the slow biomass breakthrough into key energy sources are high technology costs and lack of awareness of the people. Compared with the equally efficient fossil fuel stoves, combustion biomass stoves are definitely more expensive and this is certainly a key reason why they are not widely used. It is understandable that only individuals decide to opt for relatively expensive investment in biomass combustion stoves, which is currently justifiable only in the long-term.		X			X				X		
				Efforts should be made to reduce the technological costs of biomass energy production, which will lead to reducing the financial help from the state. Some countries are weary of reduced budget inflows, since the use of biomass would reduce fossil fuel consumption and would therefore reduce the amount of CO2 taxes, and consequently it is difficult to expect adequate state measures.		X			X				X		
Cyprus															
Portugal															



Country	Theme			Action scale				Participants						
	New constructions	Requalification of recent buildings	Renovation and refit works of historical buildings	Local	National	Transnational	European	Public Administration / Managing Authorities	Universities / Educational Bodies	Designers (Associations of)	Builders / Technicians	Producers / Distributors	Users / Owners / Property Managers	Other (specify)
Italy	Projects to spread proper techniques; training for people working in the field (designers, technicians in public offices, builders) and with the involvement of different professional backgrounds (geologists, engineers, architects).	Projects to spread proper techniques; training for people working in the field (designers, technicians in public offices, builders) and with the involvement of different professional backgrounds (geologists, engineers, architects).	Works "ex novo" in historical contexts	X	X	X		X	X	X	X	X		
	Comparison of the conditions offered by the producers with the aim of soliciting and adapting the performance and especially the guarantees offered by the producers to those of other countries (guarantees of 75 years in Switzerland against 20-25 in Italy).	Comparison of the conditions offered by the producers with the aim of soliciting and adapting the performance and especially the guarantees offered by the producers to those of other countries (guarantees of 75 years in Switzerland against 20-25 in Italy).			X	X							X	
Greece	Projects for the implementation and monitoring of good practices to improve the ability to identify the optimal combination of renewable energy sources according to climatic conditions, the morphological characteristics of the site and the size and use of buildings.	Projects for the implementation and monitoring of good practices to improve the ability to identify the optimal combination of renewable energy sources according to climatic conditions, the morphological characteristics of the site and the size and use of buildings.		X	X	X		X	X		X			
	Projects for the drafting of local regulations capable of supporting the application of the plants that use geothermal resources.	Projects for the drafting of local regulations capable of supporting the application of the plants that use geothermal resources.		X	X			X						



Country	Theme			Action scale				Participants							
	New constructions	Requalification of recent buildings	Renovation and refit works of historical buildings	Works "ex novo" in historical contexts	Local	National	Transnational	European	Public Administration / Managing Authorities	Universities / Educational Bodies	Designers (Associations of)	Builders / Technicians	Producers / Distributors	Users / Owners / Property Managers	Other (specify)
Spain	Projects for education and research programs concerning geothermic energy which would help in the creation of a qualified net of professionals and companies able to offer a close and adequate service to final user.					X	X			X	X				
	Projects for normative/regulatory structure adjustment or enacting new specific laws, especially at a regional level, aimed at facilitating the exploitation of geothermic resources.				X	X			X						
France															
Slovenia				In our opinion, the biggest obstacle to even greater use of heat pumps is the high initial investment costs compared to other heat sources for heating systems, despite the fact that the operating costs are lower. Granting irreversible funds and easier access would be one solution. Countries that have this kind of heat pump co-financing regulated have more users of such heating systems. There is an annual battle in Slovenia with bureaucracy for the irreversible funds.											
Cyprus															
Portugal															



Country	Theme			Action scale				Participants						
	New constructions	Requalification of recent buildings	Renovation and refit works of historical buildings	Local	National	Transnational	European	Public Administration / Managing Authorities	Universities / Educational Bodies	Designers (Associations of)	Builders / Technicians	Producers / Distributors	Users / Owners / Property Managers	Other (specify)
Italy														
Greece														
Spain														
France	European programs aimed at promoting research on these topics should be encouraged. Software already exists but is little used. A promotional campaign to architecture and engineering schools is expected to train future users about these new technologies. More awareness campaigns for users should be conducted to ensure the proper use of these systems, especially in the tertiary sector.	European programs aimed at promoting research on these topics should be encouraged. Software already exists but is little used. A promotional campaign to architecture and engineering schools is expected to train future users about these new technologies. More awareness campaigns for users should be conducted to ensure the proper use of these systems, especially in the tertiary sector.	Works "ex novo" in historical contexts		X		X	X	X			X		
Slovenia	The principle challenges of "families to positive energies" launched at a European level should be extended to offices.	The principle challenges of "families to positive energies" launched at a European level should be extended to offices.			X		X	X					X	
Cyprus														
Portugal														



Country	Theme			Action scale				Participants						
	Natural airing	Renovation and refit works of historical buildings	Works "ex novo" in historical contexts	Local	National	Transnational	European	Public Administration / Managing Authorities	Universities / Educational Bodies	Designers (associations of)	Builders / Technicians	Producers / Distributors	Users / Owners / Property Managers	Other (specify)
Greece	New constructions	Requalification of recent buildings	Renovation and refit works of historical buildings											
	Moreover, since the rational operation of these buildings will determine the success of the systems, the disseminating activities should also include seminars, workshops and guidelines on the maintenance and use of the applied techniques.				X	X	X		X					
Spain	Projects aiming at collecting or creating tools, weather data archives and regulations that could provide the constructors with valuable information on weather conditions and regulations of the areas in which natural airing systems could be applied as well as an evaluation check that would calculate the building's behavior after the application of the interventions.													
	Research projects for creating specific software tools and methods that could be easily applied in the design stages of a building or in urban development.			X	X	X		X						
France	Projects for normative/regulatory structure adjustment or enacting new specific laws, especially for regional level, aimed to include the use of natural ventilation as a sustainable practice, specifying minimum rates in different cases.			X	X			X						
	Financing studies of existing territorial conditions (wind direction, orography, natural barriers) which can then be used to define urban planning for future city developments.			X	X	X		X						
	Interdisciplinary design and different regulatory approach that do not limit the use of systems and equipment.				X			X						
Slovenia														
Cyprus														
Portugal														



Country	Theme			Action scale				Participants						
	Requalification of recent buildings	Renovation and refit works of historical buildings	Works "ex novo" in historical contexts	Local	National	Transnational	European	Public Administration / Managing Authorities	Universities / Educational Bodies	Designers (associations of)	Builders / Technicians	Producers / Distributors	Users / Owners / Property Managers	Other (specify)
Italy	Projects for the adjustment of normative/regulatory structures, especially at a local level (e.g. municipal construction regulations), aimed at facilitating the integration of natural ventilation systems with the purpose of guiding and boosting local urban design.			X	X			X		X				
	Projects focused on environmental data collection at a local scale aimed at providing effective synthetic tools useful to design and evaluate natural ventilation systems and for urban planning.			X	X	X		X						
Greece	Projects aimed at the elaboration of simplified software for the preliminary evaluation of air flows (natural ventilation) for the passive cooling of indoor environments, which could also be used by non-skilled designers.				X				X					
	Projects focused on demonstrating the areas that best fulfill requirements concerning weather conditions in order to apply the rules of natural airing.			X	X	X		X	X					
	Projects for the dissemination of the impact that the implementation of natural airing applications may have on homes and public buildings.				X			X	X					



Country	Theme			Action scale				Participants						
	New constructions	Requalification of recent buildings	Renovation and refit works of historical buildings	Local	National	Transnational	European	Public Administration / Managing Authorities	Universities / Educational Bodies	Designers (Associations of)	Builders / Technicians	Producers / Distributors	Users / Owners / Property Managers	Other (specify)
Italy	An inter-institutional study capable of finding criteria and types compatible with regional landscape rules to outline rules based on performance.	Requalification of recent buildings	Renovation and refit works of historical buildings	X	X			X	X	X				
	Specific training for professionals, evaluators and future technicians studying in this subject area.		An inter-institutional study capable of finding criteria and types compatible with regional landscape rules to outline rules based on performance.		X			X	X		X			
	Development and distribution of software for the detection calculation of the average amount of daylight factor in indoor areas.		Development and distribution of software for the detection calculation of the average amount of daylight factor in indoor areas.		X	X						X		
	Produce good practices starting from public housing, and include the aspect of natural lighting in the general criteria of sustainable architecture.		Produce good practices starting from public housing, and include the aspect of natural lighting in the general criteria of sustainable architecture.		X				X					
Greece	Projects focused on demonstrating the areas that best fulfill the requirements concerning weather conditions in order to apply the rules of natural lighting.			X	X	X		X	X					
	Projects for the dissemination of the impact that the implementation of natural lighting applications may have on homes and public buildings. Moreover, since the rational operation of these buildings will determine the success of the systems, the disseminating activities should also include seminars, workshops and guidelines on the maintenance and use of the applied techniques.			X	X			X						



Country	Theme			Action scale				Participants						
	Natural lighting	Renovation and refit works of historical buildings	Works "ex novo" in historical contexts	Local	National	Transnational	European	Public Administration / Managing Authorities	Universities / Educational Bodies	Designers (Associations of)	Builders / Technicians	Producers / Distributors	Users / Owners / Property Managers	Other (specify)
Greece	<p>New constructions</p> <p>Projects aiming at collecting or creating tools, weather data archives and regulations that could provide the constructors with valuable information on weather conditions and regulations of the areas that natural lighting systems could be applied as well as an evaluation check that would calculate the buildings' behavior after the application of the interventions.</p>	<p>Requalification of recent buildings</p> <p>Renovation and refit works of historical buildings</p>	<p>Works "ex novo" in historical contexts</p>	X	X			X						
Spain	<p>Projects for education and research programs concerning natural lighting with specific focus on existing buildings, renovation projects and historical areas. *</p> <p>Projects for normative/regulatory structure adjustment or enacting new specific laws, especially at a regional level, aimed at including the use of this resource as well as the different strategies for taking advantage of it as a sustainable practice **</p>		*	X	X	X		X						
France	<p>Software already exists but is not sufficiently used. An advertising campaign for architecture and engineering schools would contribute towards introducing users to new technologies.</p> <p>It would be interesting to implement european programs discussing these topics.</p>	<p>Software already exists but is not sufficiently used. An advertising campaign for architecture and engineering schools would contribute towards introducing users to new technologies.</p> <p>It would be interesting to implement european programs discussing these topics.</p>		X	X	X		X			X			
Slovenia														
Cyprus														
Portugal														



Country	Theme			Action scale				Participants						
	Automatic control systems	Automatic control systems	Automatic control systems	Local	National	Transnational	European	Public Administration / Managing Authorities	Universities / Educational Bodies	Designers (Associations of)	Builders / Technicians	Producers / Distributors	Users / Owners / Property Managers	Other (specify)
Italy	New constructions	Requalification of recent buildings	Renovation and retrofit works of historical buildings	X	X			X						
	Solicit the adoption of the CEN EN1523 regulations as a guideline for local rules (following the example of Emilia Romagna).		Works "ex novo" in historical contexts											
Greece	Promotion for insiders, technicians and designers of partnership in regions or leading countries in the sector, strictly aimed at the diffusion of "building automation" in the sector of energy conservation .													
Spain														
France	Need for a user friendly interface and practical operating manual.				X	X						X	X	
	Need for international protocols to uniform the control system.						X	X						
Slovenia	Communication technology does not in itself solve the problem of inter-operability of different systems, so it would make sense for the systems to be open. This means that the system has the following properties:													
Cyprus														
Portugal														



Country	Theme		Action scale				Participants						
	New constructions	Renovation and refit works of historical buildings	Local	National	Transnational	European	Public Administration / Managing Authorities	Universities / Educational Bodies	Designers (Associations of)	Builders / Technicians	Producers / Distributors	Users / Owners / Property Managers	Other (specify)
Italy	<p>Creation of an observatory to monitor the action taken, together with the dissemination of best practices in order to inform / train all stakeholders (citizens, administrators, entrepreneurs, developers, engineers, etc.), thus providing added value to the many local technical energy agencies (RENAEL), but that does not always impose itself on the territory, in order to train the technical workers who work in both private and public sectors.</p> <p>Implement, through project initiatives, the technological research of stratification insulating for housing (Phase Change Materials (PCM), Transparent insulation materials (TIM) and thin thermo-reflective insulation) and transparent surfaces (photochromatic, thermochromatic, electrochromatic glass, ETFE , etc.) that would enable the application of innovative and industrialized technologies and materials.</p>	Renovation and refit works of historical buildings		X	X		X	X		X			
		Works "ex novo" in historical contexts		X	X	X		X					
Greece	<p>To overcome the difficulty in understanding the technical data and especially in gathering evidence on the energy quality of buildings, there should be a project for the creation of archives and databases and media systems for learning and developing through simple indicators, for an overall assessment of the existing building sector.</p> <p>Project based on an energy analysis of all public buildings and the general state of the structures, (age, regulatory compliance) of critical energy performance indicators and the status of plant systems in order to enact and enable investments, restructuring and upgrading of public assets.</p>			X			X						
					X	X		X	X	X	X		
	<p>Projects aiming at collecting all the available materials and insulating processes that could be applied depending on the special needs of each building. In addition, this platform could operate as a means of communication between technicians for the exchange of experiences.</p>												
	<p>Implementation of a database aimed at presenting all the construction materials that are labeled and promote sustainability in the construction sector as well as at informing stakeholders on the existing regulations and guidelines.</p>		X	X	X		X						



Country	Theme Involucare			Action scale				Participants						
	New constructions	Requalification of recent buildings	Renovation and reft works of historical buildings	Local	National	Transnational	European	Public Administration / Managing Authorities	Universities / Educational Bodies	Designers (Associations of)	Builders / Technicians	Producers / Distributors	Users / Owners / Property Managers	Other (specify)
Spain	Research projects for new materials and solutions, and forum creation for discussing the progress made.		Works "ex novo" in historical contexts		X	X						X		
	Planning of projects for the implementation of an energy labeling system for construction products and materials, with the objective of defining the balance between wasted and saved energy in the entire process.				X	X			X			X		
France	Normative and regulatory adjustment for establishing control systems for constructions, with the aim of ensuring the proper implementation of the law. This is the only way of detecting dysfunctions to feedback the continuous improvement process.				X					X		X		
	Demonstrate the economic return of the best involucare solutions and consider the concept of total cost and not just the cost of construction. Training workers involved in building and financing construction as reference models.			Demonstrate the economic return of the best involucare solutions and consider the concept of total cost and not just the cost of construction. Training workers involved in building and financing construction as reference models.		X	X				X			
Slovenia			Focus on ventilation in relation to the type of insulation and the type of building to avoid dampness problems in perimeter walls.		X	X				X				
			With the new regulations on thermal insulation and regulations on fire prevention, the requirements for the renovation of façades of apartment buildings has been tightened among other things. During renovation work, we no longer ask if we should install additional heating insulation or how thick it should be, but we ask from which material the insulation should be made so it is not too thick and at the same time satisfies all the fire prevention requirements.		X								X	



Country	Theme			Action scale				Participants						
	New constructions	Requalification of recent buildings	Renovation and reft works of historical buildings	Local	National	Transnational	European	Public Administration / Managing Authorities	Universities / Educational Bodies	Designers (associations of)	Builders / Technicians	Producers / Distributors	Users / Owners / Property Managers	Other (specify)
Slovenia			Works "ex novo" in historical contexts		X	X		X						
			Our opinion is that straightening at a legislative level does not seem justified at this stage.											
Cyprus			Advanced low-energy buildings as required by current regulations on thermal protection could be achieved through financial incentives.		X	X		X					X	
			<i>It is difficult to make suggestions when the competent authorities are already doing so much to increase public awareness</i>											
Portugal			The effectiveness of the campaigns may be increased now that there is an economic crisis with no end in sight and attention is on cost cutting, economizing and resource conservation. There needs to be considerable effort made to get people out of the "subsidy" mindset.		X	X		X						



Country	Theme			Action scale				Participants					
	System (heating, air-conditioning)	Renovation and refit works of historical buildings	Works "ex novo" in historical contexts	Local	National	Transnational	European	Public Administrations / Managing Authorities / University / Educational Bodies	Designers (Association of)	Builders / Technicians	Producers / Distributors	Users / Owners / Property Managers	Other (specify)
Italy	New constructions	Requalifications of recent buildings	Renovation and refit works of historical buildings	Works "ex novo" in historical contexts									
Greece													
Spain													
France													
			<i>Water-based heat recovery systems</i>										
			Communication and information initiatives will have to be undertaken in these countries, because this solution shows benefits greater than the solar heating systems at certain latitudes. Subsidies or grant tax credit to renewable energy systems could be extended to this kind of technology.		X			X		X			
			<i>Heaters and coolers</i>										
			More focus on systems design and maintenance . . .		X				X	X			
Slovenia			<i>Ventilation-based heat recovery systems</i>										
			Based on our opinion, some people are insufficiently aware of or are not adequately informed on this kind of ventilation system in order to know its advantages. For some, the installation of ventilation systems is an unnecessary cost, while others do not even consider it.		X							X	
			We agree with the regulation which determines the technical requirements for the ventilation and air conditioning of buildings and with the technical demands for mechanical ventilation systems if they are installed in buildings. People will thus be more informed.		X							X	
Cyprus													
Portugal													



Country	Theme		Action scale					Participants					
	New constructions	Requalification of recent buildings	Local	National	Transnational	European	Public Administration / Managing Authorities	Universities / Educational Bodies	Designers (Associations of)	Builders / Technicians	Producers / Distributors	Users / Owners / Property Managers	Other (specify)
Italy	Renovation and reit works of historical buildings	Works "ex novo" in historical contexts											
	Encourage inter-municipal projects that are based on the actual intention to implement construction processes, how to achieve better quality housing and better living conditions while protecting the environment and the specific characteristics of each country / area, as well as local traditions: the goal is not to mark the difference between the best and worst municipalities , but rather to create a good context to stimulate shared choices and more environmentally sustainable action.		X	X	X	X		X	X	X	X	X	
Greece	Support the implementation of a cluster that consists of retailers and distributors of eco-compatible and natural materials which can be used in the construction sector and reduce the environmental impact and the harmful effects of toxic materials.												
	Projects aiming at the creation of a data base containing the different eco-compatible materials and instructions on their application to buildings as well as different traditional environmentally friendly techniques that are applied in different areas.			X	X	X							
Spain													
France		Today, there are too many brands on the market and European harmonization appears necessary, in order to give clear information to customers, but also to enhance the efforts made by manufacturers on the European market.						X			X		
							X						



Country	Theme			Action scale				Participants						
	New constructions	Requalification of recent buildings	Renovation and refit works of historical buildings	Local	National	Transnational	European	Public Administration / Managing Authorities	Universities / Educational Bodies	Designers (associations of)	Builders / Technicians	Producers / Distributors	Users / Owners / Property Managers	Other (specify)
France	Programs to develop local industry production, processing and marketing of eco-materials should be implemented, given that there is currently a vicious circle: users complain that their buildings are not constructed using eco-compatible materials, while constructors say that they cannot find them on the market, and manufacturers that demand is not sufficient to produce them.	Requalification of recent buildings	Renovation and refit works of historical buildings		X	X					X	X	X	
	Programs to develop local industry production, processing and marketing of eco-materials should be implemented, given that there is currently a vicious circle: users complain that their buildings are not constructed using eco-compatible materials, while constructors say that they cannot find them on the market, and manufacturers that demand is not sufficient to produce them.			X	X			X						
Sloveni				X	X									
						X		X						
Cyprus	Applied research must be encouraged so that momentum is gradually built up regarding the technical knowledge and specifications of such materials, which must be viewed in a new context.				X				X				X	
	There has to be government expenditure on demonstration buildings.				X									
Portugal														



Country	Theme			Action scale				Participants						
	Microclimatic and environmental control through vegetation	Renovation and refit works of historical buildings	Works "ex novo" in historical contexts	Local	National	Transnational	European	Public Administration / Managing Authorities	Universities / Educational Bodies	Designers (Associations of)	Builders / Technicians	Producers / Distributors	Users / Owners / Property Managers	Other (specify)
Italy	New constructions	Requalification of recent buildings	Renovation and refit works of historical buildings											
	Projects for normative/regulatory structure adjustment, especially at a local level (e.g. municipal construction regulations), aimed at facilitating the integration of vegetation in architecture. Such facilitations should be referred to vertical and horizontal greening systems and boosting their use in relation to the positive effects on the microclimate and environment. *				X	X	X		X			X		
	Pilot projects for the monitoring of vertical and horizontal greening systems aimed at quantifying the microclimatic and environmental benefits obtainable in MED territory, which are also required to clarify the regulations. **					X	X		X					
	Projects for highlighting the potential and critical aspects of vertical greening systems aimed at developing guidelines and/or Layman's reports and a UNI regulation system (with similar characteristics to that concerning the instructions for the design, execution, control, and maintenance of green roofs, ALLEGATO NORMA 2). ***					X	X		X					
Greece	Projects focused on the compilation of a regional database for plant species aimed at responding to the specific local climate needs. ****			X				X				X		
	Projects focused on the best practices regarding the creation of green roofs and the use of special vegetation on the surroundings of buildings aiming at preserving the microclimatic and environmental conditions that improve the life of the building's users.					X		X						
	Projects aimed at developing tools and data bases that will include the most suitable species according to weather conditions and expected results, as well as special techniques and guidelines provided by scientists with experience in the field.			X		X			X			X		



Country	Theme Microclimatic and environmental control through vegetation				Action scale				Participants						
	New constructions	Requalification of recent buildings	Renovation and refit works of historical buildings	Works "ex novo" in historical contexts	Local	National	Transnational	European	Public Administration / Managing Authorities	Universities / Educational Bodies	Designers (associations of)	Builders / Technicians	Producers / Distributors	Users / Owners / Property Managers	Other (specify)
Greece	Projects for the collection of all the existing rules and regulations, aimed at integrating vegetation as a means of achieving energy efficiency and improving the architectural characteristics of different areas.						X	X			X				
Spain	Research projects for tests and experiments, aimed at assessing benefits and risks for different green enclosure solutions, especially from the viewpoint of efficiency and environmental conditioning.						X			X				X	
	Research programs concerning different vegetation species, with the objective of collecting characteristics, such as suitability for green enclosures in the Andalusia area, irrigation needs, shading profiles during different seasons, etc. The final document should be a catalogue of empirical data.				X				X	X				X	
	Projects to integrate of all this information in the existing software (LIDER, CALENER) for calculating efficiency in buildings.					X			X						
France	Lack of technical regulations which consider the overall effects of vegetation.				X	X			X						
	Find solutions to valorize the effects of microclimatic control through vegetation.					X			X						
Slovenia															
Cyprus	To increase awareness, cross communication techniques must be used. Landscape architects must write articles on energy conservation and technical magazines in order to make engineers and technical designers go to gardening experts to seek further ideas and examples.					X				X					
	Interior designers' attention must also be focused to gardening magazines for ideas and energy saving benefits.					X				X					
Portugal															



Country	Theme		Action scale				Participants						
	Water resources (rain collection, etc)		Local	National	Transnational	European	Public Administrations / Managing Authorities	Universities / Educational Bodies	Designers (associations of)	Builders / Technicians	Producers / Distributors	Users / Owners / Property Managers	Other (specify)
Italy	New constructions	Renovation and refit works of historical buildings											
Greece	Requalification of recent buildings	Works "ex novo" in historical contexts											
Spain	Projects for normative/regulatory structure adjustment or enacting new specific laws, especially at a regional level, aimed at defining water re-usage as a valuable practice in construction sustainability, specifying the minimum volumes of treated water required.			X			X						
	Projects for studying the possibilities of implementing water re-using technology in urban public spaces or existing administration buildings.			X	X		X	X					
France	To develop these technical solutions, which limit the costs of maintenance for the local community, special fees should be introduced by local communities.	To develop these technical solutions, which limit the costs of maintenance for the local community, special fees should be introduced by local communities.	X	X			X						
	A work day could be launched at a European level to compare different technologies and to provide solutions depending on the climate and also geographical constraints. Indeed, some solutions are now very space consuming and could be improved.	A work day could be launched at a European level to compare different technologies and to provide solutions depending on the climate and also geographical constraints. Indeed, some solutions are now very space consuming and could be improved.				X	X	X		X			
Slovenia													
Cyprus													
Portugal													



6.2. The “Bio-construction Action Plans” of the Different Partners, Organized by Country

BIO-CONSTRUCTION ACTION PLAN OF ITALY

The suggestions for the bio-construction plan as to the types of *aggregation* of the built up areas are the following:

- developing policies able to guide drafting local master plan (for instance bonuses for volumetric space) for those building on the basis of aggregating criteria or adopting solutions for correctly locating new homes in the environment as to micro-climatic control (for instance assessing the position of the new volumetric spaces as to their context, with the goal to obtain suitable conditions of sun exposure, ventilation as the seasons change);
- promoting studies to find solutions that facilitate refurbishing buildings according to the abovementioned criteria, for instance, solutions that encourage the expansion of existing “complexes” where it is easier to implement criteria based on aggregation and limited land use;
- raising the awareness of the public opinion (for instance educational projects or conferences) as to energy saving and environmental protection, as well as at times promoting a sharing approach to the detriment of isolation and exclusive use of the spaces;
- paying more attention to those cases where public spaces play an important role and take into account some aspects of the most recent experiences of cohousing may facilitate introducing sustainable strategies for waste, energy, water and environment management.

As to *passive solar*, the bio-construction action plan includes the following:

- projects focusing on the collection of environmental data on a local scale, with the goal to provide effective and synthetic tools that are useful to design and assess the passive solar systems;
- projects aiming at developing simplified software for the preliminary evaluation of solar heat gain for winter heating of the indoor rooms which can be used also by inexperienced designers;
- projects for local level normative adjustments (for instance the city building regulations) with the goal to facilitate the inclusion of the solar passive systems within the architecture. Such operations more particularly may include solar walls (Trombe walls) and the solar greenhouses, to be considered as utility rooms which are inhabitable. This can also foster a correct maintenance, for instance producing a user friendly operating manual.

As to the *solar collectors*, the bio-construction action plan shall entail:

- projects for reorganizing norms and regulations, above

all at a local level, with the aim to supply indications based on precise, yet flexible performances, more particularly to deal with the integration of the solar thermal collector within the architectural design;

- projects able to devise and promote solutions for including solar thermal collectors within tourist resorts (beach resorts, vacation homes etc.), more particularly with the goal to provide incentives in order to increase exploiting the solar thermal energy;
- projects intended to foster a simpler inclusion of the solar thermal collectors, with natural, forced or combined circulation, as to the location of the tanks, the new fastening solutions able to limit the exposure of workers to risks and the resulting security costs, with solutions which can be combined with other types of renewable energy.

As to the use of *photovoltaic panels*, the bio-construction action plan pays attention to the architectural integration thus entailing:

- projects able to devise and study solutions for including photovoltaic panels within the architectural design, both in case of agricultural constructions (such as greenhouses) or in case of industrial areas such as ports or road infrastructures (railroad, motor ways etc.). These projects shall be used to single out the areas where to install photovoltaic systems for the users (organized in consortia) who live in urban centers or in areas of high landscape values or else in multi-storey buildings;
- projects for reorganizing standards and regulations, especially at a local level, in order to provide solar thermal energy based on the precise yet flexible performances (such as charts, tables or lists of criteria), more particularly addressing the inclusion of the photovoltaic panels in the architectural design;
- projects for productive innovation, more particularly addressing the aesthetic quality (panel design); the new fastening solutions able to limit the risks for the workers and therefore able to cut down the security costs as well as solutions able to combine other types of renewable energy (micro-generation);
- in the case of the mini/micro wind power which is still poorly widespread in Italy, the bio-construction action plan singles out:
 - projects intended to cast a light on the potentials and criticalities of the inclusion of micro-wind turbines within the architectural design, with the development of guidelines on the protection of the historical building heritage and the characteristics of the landscape and the sociological and cultural aspects;
 - projects to increase the collection of environmental data on a local scale, with the goal to provide effective tools to be used in the design of wind power system and urban planning;
 - projects focusing on the reorganization of standards and regulations, above all on a local level (for instance, city regulations and master



plans), to provide instructions based on precise yet flexible performances, more particularly addressing the including of the wind power systems in the architectural design (which is useful while designing in specific urban and territorial contexts);

- projects for a reorganization of the program of incentives to promote mini and micro-wind turbines not only with financial contributions, but also with other instruments (such as streamlining the authorization process, bonuses for volumetric space for the highly energy efficient buildings).

To foster a correct use of biomass, the bio-construction action plan entails:

- constructing pilot systems to be applied in convenient contexts and for convenient uses, for instance in a farming context (greenhouses, woodworking etc.);
- drafting informative materials to promote singling out compatible biomass systems and updating city planning instruments and building regulations to foster their dissemination;
- as to domestic systems, fostering the set up of suitable storage room, city-planning and landscape norms which take into account this possible need;
- as to the commercial distribution, urging the producers to supply smaller and lighter pellet packs that are more suitable to household needs;
- as to the larger systems for the production of power and tele-heating, it is necessary to devise good design and implementation practices within a shared process involving the various stakeholders (administrators, technicians, inhabitants, manufacturers, investors) so that the biases and the real criticalities shall be resolved in the appropriate venues and during the appropriate stages;
- promoting the specific training of the system technicians;
- regulatory update concerning the forest interventions (which are currently assessed as building interventions);
- starting pilot actions for awarding contracts for the management of public forests;
- reexamination of the “Celeste” system (a specific software developed by the Liguria Regional Government for the energy performance certification) so that to enhance the use of biomass boilers and stoves (the former currently are considered as biomass traditional boilers while the latter are not envisaged).

Even *geothermal power*, which is still underused, is included in the bio construction action plan and several actions are singled out:

- projects to disseminate the appropriate know-how;
- training projects of the professionals (designers, technicians, public office technicians, construction companies) with the involvement of different professional profiles (geologists, engineers, architects);
- acknowledgement of the conditions offered by the producers with the goal to demand the Italy manufacturers to align their performances and above

all their warranties to the ones provided in the other countries (75 years in Switzerland versus 20 – 25 years in Italy);

- projects for implementing and monitoring the good practices for experimenting the optimal combination of renewable energy sources in practice, according to the climate conditions, the morphological characteristics of the site, the size and the use of the buildings;
- projects for drafting suitable local regulations to support the installation of the systems which use geothermal resources, more particularly in the contexts of landscape and historical value;

About the *natural aeration*, to support the dissemination of the construction criteria of the bioclimatic architecture able to cut down the energy needs the bio-construction action plan includes the following:

- adaptation of the local set of rules and the city regulations, in order to facilitate the introduction of natural aeration systems and foster their design;
- collection of environmental data on a local scale in order to create an effective and synthetic instrument to be used during the design stage, supporting the evaluation and the choice of the natural aeration systems in building and of the air currents in an urban environment;
- development of simplified software for the preliminary evaluation of the air flows (natural aeration), that can be used for the adoption of passive cooling systems, which can be used also by designers without having a specific training in fluid dynamics.

As to *natural lighting*, the bio-construction action plan includes:

- opening an inter-institutional negotiating table where it is possible to set up all the lighting criteria and strategies for lighting in compliance with the regional landscape regulations;
- specific training for professionals, for evaluators and for the future technicians which will have to master the subject;
- developing and disseminating software for the detection and the calculation of the average daylight factor in indoor spaces;
- drafting good practices starting from social housing.

As to the *micro-climatic control automatic systems*, the bio-construction action plan includes the following:

- suggestion to adopt the CEN EN1523 standard as a guide line for the local regulations (following the example of the Emilia Romagna Regional Government);
- promotion of training stages for the professionals such as technicians and designers, development of partnerships in leading regions or countries, for the dissemination of the building automation for energy saving.

As to *building enclosure and echo-compatible materials*, the horizontal actions concern several issues as follows:



- creation of an observatory to monitor the actions carried out with the dissemination of good practices to inform/form all the interested individuals (citizens, administrators, entrepreneurs, developers, engineers etc.), thus giving an added value to the many local technical agencies (RENAEL) that not always manage to impose themselves on the territory by playing the role of the technicians operating both in the private and the public sector;
- since in Liguria there are few experimentations on the multilayer innovative materials which combine thermal insulation, thermal lag and thermal reflection, it is necessary to research and study from a technological point of view phase change materials (PCM), transparent insulating materials (TIM) and thin layered insulating materials within projects, in order to support the application of innovative technologies and materials as well as industrial experimentation;
- supporting the dissemination of eco-compatible construction systems (wood frame system, cross laminated solid timber or plywood panels - XLAM) poorly taken into account locally in Liguria. In order to disseminate some construction practices, it is necessary to work horizontally (it is difficult to propose a client XLAM construction, knowing that the Local Health Authorities officials may ask for modification at the end of the construction work, which, although limitedly, would thwart the quality and benefits offered by XLAM).

In the light of the progressively increasing complexity of the projects and of the relevance of the building performances, the development of new methods and the new instruments of evaluation are important goals to be achieved in a designing and planning scenario which should deal with the energy behavior of a new building in a wider and inclusive manner.

- Encouraging inter-municipal projects which are based on the real intentions to implement constructive processes, for better quality dwellings, but also for a better life while respecting the environment and the specific characteristics of each country/area, according to the local traditions: the goal is not to emphasize the difference between the more or less virtuous municipalities, rather to foster a dialogue leading to shared choices and more sustainable actions in environmental terms.
- Implementing the potential of the sustainable building sector, ranging between the production of materials, their detailed distribution on the territory through a network of distributors and retailers, and training of the workers in the building sector through courses organized by schools of construction and by trade associations, up until providing incentives on a regional and/or municipal level for the final user. Also building regulations shall be adopted in order to promote and regulate the development of sustainable construction in the municipality, to orient the users towards an appropriate use of the methods, technologies and materials which use less the natural resources and

have a limited environmental impact.

Last but not least, about the use of vegetation for the microclimate wellbeing of the buildings, the bio-construction action plan includes the following:

- compliance with the regulations, especially on a local level (city building regulations) with the goal to facilitate the inclusion of vegetation in the architectural practice. The intention is to promote the use of vertical and horizontal ecological systems, to achieve positive effects on the microclimate and the environment;
- pilot projects for monitoring vertical and horizontal green system with the goal to quantify the microclimatic and environmental benefits which can be obtained in the MED territories, which are necessary also for achieving clearer ideas;
- projects which emphasize potentials and critical aspects of the vertical green systems for developing guidelines and/or Layman reports and of a UNI standard (with similar characteristics to the ones concerning the design, performance and control and maintenance of green roofs);
- projects for the creation of a regional data bank to steer the choices of vegetable species which can be used suitably to the specific local climate needs. Additional analysis and specifications can be downloaded online from the Matrix - Italy (<http://www.scoremed.eu/themes.php>).

CYPRUS BIO-CONSTRUCTION ACTION PLAN

The Cypriot partner dealt with micro wind power, criteria of bioclimatic architecture and use of vegetation for the microclimatic control of buildings.

As to the *micro wind power*, it is suggested as follows:

- creating incentives (tax exemptions, interest rates abatements etc.) for those who install micro-turbines in their homes;
- an information campaign about the benefits offered by wind power on the media (press, TV channels etc.)
- streamlining the authorizations by the planning authorities for the installations of the micro-turbines in the extra urban areas.

As to building's *thermal insulation*, taken into account the economic crisis, it is appropriate to make an effort to develop a greater awareness about the cash management savings and to reduce resources consumptions, urging people to give up the subsidy mentality. Therefore, the strategies of enclosure to cut down consumptions.

As to the use of *eco-compatible materials*, applied research shall be encouraged in order to better specify and clarify the possible use of innovative materials. It is necessary that the government commits to the construction of demonstrative buildings.

Last but not least, as to the use of *vegetation* for the microclimatic wellbeing of the buildings, it is necessary to start information campaign crossing over the know-how of engineers, architects, interior designers, landscape and garden designers, agricultural technicians by using the specialized press.



Additional investigations and specifications can be downloaded from the Matrix-Cyprus (<http://www.scoremed.eu/themes.php?PART=7>).

FRANCE

- bio-construction action plan of the Marseilles partner;
- bio-construction action plan of the Drôme partner;
- bio-construction action plan of the Rhône partner.

As to *bioclimatic architecture* (types of aggregation, passive solar, solar screening, natural lighting ...), the French teams present their proposal for future European actions that shall entail the following:

- research shall be necessary to develop suitable new software, orientation systems and project inspections, shared by planners and designers and the public administration technicians, in order to support the dissemination of the bioclimatic criteria in the project process, however foreseen of the thermal regulations of 2012, and establish common cultural references;
- supporting architects' and engineers' appropriate university training;
- including CO2 consumption and characteristics among the performance criteria for the selection of materials, with the introduction of a specific taxation;
- testing the new construction technologies and the use of natural materials, to demonstrate the anti-seismic and fire behavior.

As to *passive solar*, it is necessary to emphasize the uselessness of a shared IT tool in order to cut down the initial project costs and the possibility to organize suitable initiatives of dissemination (training, projects) as to the design and construction of the Trombe-Michel walls.

In addition, it is necessary to introduce financial incentives to support the use of solar collectors in the Mediterranean area, more particularly to meet the needs of the tourist and hotel industry.

As to the *biomass systems*, the need for suitable European tools is highlighted in order to develop the supply chain in the largely forested areas by involving all the players. In addition, measures shall be developed for boilers manufacturers in order to improve combustion efficiency and dust suppression in the emissions.

As to *sun screening systems for controlling sun exposure*, it is emphasized that it is necessary to promote awareness raising campaigns for the correct use of these systems, directed to service sector, following the format of the past domestic uses campaigns. (“*Families to Positive Energies*”).

As to the *confined space conditioning systems*, it is appropriate to introduce tax credits for rewarding the use of renewable energy, more particularly solar radiation so widely available in the Mediterranean area.

Concerning *eco-compatible materials*, it would be desirable to pursue a policy of harmonization and reorganization of the many bio brands on a European level. That would contribute to provide a correct information to the users and reward the efforts made by the manufacturers on the European market.

It would also be appropriate to promote programs that would develop the local industry for manufacturing and marketing ecological materials. It is necessary to have actions able to transform a vicious circle into a virtuous one as currently people complain that their home are not built with ecological materials and the builders say that there no ecological materials on the market whilst the manufacturers report that the demand for ecological materials is not enough. It is therefore necessary to devise measures that will allow to overcome these criticalities.

Last but not least, appropriately regulatory instruments on the use of such materials in the renovation of historical buildings should be developed.

As to the rationalization of the use of the *water resource*, it is appropriate to develop techniques for cleaning and reusing waste water (resulting from domestic activities rather than from toilets) which can be treated and used for maintaining green areas and urban furnishing.

These solutions may be adopted even in historical contexts and can contribute to cut down the costs of the local community.

It would useful to organize a European Day on this theme in order to single out the technical solutions which could be used, by avoiding those solutions which entail a greater land consumption, as it sometimes happens today.

Additional information and specifications can be downloaded online from the Matrix-France (<http://www.scoremed.eu/themes.php?PART=4>).

GREECE

- bio-construction action plan of the South Aegean partner;
- bio-construction action plan of the Cephalonian partner

As to *passive solar*, the Greek teams suggest the following:

- research projects should be carried out in order to single out the best environmental conditions to be used in the passive solar systems;
- buildings which use passive solar systems and measure the effects of such systems should be built, both in the case of residential buildings and public buildings;
- the results achieved should be culturally disseminated by organizing workshops, seminars and drafting specific guide lines for passive solar devices' use and maintenance;
- data banks should be created by geographic areas, singling out their climate characteristics and current regulations, so that builders may be facilitated in singling out suitable solutions for the local environment;
- instruments such as virtual models and software should be created in order to assess the effects resulting from the adoption of passive solar systems. Besides that, as to the solar thermal energy, Greece's action plans include the following:
- studies for defining the specific installation characteristics of the collectors according to the local climate functions;



- projects for the dissemination of the savings resulting from the installation of solar thermal collectors in residential buildings, hotels and public offices;
- collection of meteorological data and local norms archives, for the creation of suitable instruments for providing precious basic information to builders, instruments which are suitable also to allow calculating energy consumption and savings.

In case of *photovoltaic systems*, the following is proposed:

- projects focused on the best practices for the installation of photovoltaic systems in homes, public buildings and spaces, hotels etc. including financial services and energy data, for promoting this technology by showing advantages and perspectives;
- projects aiming at developing instruments and software for calculating the solar capacity factor existing in the each area to suggest targeted installations, on the basis of specific requirements of each building;
- projects proposing specific types of photovoltaic systems complying with the architectural character of the rural, fragile areas with a landscape value.

As to the *natural aeration and lighting*, the bioconstruction plans of the two Greek teams propose the following:

- demonstrative projects in the areas which meet the best the environmental conditions for the norms for natural aeration and/or lighting;
- dissemination projects about the effects resulting from the construction of natural aeration and/or lighting systems in the residential and public buildings. Such dissemination activities should also include seminars, workshops and guidelines on the maintenance and use of the applied techniques;
- creation of databases to provide builders with precious information about the local conditions for the areas where the natural aeration and/or lighting systems would be built, as well as creation of instruments to assess the behavior of the building after the application of natural and aeration and lighting systems.

As to *building enclosures*, the two bio-construction action plans propose:

- projects intended to collect all the available materials and the insulations which could be applied according to the specific needs of each building. In addition, a platform of this kind could operate as a place of communication among technicians for exchanging experiences;
- creation of a data bank to promote the sustainability of the construction industry, containing all labeled construction materials, inform the concerned professionals about the regulations and guidelines in force.

As to the use of *eco-compatible materials*, the following actions of general interest are emphasized:

- sustaining the implementation of a cluster made of

retailers and distributors of eco-compatible and natural materials which can be used in the construction industry, by cutting down the environmental impact and the consequences resulting from harmful substances;

- projects aiming at the creation of a data bank containing the different eco-compatible materials and the instructions for their application in buildings as well as the environmentally friendly different traditional techniques adopted in various areas.

Last but not least, as to the *use of vegetation*, as a system to achieve better environmental and microclimatic conditions, the Greeks propose:

- projects that illustrate the best practices concerning the creation of green roofs and the use of vegetation especially around buildings, in order to preserve the microclimate and environmental conditions which improve the life of the users;
- projects that aim at developing instruments and data banks including the most suitable species to the meteorological conditions and expected results, just like the special techniques and the guidelines offered by research workers specialized in the subject;
- projects which collect all the existing regulations and norms aiming at introducing vegetation as a means to reach energy efficiency and improve the architectural characteristics of the different areas.

Additional investigations and specifications can be downloaded from the Matrix-Greece (<http://www.scoremed.eu/themes.php?PART=2>).

BIO CONSTRUCTION ACTION PLAN OF PORTUGAL

In Portugal, several initiatives are leading to developing interesting applications, among which the Edifício Solar XXI of Lisbon, headquarter of the National Laboratory of Engineering and Geology, which keeps being a reference point. This building, which is the most famous bioclimatic architecture of Portugal, includes solar thermal and photovoltaic energy systems and passive cooling and heating systems as well as natural lighting and aeration systems, became a useful reference point for all future constructions.

Portugal, although still affected by the economic crisis, in only 5 years was able to increase the energy produced from renewable sources (wind power, hydroelectric, photovoltaic and wave energy) from 17% to 45% in 2010. In 2009, it built a solar energy mega power plant. Currently, the country is focusing on drafting *eco-energy plans*, as tool to foster the end of the crisis by cutting down energy costs, by focusing on energy production from renewable sources.

40% of the country's deficit resulted from the imports of fossil fuels. With important power plant projects (the wind power plant of the Alto Minho, the solar power plant of Moura and the Aguçadora power plant which shall produce wave energy), Portugal reversed the trend to such an extent that it planned to shut down the conventional power plants, covering by 2020 60% of the energy need with energy production from renewable



sources.

Portugal produced hydroelectric energy for decades. The new programs combine wind and hydroelectric power: the wind power plants pump water upstream during the night – when the winds blow harder –and then water runs downstream during daytime, when the demand for electric power is greater.

Portugal has been developing the *national grid of electric cars charging stations*, to such an extent that the police forces selected electric cars for its fleet.

In addition, lately the MOBI.E project has been tested (reaching its operational in 2011) that develops software and hardware for electric cars charging stations.

In order to support this great energy transformation, Portugal also invested in technology. Its investments were widely rewarded over time and did not worsen existing conditions while shifting from one system to the other and in the meantime created an industry which employs 100.00 workers.

In Portugal, the National Society for the Transmission of Energy, *Redes Energeticas Nacionais* or REN, uses sophisticated models for weather forecast, more particularly as to wind recovery and software programs for calculating the energy produced by various renewable energy systems. Victor Baptista, General Director of REN recognized that these changes require lots of skills, decision making abilities and flexibility, but they are indispensable to avoid black outs. At the moment, the bet is won to such an extent that *Energias de Portugal*, the largest energy company of the country, exported its technology to America, where through its American branch *Horizon Wind Energy*, built and managed wind farms in Iowa and in Texas.

(sources: Portugal Technical Group, web: qualenergia.it, puntogreen.it, ecoo.it, guerrecontro.altervista.org, passive-on.org, in3act.com, <http://blog.premioarchitettura.it>).

BIO CONSTRUCTION ACTION PLAN OF SLOVENIA

As to the *photovoltaic systems*, for the production of electric energy, the Slovenian group emphasized the fragmentary and confused regulations about issuing authorizations and about grid connections costs. Therefore, it is suggested to *introduce clear and transparent* ideas which would apply to all the electric energy distribution companies. Such an action would positively affect the rapid development of the photovoltaic in Slovenia and the grid connections for commercial and private uses.

As to heating and *biomass*, two criticalities are emphasized; the former about the additional costs for stocking fuels, the lower efficiency as to fossil fuels and the greater cost of the system. The latter concerns the reluctance of the Government to provide incentives to such systems due to the lower tax revenue that would result from the reduction of CO2 emissions.

For these two main reasons, the Slovenian workgroup states that it would be appropriate to direct the efforts to cut down the start-up expenses, so that as a result the amount of governmental incentives for them would

decrease.

As to the use of *geothermal heat pumps*, the greatest deterrent is the high start-up expenses, notwithstanding these systems are really more competitive throughout their lifetime. Easily accessible forgivable loans are only one of the possible solutions to stimulate geothermal power, as it was found out in the case of countries which provided loans in this sector. Certainly, next to the provision of incentives, red tape should be streamlined.

As to the *automatic control systems*, there is a problem of communication between different systems and software, as they have to be opened and modifiable. This means that it is necessary to:

- be able to replace a component of a certain brand with the one of another brand and that is why detailed specifications are needed (what they are needed for and how they work);
- being able to implement management systems software in case the system is enlarged or modified, with components of other brands/models. It is important that the manufacturers show their ability and desire to make their products interface with the products of other producers.

As to the *building enclosure* and the thermal insulation and fire resistance performances, the existing regulations clearly define the necessary conditions. Singling out the best solutions for the required performances is a design and planning choice, case by case.

Financial incentives could be provided to build low energy consumption homes, as required by the regulations.

The *controlled ventilation systems with heat recovery* are advantageous because they cut down air heating costs, yet people do not have enough information about them and are not familiar with these systems. It is useful to provide descriptions of the ventilation systems to the citizens so that they can make informed choices.

As to the *eco-compatible materials*, the workgroup maintains that the lack of financial incentives for investments in environmental technologies is the greater obstacle in Slovenia. In order to spur the sector, it would be appropriate to set up forgivable loan incentives and co-funding investments in companies part of eco-technology industry, tax reliefs for purchasing ecological solutions, favorable credit terms for the distribution of eco-technologies.

Additional information and specifications can be downloaded from the Matrix-Slovenia (<http://www.scoremed.eu/themes.php?PART=5>).

BIO CONSTRUCTION ACTION PLAN OF SPAIN

As to *solar thermal collectors*, the Spanish partners maintains that it is necessary to define a clear, stable and fast program of subsidies, so that the uncertainties of the market can be avoided for lack of clear investment terms.

They also emphasize that it would appropriate to promote research programs about domestic water and spaces heating, but also new applications such as



building cooling.

The technicians emphasize that it is useful to create catalogues of solutions able to facilitate the inclusion of the systems in the architectural design.

As to the use *wind micro-turbines*, the need for research programs on wind in specific areas of the Mediterranean is emphasized, by also drafting wind maps which shall be accessible and understandable to users, technicians and installers.

It would also be useful to set up regional norms and regulations in order to facilitate the systems’ authorization procedures.

Concerning *biomass energy*, it would be appropriate to develop research programs that can improve system performance and single out ways to resolve the possible conflict with agricultural use.

The dissemination of *geothermal power* applications may be promoted in order to support the creation of a network of qualified professionals and companies, able to provide a suitable service to final users.

Also the regulations should be adapted, especially on a regional level, in order to facilitate the use of geothermal resources.

As to the *natural aeration systems*, the bio-construction action plan entails promoting research programs to develop specific software and calculation methods which could be easily applied in the designing stage on a building and urban scale.

In addition, there should be projects about the conditions for adapting the regulations on a local scale, in order to introduce the use of natural aeration as a sustainable practice, by applying the specific minimum rates of such systems to meet the environmental comfort and building hygiene provisions. Moreover, it would be necessary to fund studies about how to single out local environmental conditions as a support to city planning.

As to *natural lighting*, in addition to foresee similar local regulations, it would be appropriate to implement training and research programs applied to existing buildings, refitted buildings and historical centers.

Concerning *new eco-compatible materials* it would be useful to have research studies and foster the creation of blogs and forums in order to disseminate their results. It is important to think about a construction materials and products labeling program which takes into account the entire life cycle of the materials while defining their energy consumptions (creation, transportation, installation, maintenance, disposal).

Norms and regulations are useful in order to check the application of such materials so that they can contribute to the ongoing improvement of the system, through a feedback of the process showing malfunctions.

The use of *vegetation for the microclimatic wellbeing* of the buildings could be supported by research projects about the assessment of risks and benefits of the different solutions of green enclosure solutions, above all from an environmental efficiency and conditioning point of view. In addition, the vegetable essences could be classified

through appropriate research in order to single out the most suitable ones for the Andalusian climatic conditions, according to irrigation needs, characteristics of the foliage in the different seasons etc. in order to develop a list of empirical data.

Projects should be launched about including information on the use of vegetable essences in the existing software (Lider, Calener) for the calculation of the buildings’ energy performance.

As to the *rational use of water resources*, regional norms and regulations should be adjusted within projects in order to define the reuse of water as an important practice for the sustainability of the buildings, by specifying the minimum quantities of treated water to be used.

In addition, there should be projects studying the possibility to recycle water in urban spaces or existing administrative buildings.



6.2.1. The National Tables of the “Bio-construction Action Plans”

Theme	Italy				Action scale				Participants						
	New constructions	Requalification of recent buildings	Renovation and refit works of historical buildings	Works "ex novo" in historical areas	Local	National	Transnational	European	Public Administrations/Managing Authorities	Universities / Educational Bodies	Designers (associations of)	Builders / Technicians	Producers / Distributors	Users / Owners / Property Managers	Other (specify)
Aggregation/ exposure for micro- climatic control	Achieve regulatory orientation on a territorial scale able to guide the drafting of local master plans to the introduction of incentives (eg. volumetric prizes) for those who build on the basis of aggregate criteria or adopting solutions for the correct environmental insertion of new housing in relation to micro-climatic control			Achieve regulatory orientation on a territorial scale able to guide the drafting of local master plans to the introduction of incentives (eg. volumetric prizes) for those who build on the basis of aggregate criteria or adopting solutions for the correct environmental insertion of new housing in relation to micro-climatic control	X				X	X	X				
			Promotion of studies aimed at finding solutions that would facilitate the recovery works of buildings with such criteria, that are often neglected (e.g. incentive solutions for the expansion of existing "nuclei")	Promotion of studies aimed at finding solutions that would facilitate the recovery works of buildings with such criteria, that are often neglected (e.g. incentive solutions for the expansion of existing "nuclei")	X	X	X		X						
	Promotion of public awareness initiatives (eg. tenders, educational projects, conferences or education for citizenship) concerning issues of public welfare, energy saving and environmental protection, encouraging an attitude of sharing rather than the current tendency towards isolation and the exclusive use of spaces.								X						X



Theme	Italy				Action scale	Participants									
	New constructions	Requalification of recent buildings	Renovation and retrofit works of historical buildings	Works "ex novo" in historical contexts		Local	National	Transnational	European	Public Administration/Managing Authorities	Universities / Educational Bodies	Designers (associations of)	Builders / Technicians	Producers / Distributors	Users / Owners / Property Managers
Passive Solar	Projects focused on environmental data collection at a local scale aimed at providing effective synthetic tools for the design and evaluation of passive solar power systems.			Projects focused on environmental data collection at a local scale aimed at providing effective synthetic tools for the design and evaluation of passive solar power systems.	X		X			X	X				
	Projects aimed at the production of simplified software for the preliminary evaluation of solar heat gain for the winter heating of indoor environments, which could be used also by non-skilled designers.			Projects aimed at the production of simplified software for the preliminary evaluation of solar heat gain for the winter heating of indoor environments, which could be used also by non-skilled designers.		X		X		X	X		X		
	Projects for normative/regulatory structure adjustment, especially at a local level (e.g. local construction regulations) aimed at facilitating the architectural integration of passive solar power systems. Such facilitations would particularly be referred to sun-facing walls (Trombe wall) and greenhouses, considering them as “technical volumes” and not liveable. This could also boost the correct management of maintenance (for example producing easy operating manuals for the users)				*	X		X		X					
	Projects for the correct methodological outline, the promotion of energy analysis campaigns for existing buildings, with specific focus on suburbs and public real estates. This analysis campaign could enable the identification of intervention areas, costs and incisive financial action for the restructuring of large urban areas.				X		X		X						



Theme	Italy		Action scale				Participants								
	New constructions	Requalification of recent buildings	Renovation and retrofit works of historical buildings	Works "ex novo" in historical contexts	Local	National	Transnational	European	Public Administrations / Managing Authorities /gestori di grandi patrimoni edilizi	Universities / Educational Bodies	Designers (Association of)	Builders / Technicians	Producers / Distributors	Users / Owners / Property Managers	Other (specify)
Passive Solar	characterized by a major deterioration and degradation but often involving high property values.		Renovation and retrofit works of historical buildings	Works "ex novo" in historical contexts											
					X	X	X		X						
					X	X	X		X						
Solar heating systems			Projects for the reorganization of rules and regulations, especially at a local level, aimed at providing indications based on performance that are precise but flexible, with specific reference to dealing with the issues of architectural integration of solar heating systems.		X	X	X		X		X		X		
					X	X	X		X						
					X	X	X		X						
Photovoltaic			Projects aimed at facilitating the integration of solar heating systems designed for natural, forced, or mixed circulation with respect to several aspects: placing of tanks, new fitting solutions to limit the risks to workers and consequently the safety costs; solutions capable of combining other types of renewable energy (micro-generation).		X	X	X		X		X		X		
					X	X	X		X						
					X	X	X		X						
			Projects for studying and promoting solutions for the architectural integration of photovoltaic systems, both on agricultural land (e.g. greenhouses) and industrial areas such as ports and harbours or road infrastructures (e.g. railways, highways etc.); these projects will be used to find areas for the installation of photovoltaic systems for users (organized into purchase pools) who have trouble installing photovoltaic systems in city centers or in areas with high property values or multi-storey buildings.		X	X	X		X		X		X		
					X	X	X		X						
					X	X	X		X						
			Projects for the reorganization of rules and regulations, especially at a local level, aimed at providing indications based on performance that are precise but flexible (such as diagrams, tables or lists of criteria), with a specific focus on the issues involved in the architectural integration of photovoltaic systems.		X	X	X		X		X		X		
					X	X	X		X						
					X	X	X		X						
			Projects for product innovation specifically focused on aesthetic quality (design of panels), new fitting solutions able to limit the risks to workers and consequently the safety costs, and solutions capable of combining other type of renewable energy (micro-generation).		X	X	X		X		X		X		
					X	X	X		X						
					X	X	X		X						



Theme	Italy			Action scale				Participants							
	New constructions	Requalification of recent buildings	Renovation and refit works of historical buildings	Works “ex novo” in historical contexts	Local	National	Transnational	European	Public Administration / Managing Authorities	Universities / Educational Bodies	Designers (Associations of)	Builders / Technicians	Producers / Distributors	Users / Owners / Property Managers	Other (Specify)
Small wind turbine	Projects aimed at highlighting potentialities and critical aspects of building-integrated wind turbines aimed at the development of guidelines, with specific focus on the safeguarding of historical buildings and landscape features and to sociological and cultural aspects.				X	X	X		X	X	X		X		
	Projects for increasing environmental data collection at a local scale aimed at providing effective tools for the designing of wind systems and urban planning. *			*	X	X	X		X	X					
	Projects focused on reorganizing rules and regulations, especially at a local level (for example, municipal regulations and urban planning tools), aimed at providing indications based on performance that are precise but flexible, specifically focusing on the issues of architectural integration of wind systems (useful for design processes in a local urban context).				X	X	X		X	X			X	X	
Biomass	Projects for the reorganization of the incentives program to promote mini and micro wind turbines, not only through financial contributions but also with other facilities (for example, the authorization process could be simplified or given the right to increase the number of energy efficient buildings). **			**	X	X			X				X	X	
	Realize pilot systems and apply them in relevant contexts, such as agriculture (for example greenhouses, carpentry, etc.) and inland valleys for heating and producing electricity.		Realize pilot systems and apply them in relevant contexts, such as agriculture (for example greenhouses, carpentry, etc.) and inland valleys for heating and producing electricity.		X	X	X		X				X	X	
	Create local events involving all the stakeholders		Create local events involving all the stakeholders		X				X				X	X	
	Realize infrastructures (areas and management) to strengthen the timber sector and increase the ecological use of waste vegetable products		Realize infrastructures (areas and management) to strengthen the timber sector and increase the ecological use of waste vegetable products		X	X	X		X				X	X	
	Update urban planning systems to stimulate the diffusion of these projects (awards for areas and compatible uses)		Update urban planning systems to stimulate the diffusion of these projects (awards for areas and compatible uses)		X	X			X						X



Theme	Italy			Action scale				Participants							
	New constructions	Requalification of recent buildings	Renovation and retrofit works of historical buildings	Works "ex novo" in historical contexts	Local	National	Transnational	European	Public Administration / Managing Authorities	Universities / Educational Bodies	Designers (Associations of)	Builders / Technicians	Producers / Distributors	Users / Owners / Property Managers	Other (specify)
Biomass	Revise the national and local forestry regulations		Revise the national and local forestry regulations		X				X						
	Adapt the so called Celeste system (a specific software used by Liguria Region for energy certification purposes) to include the use of biomass boilers		Adapt the so called Celeste system (a specific software used by Liguria Region for energy certification purposes) to include the use of biomass boilers		X				X						
Geothermic	Projects to spread proper techniques; training for people working in the field (designers, technicians in public offices, builders) and with the involvement of different professional backgrounds (geologists, engineers, architects)		Projects to spread proper techniques; training for people working in the field (designers, technicians in public offices, builders) and with the involvement of different professional backgrounds (geologists, engineers, architects)		X				X			X			
	Comparison of the conditions offered by the producers with the aim of soliciting and adapting the performance and especially the guarantees offered by those of other countries (guarantees of 75 years in Switzerland against 20-25 in Italy)		Comparison of the conditions offered by the producers with the aim of soliciting and adapting the performance and especially the guarantees offered by those of other countries (guarantees of 75 years in Switzerland against 20-25 in Italy)			X							X		
	Projects for the implementation and monitoring of good practices to improve the ability to identify the optimal combination of renewable energy sources according to climatic conditions, the morphological characteristics of the site and the size and use of buildings		Projects for the implementation and monitoring of good practices to improve the ability to identify the optimal combination of renewable energy sources according to climatic conditions, the morphological characteristics of the site and the size and use of buildings			X									



Theme	Italy				Action scale				Participants						
	New constructions	Requalification of recent buildings	Renovation and retrofit works of historical buildings	Works "ex novo" in historical contexts	Local	National	Transnational	European	Public Administration / Managing Authorities	Universities / Educational Bodies	Designers (associations of)	Builders / Technicians	Producers / Distributors	Users / Owners / Property Managers	Other (specify)
Geothermic	Projects for the drafting of local regulations capable of supporting the application of the plants that use geothermal resources		Projects for the drafting of local regulations capable of supporting the application of the plants that use geothermal resources		X	X			X						
Different renewable energy systems															
	Sun screen control														
Natural airing	Projects for the adjustment of normative/regulatory structures, especially at a local level (e.g. municipal construction regulations), aimed at facilitating the integration of natural ventilation systems with the purpose of guiding and boosting local urban design				X	X			X		X				
	Projects focused on environmental data collection at a local scale aimed at providing effective synthetic tools useful to design and evaluate natural ventilation systems and for urban planning.				X	X	X		X	X					
	Projects aimed at the elaboration of simplified software for the preliminary evaluation of air flows (natural ventilation) for the passive cooling of indoor environments, which could also be used by non-skilled designers.					X				X					



Theme	Italy			Action scale					Participants						
	New constructions	Requalification of recent buildings	Renovation and reft works of historical buildings	Works "ex novo" in historical contexts	Local	National	Transnational	European	Public Administration / Managing Authorities	Universities / Educational Bodies	Designers (Associations of)	Builders / Technicians	Producers / Distributors	Users / Owners / Property Managers	Other (specify)
Natural lighting	An inter-institutional study capable of finding criteria and types compatible with regional landscape rules to outline rules based on performance		An inter-institutional study capable of finding criteria and types compatible with regional landscape rules to outline rules based on performance		X	X			X	X					
	Specific training for professionals, evaluators and future technicians studying in this subject area		Specific training for professionals, evaluators and future technicians studying in this subject area			X			X	X		X			
	Development and distribution of software for the detection calculation of the average amount of daylight factor in indoor areas.		Development and distribution of software for the detection calculation of the average amount of daylight factor in indoor areas.			X	X			X		X			
	Produce good practices starting from public housing, and include the aspect of natural lighting in the general criteria of sustainable architecture		Produce good practices starting from public housing, and include the aspect of natural lighting in the general criteria of sustainable architecture			X				X					
Automatic control systems	Solicit the adoption of the CEN EN1523 regulations as a guideline for local rules (following the example of Emilia Romagna)		Solicit the adoption of the CEN EN1523 regulations as a guideline for local rules (following the example of Emilia Romagna)		X	X			X						
	Promotion for insiders, technicians and designers of partnership in regions or leading countries in the sector, strictly aimed at the diffusion of “building automation” in the sector of energy conservation		Promotion for insiders, technicians and designers of partnership in regions or leading countries in the sector, strictly aimed at the diffusion of “building automation” in the sector of energy conservation			X						X			



Theme	Italy		Action scale				Participants								
	New constructions	Requalification of recent buildings	Renovation and retrofit works of historical buildings	Works "ex novo" in historical contexts	Local	National	Transnational	European	Public Administration / Managing Authorities	Universities / Educational Bodies	Designers (Associations of)	Builders / Technicians	Producers / Distributors	Users / Owners / Property Managers	Other (specify)
Involve (insulation, mass, PCM)	Creation of an observatory to monitor the action taken, together with the dissemination of best practices in order to inform / train all stakeholders (citizens, administrators, entrepreneurs, developers, engineers, etc.), thus providing added value to the many local technical energy agencies (RENAEL), but that does not always impose itself on the territory, in order to train the technical workers who work in both private and public sectors.				X	X	X		X	X			X		
	Implement, through project initiatives, the technological research of stratification insulating for housing (Phase Change Materials (PCM), Transparent insulation materials (TIM) and thin thermoreflective insulation) and transparent surfaces (photochromatic, thermochromatic, electrochromatic glass, ETFE , etc.) that would enable the application of innovative and industrialized technologies and materials.						X			X	X				
Systems (heating, air-conditioning) Eco-compatible materials	To overcome the difficulty in understanding the technical data and especially in gathering evidence on the energy quality of buildings, there should be a project for the creation of archives and databases and media systems for learning and developing through simple indicators, for an overall assessment of the existing building sector.					X			X						
	Project based on an energy analysis of all public buildings and the general state of the structures, (age, regulatory compliance) of critical energy performance indicators and the status of plant systems in order to enact and enable investments, restructuring and upgrading of public assets.						X			X	X				
	Encourage inter-municipal projects that are based on the actual intention to implement construction processes, how to achieve better quality housing and better living conditions while protecting the environment and the specific characteristics of each country / area, as well as local traditions: the goal is not to mark the difference between the best and worst municipalities, but rather to create a good context to stimulate shared choices and more environmentally sustainable action.				X	X			X	X				X	
	Implement the potential of the "sustainable building" sector from the production of materials and their widespread distribution throughout the territory through a network of distributors and retailers, the training of workers in the construction industry through courses organized by specialist schools and industry associations, from regional incentives and / or at a municipal level for the end user and the adoption of sustainable building regulations designed to promote and regulate sustainable building development in the municipality, by directing users to the appropriate use of methods, technologies and materials aimed at decreasing the use of natural resources and reducing the environmental impact.				X	X	X		X	X			X		



Theme	Italy			Action scale				Participants							
	New constructions	Requalification of recent buildings	Renovation and refit works of historical buildings	Works "ex novo" in historical contexts	Local	National	Transnational	European	Public Administration / Managing Authorities	Universities / Educational Bodies	Designers (Associations of)	Builders / Technicians	Producers / Distributors	Users / Owners / Property Managers	Other (specify)
<p>Microclimatic and environmental control through vegetation</p>	<p>Projects for normative/regulatory structure adjustment, especially at a local level. (e.g. municipal construction regulations), aimed at facilitating the integration of vegetation in architecture. Such facilitations should be referred to vertical and horizontal greening systems and boosting their use in relation to the positive effects on the microclimate and environment. *</p>			*	X				X	X			X		
	<p>Pilot projects for the monitoring of vertical and horizontal greening systems aimed at quantifying the microclimatic and environmental benefits obtainable in MED territory, which are also required to clarify the regulations. **</p>			**		X			X	X					
	<p>Projects for highlighting the potential and critical aspects of vertical greening systems aimed at developing guidelines and/or Layman's reports and a UNI regulation system (with similar characteristics to that concerning the instructions for the design, execution, control, and maintenance of green roofs, ALLEGATO NORMA 2). ***</p>			***		X		X	X	X					
	<p>Projects focused on the compilation of a regional database for plant species aimed at responding to the specific local climate needs. ****</p>			****	X				X	X			X		
<p>Water resources (rain collection, etc)</p>															



Theme	Greece				Action scale				Participants						
	New constructions	Requalification of recent buildings	Renovation and refit works of historical buildings	Works "ex novo" in historical contexts	Local	National	Transnational	European	Public Administration / Managing Authorities	Universities / Educational Bodies	Designers (Associations of)	Builders / Technicians	Producers / Distributors	Users / Owners / Property Managers	Other (specify)
Aggregation/ exposure for micro-climatic control															
Passive Solar power	Projects focused on demonstrating the areas that best fulfill the requirements concerning weather conditions in order to apply the rules of passive solar power systems.				X	X	X	X	X	X	X				
	Projects for the dissemination of the impact that the implementation of passive solar applications may have on residential and public buildings. Moreover, since the rational operation of these buildings will determine the success of the systems, these activities should also include seminars, workshops and guidelines on the maintenance and use of the applied techniques.				X	X	X	X		X	X				
	Projects aimed at collecting or creating tools, weather data archives and regulations that could provide the constructors with valuable information on weather conditions and regulations of the areas in which passive solar systems could be applied as well as an evaluation check that would calculate the building's behavior after the application of the interventions.				X				X			X			



Theme	Greece			Action scale				Participants							
	New constructions	Requalification of recent buildings	Renovation and retrofit works of historical buildings	Works "ex novo" in historical contexts	Local	National	Transnational	European	Public Administration / Managing Authorities	Universities / Educational Bodies	Designers (Associations of)	Builders / Technicians	Producers / Distributors	Users / Owners / Property Managers	Other (specify)
Solar heating systems	Projects focused on demonstrating the areas that best fulfill the requirements concerning weather conditions in order to install solar heating systems.				X				X						
	Projects for the dissemination of the impact that the installation of solar heating systems would have on homes, hotels and public buildings				X				X				X		
	Projects aimed at collecting or creating tools, weather data archives and regulations that could provide the constructors with valuable information on weather conditions and regulations of the areas where solar heating systems could be installed as well as an evaluation check that would calculate energy consumption and savings after the application of the intervention.				X					X			X		
Photovoltaic															
	Projects focused on the best practices regarding the installation of photovoltaic systems in homes, public buildings and areas, hotels etc., including financial and energy data, aiming at promoting this technique by showing its advantages and prospects.				X				X						
	Projects aimed at developing tools and software for the calculation of the existing solar capacity in different areas and propose precise installations according to the needs of each individual building.				X				X				X		



Theme	Greece				Action scale				Participants						
	New constructions	Requalification of recent buildings	Renovation and refit works of historical buildings	Works "ex novo" in historical contexts	Local	National	Transnational	European	Public Administration / Managing Authorities	Universities / Educational Bodies	Designers (associations of)	Builders / Technicians	Producers / Distributors	Users / Owners / Property Managers	Other (specify)
Photovoltaic		Projects that propose different types of photovoltaic installations which respect the architectural character of rural and fragile areas as well as their rules and regulations.			X	X	X			X	X		X		
Small wind turbine															
Biomass															
Geothermic															
Sun screen control															
Natural airing	Projects focused on demonstrating the areas that best fulfill requirements concerning weather conditions in order to apply the rules of natural airing.				X	X	X		X	X					
	Projects for the dissemination of the impact that the implementation of natural airing applications may have on homes and public buildings. Moreover, since the rational operation of these buildings will determine the success of the systems, the disseminating activities should also include seminars, workshops and guidelines on the maintenance and use of the applied techniques.								X	X					



Theme	Greece				Action scale				Participants						
	New constructions	Requalification of recent buildings	Renovation and refit works of historical buildings	Works "ex novo" in historical contexts	Local	National	Transnational	European	Public Administration / Managing Authorities	Universities / Educational Bodies	Designers (associations of)	Builders / Technicians	Producers / Distributors	Users / Owners / Property Managers	Other (specify)
Natural airing	Projects aiming at collecting or creating tools, weather data archives and regulations that could provide the constructors with valuable information on weather conditions and regulations of the areas in which natural airing systems could be applied as well as an evaluation check that would calculate the building's behavior after the application of the interventions.				X	X	X		X	X					
Natural lighting	Projects focused on demonstrating the areas that best fulfill the requirements concerning weather conditions in order to apply the rules of natural lighting				X	X	X		X	X					
	Projects for the dissemination of the impact that the implementation of natural lighting applications may have on homes and public buildings. Moreover, since the rational operation of these buildings will determine the success of the systems, the disseminating activities should also include seminars, workshops and guidelines on the maintenance and use of the applied techniques.				X	X			X	X					
	Projects aiming at collecting or creating tools, weather data archives and regulations that could provide the constructors with valuable information on weather conditions and regulations of the areas that natural lighting systems could be applied...				X	X			X	X					



Theme	Greece				Action scale				Participants						
	New constructions	Requalification of recent buildings	Renovation and refit works of historical buildings	Works “ex novo” in historical contexts	Local	National	Transnational	European	Public Administration / Managing Authorities	Universities / Educational Bodies	Designers (Associations of)	Builders / Technicians	Producers / Distributors	Users / Owners / Property Managers	Other (specify)
Natural lighting	... as well as an evaluation check that would calculate the building's behavior after the application of the interventions.														
Automatic control systems															
Involucure	Projects aiming at collecting all the available materials and insulating processes that could be applied depending on the special needs of each building. In addition, this platform could operate as a means of communication between technicians for the exchange of experiences.					X	X		X	X			X		
	Implementation of a database aimed at presenting all the construction materials that are labeled and promote sustainability in the construction sector as well as at informing stakeholders on the existing regulations and guidelines.						X		X						
Systems (heating and air-conditioning)															
Eco-compatible materials	Support the implementation of a cluster that consists of retailers and distributors of eco-compatible and natural materials which can be used in the construction sector and reduce the environmental impact and the harmful effects of toxic materials.							X					X		
	Projects aiming at the creation of a data base containing the different eco-compatible materials and...					X	X								X



Theme	Greece				Action scale				Participants						
	New constructions	Requalification of recent buildings	Renovation and refit works of historical buildings	Works "ex novo" in historical contexts	Local	National	Transnational	European	Public Administration / Managing Authorities	Universities / Educational Bodies	Designers (associations of)	Builders / Technicians	Producers / Distributors	Users / Owners / Property Managers	Other (specify)
Eco-compatible materials	... instructions on their application to buildings as well as different traditional environmentally friendly techniques that are applied in different areas.														
Microclimatic and environmental control through vegetation	Projects focused on the best practices regarding the creation of green roofs and the use of special vegetation on the surroundings of buildings aiming at preserving the microclimatic and environmental conditions that improve the life of the building's users.				X		X								
Water resources	Projects aimed at developing tools and data bases that will include the most suitable species according to weather conditions and expected results, as well as special techniques and guidelines provided by scientists with experience in the field.				X		X					X			
	Projects for the collection of all the existing rules and regulations, aimed at integrating vegetation as a means of achieving energy efficiency and improving the architectural characteristics of different areas.							X		X					



Theme	Spain				Action scale				Participants						
	New constructions	Requalification of recent buildings	Renovation and refit works of historical buildings	Works "ex novo" in historical contexts	Local	National	Transnational	European	Public Administration / Managing Authorities	Universities / Educational Bodies	Designers (associations of)	Builders / Technicians	Producers / Distributors	Users / Owners / Property Managers	Other (specify)
Aggregation/ exposure for micro-climatic control Passive Solar															
	Establish a fast and stable subventions program to avoid uncertainty in the market for lack of clarity in investment terms					X				X					
Solar heating systems	Promote research programs for the optimization of solar thermal systems, applied to the generation of hot water and heating, and especially to the development of new applications such as cooling.					X	X	X	X	X			X		
	Development of a catalog of solutions and systems that facilitates the architectural integration of the equipment used.					X	X			X			X		
Photovoltaic															
Small wind turbine	Projects for research programs concerning wind and currents conditions in specific areas of the Mediterranean. Production of air flow maps and documentation freely accessible to final users and installers.		Projects for research programs concerning wind and currents conditions in specific areas of the Mediterranean. Production of air flow maps and documentation freely accessible to final users and installers.												
	Projects for normative/regulatory structure adjustment or enacting new specific laws, especially at a regional level, aimed at facilitating the licensing procedures, and thus the exploitation of wind resources.		Projects for normative/regulatory structure adjustment or enacting new specific laws, especially at a regional level, aimed at facilitating the licensing procedures, and thus the exploitation of wind resources.			X	X								



Theme	Spain		Action scale				Participants								
	New constructions	Requalification of recent buildings	Renovation and refit works of historical buildings	Works “ex novo” in historical contexts	Local	National	Transnational	European	Public Administration / Managing Authorities	Universities / Educational Bodies	Designers (associations of)	Builders / Technicians	Producers / Distributors	Users / Owners / Property Managers	Other (specify)
Biomass	Projects for education and research programs concerning biomass energy which would help in the progress of alternatives to the energy/food conflict and increase the performance of the equipment used.			Projects for education and research programs concerning biomass energy which would help in the progress of alternatives to the energy/food conflict and increase the performance of the equipment used.	X	X	X		X	X	X			X	
Geothermic	Projects for education and research programs concerning geothermic energy which would help in the creation of a qualified net of professionals and companies able to offer a close and adequate service to final user.					X				X					
Different renewable energy systems	Projects for normative/regulatory structure adjustment or enacting new specific laws, especially at a regional level, aimed at facilitating the exploitation of geothermic resources.				X	X						X			
Sun screen control															
Natural airing	Research projects for creating specific software tools and methods that could be easily applied in the design stages of a building or in urban development.				X	X	X		X	X					
	Projects for normative/regulatory structure adjustment or enacting new specific laws, especially for regional level, aimed to include the use of natural ventilation as a sustainable practice, specifying minimum rates in different cases.				X	X			X	X					
	Financing studies of existing territorial conditions (wind direction, orography, natural barriers) which can then be used to define urban planning for future city developments.				X	X	X		X	X					X



Theme	Spain			Action scale				Participants							
	New constructions	Requalifications of recent buildings	Renovation and retrofit works of historical buildings	Works "ex novo" in historical contexts	Local	National	Transnational	European	Public Administration / Managing Authorities	Universities / Educational Bodies	Designers (Associations of)	Builders / Technicians	Producers / Distributors	Users / Owners / Property Managers	Other (specify)
Natural lighting	Projects for education and research programs concerning natural lighting with specific focus on existing buildings, renovation projects and historical areas. *			*	X	X	X		X	X					
Automatic control systems	Projects for normative/regulatory structure adjustment or enacting new specific laws, especially at a regional level, aimed at including the use of this resource as well as the different strategies for taking advantage of it as a sustainable practice **			**	X	X	X		X						
Involuce (insulation, mass, PCM)	Research projects for new materials and solutions, and forum creation for discussing the progress made.					X	X					X			
	Planning of projects for the implementation of an energy labelling system for construction products and materials, with the objective of defining the balance between wasted and saved energy in the entire process.					X	X		X			X			
	Normative and regulatory adjustment for establishing control systems for constructions, with the aim of ensuring the proper implementation of the law. This is the only way of detecting dysfunctions to feedback the continuous improvement process.					X		X	X	X		X			



Spain		Action scale				Participants									
Theme	New constructions	Requalification of recent buildings	Renovation and refit works of historical buildings	Works "ex.novo" in historical contexts	Local	National	Transnational	European	Public Administration / Managing Authorities	Universities / Educational Bodies	Designers (Associations of)	Builders / Technicians	Producers / Distributors	Users / Owners / Property Managers	Other (specify)
Systems (heating, air-conditioning) Eco-compatible materials															
	Research projects for tests and experiments, aimed at assessing benefits and risks for different green enclosure solutions, especially from the viewpoint of efficiency and environmental conditioning.														
Microclimatic and environmental control through vegetation	Research programs concerning different vegetation species, with the objective of collecting characteristics, such as suitability for green enclosures in the Andalusia area, irrigation needs, shading profiles during different seasons, etc. The final document should be a catalogue of empirical data.														
	Projects to integrate of all this information in the existing software (LIDER, CALENER) for calculating efficiency in buildings.														
Water resources (rain collection, etc)	Projects for normative/regulatory structure adjustment or enacting new specific laws, especially at a regional level, aimed at defining water re-usage as a valuable practice in construction sustainability, specifying the minimum volumes of treated water required.														
	Projects for studying the possibilities of implementing water re-using technology in urban public spaces or existing administration buildings.														



6.2.1. The National Tables of the “Bio-construction Action Plans”

Theme	France		Action scale				Participants								
	New constructions	Requalification of recent buildings	Renovation and retrofit works of historical buildings	Works “ex novo” in historical contexts	Local	National	Transnational	European	Public Administration / Managing Authorities	Universities / Educational Bodies	Designers (Associations of)	Builders / Technicians	Producers / Distributors	Users / Owners / Property Managers	Other (specify)
Aggregation/ exposure for micro-climatic control	Diffuse a common computerised method for bio-climatic design (e.g. software), considering the recent national regulations for building energy management					X		X	X	X	X	X			
	European programmes and training courses for architects and engineers to promote research in the branch of bio-climatic design							X		X	X				
Passive Solar	Common computer tools would have to be used to focus on bio-climatism in the initial stage of the project. This would contribute towards not increasing costs in to significantly during this phase where budget is usually really controlled. European programs would be interesting to implement to increase awareness on these topics. Software already exists but is not sufficiently used.		Common computer tools would have to be used to focus on bio-climatism in the initial stage of the project. This would contribute towards not increasing costs in to significantly during this phase where budget is usually really controlled. European programs would be interesting to implement to increase awareness on these topics. Software already exists but is not sufficiently used.			X			X	X					
	An advertising campaign for architecture and engineering schools would contribute towards educating users on new technologies		An advertising campaign for architecture and engineering schools would contribute towards educating users on new technologies			X				X					
Solar heating systems	Another campaign concerning the efficient Trombe-Wall solution could be undertaken even if specific know-how is required.		Another campaign concerning the efficient Trombe-Wall solution could be undertaken even if specific know-how is required.			X	X			X		X			
	Hotels that have significant demand for hot water should always have access to this kind of technology. Any solutions using solar energy should be encouraged.		Hotels that have significant demand for hot water should always have access to this kind of technology. Any solutions using solar energy should be encouraged.			X	X				X			X	



Theme	France				Action scale				Participants						
	New constructions	Requalification of recent buildings	Renovation and refit works of historical buildings	Works "ex novo" in historical contexts	Local	National	Transnational	European	Public Administration / Managing Authorities	Universities / Educational Bodies	Designers (associations of)	Builders / Technicians	Producers / Distributors	Users / Owners / Property Managers	Other (specify)
Solar heating systems	Incentives should be implemented for all new projects or major renovations.		Incentives should be implemented for all new projects or major renovations.			X	X		X	X	X		X		
Photovoltaic	Projects to disseminate the principle of solar cooling or financial aid would develop this promising technology in the Mediterranean region.		Projects to disseminate the principle of solar cooling or financial aid would develop this promising technology in the Mediterranean region.		X	X	X		X	X	X				
	Conditions must still be implemented in order to not distort existing buildings or new ones and especially not take over space (farmland) to install these panels.														
	Even if most of the cells (the basic component of photovoltaic technology) are manufactured outside Europe, this sector is a major source of employment: researchers to increase yields, industrialists to turn them into panels and especially fitters and maintenance personnel are always from the country of installation. 78% of the cost of solar energy is used to create jobs locally.								X				X		
Small wind turbine															
Biomass	To reduce hazards linked to wood procurement and storage, local wood processing industries should be developed, especially in areas where forests are abundant				X	X	X		X						



6.2.1. The National Tables of the “Bio-construction Action Plans”

Theme	France				Action scale				Participants						
	New constructions	Requalification of recent buildings	Renovation and refit works of historical buildings	Works "ex novo" in historical contexts	Local	National	Transnational	European	Public Administration / Managing Authorities	Universities / Educational Bodies	Designers (associations of)	Builders / Technicians	Producers / Distributors	Users / Owners / Property Managers	Other (specify)
Biomass	Regulations capable of improving pollution control due to the use of wood as an energy source. (More efficient combustion systems and filters)					X	X						X		
Geothermic															
Different renewable energy systems															
Sun screen control	European programs aimed at promoting research on these topics should be encouraged.		European programs aimed at promoting research on these topics should be encouraged.				X		X	X			X		
	Software already exists but is little used. A promotional campaign to architecture and engineering schools is expected to train future users about these new technologies.		Software already exists but is little used. A promotional campaign to architecture and engineering schools is expected to train future users about these new technologies.			X				X					
	More awareness campaigns for users should be conducted to ensure the proper use of these systems, especially in the tertiary sector.		More awareness campaigns for users should be conducted to ensure the proper use of these systems, especially in the tertiary sector.			X			X						
	The principle challenges of "families to positive energies" launched at a European level should be extended to offices.		The principle challenges of "families to positive energies" launched at a European level should be extended to offices.			X		X					X		
Natural airing						X									X



Theme	France			Action scale				Participants							
	New constructions	Requalification of recent buildings	Renovation and reft works of historical buildings	Works "ex novo" in historical contexts	Local	National	Transnational	European	Public Administrations / Managing Authorities	Universities / Educational Bodies	Designers (Associations of)	Builders / Technicians	Producers / Distributors	Users / Owners / Property Managers	Other (specify)
Natural lighting	Software already exists but is not sufficiently used. An advertising campaign for architecture and engineering schools would contribute towards introducing users to new technologies.	It would be interesting to implement european programs discussing these topics.	Software already exists but is not sufficiently used. An advertising campaign for architecture and engineering schools would contribute towards introducing users to new technologies.		X	X	X	X	X	X		X	X		
Automatic control systems	Need for a user friendly interface and practical operating manual.				X	X			X	X			X	X	
Involucr (insulation, mass, PCM)	Demonstrate the economic return of the best involucr solutions and consider the concept of total cost and not just the cost of construction. Training workers involved in building and financing construction as reference models.		Demonstrate the economic return of the best involucr solutions and consider the concept of total cost and not just the cost of construction. Training workers involved in building and financing construction as reference models.		X	X	X	X	X			X			
Systems (heating, air-conditioning)			Focus on ventilation in relation to the type of insulation and the type of building to avoid dampness problems in perimeter walls.		X	X				X	X				
			Water-based heat recovery systems												
		Communication and information initiatives will have to be undertaken in these countries, because this solution shows benefits greater than the solar heating systems at certain latitudes.....			X								X		



6.2.1. The National Tables of the “Bio-construction Action Plans”

Theme	France			Action scale				Participants							
	New constructions	Requalification of recent buildings	Renovation and retrofit works of historical buildings	Works "ex novo" in historical contexts	Local	National	Transnational	European	Public Administration / Managing Authorities	Universities / Educational Bodies	Designers (Associations of)	Builders / Technicians	Producers / Distributors	Users / Owners / Property Managers	Other (specify)
Systems (heating, air-conditioning)	 Subsidies or grant tax credit to renewable energy systems could be extended to this kind of technology.													
			<i>Heaters and coolers</i>												
Eco-compatible materials			More focus on systems design and maintenance.		X	X							X		
			Today, there are too many brands on the market and European harmonization appears necessary, in order to give clear information to customers, but also to enhance the efforts made by manufacturers on the European market.				X					X	X		
	Programs to develop local industry production, processing and marketing of eco-materials should be implemented, given that there is currently a vicious circle: users complain that their buildings are not constructed using eco-compatible materials, while constructors say that they cannot find them on the market, and manufacturers that demand is not sufficient to produce them.		Programs to develop local industry production, processing and marketing of eco-materials should be implemented, given that there is currently a vicious circle: users complain that their buildings are not constructed using eco-compatible materials, while constructors say that they cannot find them on the market, and manufacturers that demand is not sufficient to produce them.		X	X						X	X		
			Lastly, a specific regulation for the use of these eco-materials should be considered for the renovation of old and/or historical buildings.		X	X									



Theme	France				Action scale				Participants						
	New constructions	Requalification of recent buildings	Renovation and reft works of historical buildings	Works "ex novo" in historical contexts	Local	National	Transnational	European	Public Administration / Managing Authorities	Universities / Educational Bodies	Designers (associations of)	Builders / Technicians	Producers / Distributors	Users / Owners / Property Managers	Other (specify)
Microclimatic and environmental environment I control through vegetation	Lack of technical regulations which consider the overall effects of vegetation.				X	X			X	X					
	Find solutions to valorize the effects of microclimatic control through vegetation.					X			X						
Water resources (rain collection, etc)	To develop these technical solutions, which limit the costs of maintenance for the local community, special fees should be introduced by local communities				X	X			X						
	To develop these technical solutions, which limit the costs of maintenance for the local community, special fees should be introduced by local communities														
	A work day could be launched at a European level to compare different technologies and to provide solutions depending on the climate and also geographical constraints. Indeed, some solutions are now very space consuming and could be improved.								X	X	X	X			



Theme	Slovenia			Action scale				Participants							
	New constructions	Requalification of recent buildings	Renovation and retrofit works of historical buildings	Works "ex novo" in historical contexts	Local	National	Transnational	European	Public Administration / Managing Authorities	Universities / Educational Bodies	Designers (associations of)	Builders / Technicians	Producers / Distributors	Users / Owners / Property Managers	Other (specify)
Aggregation/exposure for micro-climatic control															
Passive Solar															
Solar heating systems															
Photovoltaic			Introduction of clear and transparent rules for all electricity distribution companies could have positive effects not only on rapid photovoltaic development in Slovenia, but also connection to the grid for business and private purposes.		X	X			X			X			
			There is a need to simplify the national authorization procedure (currently involving 5 steps).		X	X			X				X		
			There are also differences in the actual cost of connection.		X	X			X						
			There are also differences in waiting periods for obtaining the necessary documentation. Certain electricity distribution companies release all consent, contracts and certificates in the longest time period allowed, while for other companies the waiting period is significantly shorter.		X	X			X				X		
Small wind turbine															
Biomass			The reasons for the slow biomass breakthrough into key energy sources are high technology costs and lack of awareness of the people. Compared with the equally efficient fossil fuel stoves, combustion biomass stoves are definitely more expensive and this is certainly a key reason why they are not widely used. It is understandable that only individuals decide to opt for relatively expensive investment in biomass combustion stoves, which is currently justifiable only in the long-term.			X			X				X		
			Efforts should be made to reduce the technological costs of biomass energy production, which will lead to reducing the financial help from the state. Some countries are weary of reduced budget inflows, since the use of biomass would reduce fossil fuel consumption and would therefore reduce the amount of CO2 taxes, and consequently it is difficult to expect adequate state measures.			X			X				X		



Theme	Slovenia			Action scale				Participants							
	New constructions	Requalifications of recent buildings	Renovation and retrofit works of historical buildings	Works "ex novo" in historical contexts	Local	National	Transnational	European	Public Administration / Managing Authorities	Universities / Educational Bodies	Designers (associations of)	Builders / Technicians	Producers / Distributors	Users / Owners / Property Managers	Other (specify)
Geothermic			In our opinion, the biggest obstacle to even greater use of heat pumps is the high initial investment costs compared to other heat sources for heating systems, despite the fact that the operating costs are lower. Granting irreversible funds and easier access would be one solution. Countries that have this kind of heat pump co-financing regulated have more users of such heating systems. There is an annual battle in Slovenia with bureaucracy for the irreversible funds.		X										
Different renewable energy systems															
Sun screen control															
Natural airing															
Natural lighting															
Automatic control systems			<i>Communication technology does not in itself solve the problem of inter-operability of different systems, so it would make sense for the systems to be open. This means that the system has the following properties:</i>												
			Ability to exchange the device with another manufacturer's device. Detailed device specifications are required (functions, purposes, etc.). Ability to implement the same real process applications to different manufacturer's devices. A detailed specification of the process is required, with the ability of different manufacturer's devices to interact with each other.		X	X				X			X		
Involucra (insulation, mass, PCW)			With the new regulations on thermal insulation and regulations on fire prevention, the requirements for the renovation of façades of apartment buildings has been tightened among other things. During renovation work, we no longer ask if we should install additional heating insulation or how thick it should be, but we ask from which material the insulation should be made so it is not too thick and at the same time satisfies all the fire prevention requirements. Our opinion is that straightening at a legislative level does not seem justified at this stage.		X									X	



6.2.1. The National Tables of the “Bio-construction Action Plans”

Theme	Slovenia			Action scale				Participants							
	New constructions	Requalification of recent buildings	Renovation and retrofit works of historical buildings	Works "ex novo" in historical contexts	Local	National	Transnational	European	Public Administration / Managing Authorities	Universities / Educational Bodies	Designers (associations of)	Builders / Technicians	Producers / Distributors	Users / Owners / Property Managers	Other (specify)
Involuce (insulation, mass, PCM)			Advanced low-energy buildings as required by current regulations on thermal protection could be achieved through financial incentives.		X	X	X		X					X	
Systems (heating, air-conditioning)		Ventilation-based heat recovery systems	Based on our opinion, some people are insufficiently aware of or are not adequately informed on this kind of ventilation system in order to know its advantages. For some, the installation of ventilation systems is an unnecessary cost, while others do not even consider it.		X	X								X	
Eco-compatible materials			We agree with the regulation which determines the technical requirements for the ventilation and air conditioning of buildings and with the technical demands for mechanical ventilation systems if they are installed in buildings. People will thus be more informed.		X									X	
Microclimatic and environmental control through vegetation			In our opinion, the biggest obstacle to companies investing in eco-technology is the lack of financial resources, as commercial and financial incentives from the state. To stimulate company investments in eco-technology, the following actions would be required: irreversible investment assets (subsidies) or co-funding eco-technology incentives, tax relief for purchasing eco-technology solutions and affordable credit for the deployment of eco-technologies.		X	X			X						
Water resources (rain collection, etc)															



Theme	Cyprus				Action scale				Participants						
	New constructions	Requalification of recent buildings	Renovation and refit works of historical buildings	Works "ex novo" in historical contexts	Local	National	Transnational	European	Public Administration / Managing Authorities	Universities / Educational Bodies	Designers (associations of)	Builders / Technicians	Producers / Distributors	Users / Owners / Property Managers	Other (specify)
Aggregation/ exposure for micro-climatic control															
Passive Solar															
Solar heating systems															
Photovoltaic															
Small wind turbine						X	X		X						
Biomass															
Geothermic															
Different renewable energy systems															
Sun screen control															
Natural airing															
Natural lighting															



Theme	Cyprus			Action scale				Participants							
	New constructions	Requalification of recent buildings	Renovation and refit works of historical buildings	Works "ex novo" in historical contexts	Local	National	Transnational	European	Public Administration / Managing Authorities	Universities / Educational Bodies	Designers (Associations of)	Builders / Technicians	Producers / Distributors	Users / Owners / Property Managers	Other (specify)
Natural lighting															
Automatic control systems															
Involucres (insulation, mass, PCM)	The effectiveness of the campaigns may be increased now that there is an economic crisis with no end in sight and attention is on cost cutting, economizing and resource conservation. There needs to be considerable effort made to get people out of the "subsidy" mindset.				X	X			X					X	
Systems (heating, air-conditioning)															
Eco-compatible materials	Applied research must be encouraged so that momentum is gradually built up regarding the technical knowledge and specifications of such materials, which must be viewed in a new context.					X								X	
	There has to be government expenditure on demonstration buildings.					X			X						
Microclimatic and environmental control through vegetation	To increase awareness, cross communication techniques must be used. Landscape architects must write articles on energy conservation and technical magazines in order to make engineers and technical designers go to gardening experts to seek further ideas and examples.					X				X					
	Interior designers' attention must also be focused to gardening magazines for ideas and energy saving benefits.					X				X				X	
Water resources (rain collection, etc)															



7. Suggestions and Criteria Shared for a “MED Bio-Housing Quality Certificate”

In this section of the Report, the criteria for a “*MED Bio-Housing Quality Certificate*” are defined on the basis of the analysis of the various Partners as to the environmental certification systems which are already used in the different Countries. The environmental certification systems are already known and in force in some of the Countries involved in the SCORE project (above all Italy and France, although they could be more widespread), while for other Countries, they are an innovation. Actually, some Countries already have forms of environmental certifications which at times are not codified yet and refer to specific themes, although it is still not customary to apply them to the current designing and constructing practice.

In order to better clarify the aim of the work carried out within the SCORE framework, enclosed is a brief explanation about the environmental certification on a building level (not to be mixed up with the energy certification which is a specific instrument addressing only the energy management, more widespread in the European countries).

Starting especially from the ‘90s, different research studies were carried out on an international level on the environmental certification for buildings; as the theoretical requirements of sustainable design were clarified, control instruments became in fact necessary to verify, assess and compare the actual performances of the different buildings as to the environment and its resources.

The eco-compatibility certification for buildings is important for different reasons and in relation to the needs of the different subjects involved in the industry and in the construction market. Thus, it is important for the following reasons: classify the projects or the activities to be funded by the public administrations; obtain concrete data on the actual performances obtained in terms of reduction of the environmental impact and of saving resource and to implement suitable development policies on the acquired knowledge; guide the different technicians involved in the design and construction site choices; in order to promote the dissemination on the market of sustainable planning and constructive strategies as well as real estate management ones on the basis of concrete data; help the future users in making purchase choices allowing for cost-benefit assessments able to consider also the energy cost and the benefits in term of living comfort, wellbeing and health.

The early certification systems were developed in Northern Europe, especially in England, Denmark and the Netherlands, the United States and Canada, by allowing since the beginning for the surfacing of different approaches that were aimed at reaching sustainability goals defined on an international scale within the various Reports about energy emergency and the state of the environment and the different international conferences on the theme. The following approaches are worth

remembering: the energy efficiency assessment, in the light of the national and international regulations for containing heating, cooling, lighting and technical systems consumption in buildings in general; LCA (*Life Cycle Assessment*) procedures referred mainly to the used construction products and the energy-environmental costs of production and operation; the eco-balances which are useful for overall testing the environmental compatibility of the built-up areas, not only as to the used resources (materials and energy) but also for respecting the physical, natural, ecosystemic and social context of inclusion.

Among the buildings’ environmental certification systems, the *BREEAM system (Building Research Establishment Environmental Assessment Method)*, is definitely worth mentioning, as it was developed and used in England since the early ‘90s. In addition to it, the LEED system (*Leadership in Energy & Environmental Design*), which was initially devised in the United States and spread out in various countries including in Europe during the mid ‘90s. These first generation systems, although very linked to the climatic and cultural specificities of the geographical areas they were developed in, nonetheless were an important reference point from an historical point of view for developing the second generation methods, such as the *Green Building Challenge*, later developed by international networks and spread out on a large scale, by originating different national systems some of them are explicitly followed.

Currently, the different countries where the building’s environmental certification practices are known, the enforced national systems result directly from modified first generation systems (the various versions of the LEED system are particularly widespread) and from systems based on the *Green Building Challenge* (for instance, the Italian ITACA Protocol), as well as systems inspired by others yet somewhat independently (for instance, the HQE system) and finally, regional scale systems or particular protocols for attributing specialized certifications (namely referred to specific technologies, such as photovoltaic and alike).

In some of the SCORE promoting partner countries, these certification systems are already used (although they are not so widespread as they should be). These systems – sometimes organized in subsystems according for instance to the different use of the buildings or of the settlements subject to the certification - took several years before becoming effective because they resulted from a complex and articulated work from the national and local administrations in cooperation with the different authorities and associations of citizens or associations protecting the interests of the various stakeholders in the building processes. Through this team work, different criteria were defined, along with their requirements, categories and subcategories, in addition to “weighing”



the different parameters taken into account within the overall certification of the buildings or settlements under evaluation.

Within the SCORE project, the goal was not therefore to create an additional system which would complicate an already complex situation (one may say even a confused one), rather it was to provide criteria so that the currently widespread systems could be improved in order to better take into account the specific needs of the MED area countries, especially referring to the high historical-cultural and landscape value of the Partners’ areas of reference.

In order to process these criteria for a “MED Bio-Housing Quality Certificate” once again, the Matrix was the starting point. Each partner (or group of partners by country of origin), was asked to come up with suggestions for supplementing the existing certification systems of their country, as a result of the analysis carried out in order to draft the cards about the themes dealt with (for instance, solar thermal energy, biomass etc.) and to present such suggestions in a specific section of the abstract of each card.

A summary of the results of each theme of the Matrix follows, which is useful both to define the “MED Bio-Housing Quality Certificate” and to compare the situations of the different Partner countries involved in the SCORE project.

The debate on the theme of environmental certification of buildings in the SCORE Partner countries, in any case, highlighted a great diversity of approach within the MED area. Systems of transnational assessment or at least shared reference models instead are needed and appropriate at least for those areas which, from a microclimatic and cultural point of view, share many aspects. The proposals that follow can serve as a useful inspiration in this sense.

Criteria for “MED Bio-Housing Quality Certificate” concerning the theme “Aggregation/Exposure for Micro-Climatic Control”

ITALY – Concerning this theme which includes “New Constructions” and “Works *ex novo* in Historical Contexts,” on the basis of the abstracts part of the Matrix – Italy on the web site (<http://www.scoremed.eu/themes.php>), it is possible to infer that the most recent versions of the more widely employed certification systems in Italy, namely the ITACA Protocol (Italian version of the “Green Building Challenge”, drafted by a network of 25 countries) and the LEED Italy (of American inspiration) take into sufficient account the topics linked to building aggregation on site as judgment parameters within specific sections.

FRANCE – As to this theme which includes “New Constructions,” on the basis of the abstract presented in the Matrix–France on the web site (<http://www.scoremed.eu/themes.php?PART=4>), it is possible to infer that the French environmental certifications for the building industry named HQE (Haute Qualité Environnementale) and the regional ones such as the

“Qualité Environnementale de la Région Rhône-Alpes” or “BDM (Bâtiment Durable Méditerranéen)” systems of the PACA Region, need a better definition of the criteria concerning the site and the land consumption. Such improvements may refer to non-French systems besides their application in France, such as the British BREEAM or the American LEED, which are mentioned as reference frame.

Criteria for a “MED Bio-Housing Quality Certificate” concerning the theme “Passive Solar”

ITALY – Concerning this theme which includes “New Constructions”, “Refit Works of Recent Buildings” and “Works *ex novo* in Historical Contexts”, on the basis of the abstract presented in the Matrix-Italy on the web site (<http://www.scoremed.eu/themes.php>), it is possible to infer that the certification systems of environmental quality of the buildings, used in Italy, provide in general few directions about the use of passive solar system. For instance, this is also true for the most renowned system in Italy, the ITACA Protocol. The ITACA Protocol for residential housing only refers to these systems in the sub-criterion 1.1.1. of the light version. Greater space could be attributed within the certification systems (and, more particularly in the above mentioned ITACA protocol) both to new constructions and of existing buildings, for the many advantages that such systems offer in terms of energy, aesthetics and functionality.

GREECE – As to this theme, including “New Constructions”, on the basis of the abstract presented in the Matrix–Greece on the web site (<http://www.scoremed.eu/themes.php?PART=2>), it is possible to infer that the technicians of this country are concerned about the superficial attention paid to the passive solar theme within systems which should dictate guidelines on the construction of buildings. More particularly, this happens in the “Regulation for Buildings Energy Performance” (KENAK), in implementation of Law 3661/08 referring to the EC Directive 2002/91. The Technical Chamber of Greece (TEE) developed a guide whose title is “Bioclimatic Design of Buildings” which deals with the operation of the different categories of passive solar systems within a specific chapter.

FRANCE – As to this theme, including “New Constructions” and “Renovation and Refit Works of Historical Buildings,” on the basis of the abstract presented in the Matrix–France in the web site (<http://www.scoremed.eu/themes.php?PART=4>), it is possible to infer that even in France, the theme of the passive solar strategies is dealt with superficially in the environmental certification systems of the buildings. More particularly, in the HQE system, the topic is dealt with by only referring to the architectural integration of passive solar technologies rather than their actual performance.

Criteria for a “MED Bio-Housing Quality Certificate” concerning the theme “Solar thermal Collector”

ITALY – About this theme which includes “Renovation



and Refit Works of Historical Buildings” and “Works *ex novo* in Historical Contexts,” on the basis of the abstracts presented in the Matrix–Italy in the web site (<http://www.scoremed.eu/themes.php>), it is possible to infer that poor attention was paid to the environmental certification systems about the purely energy aspect and even more about the architectural integration of solar thermal systems, which is particularly important in buildings and contexts of historical-cultural and landscape values. For instance, within the ITACA Protocol (light version for residential buildings), the contribution of the thermal solar is considered in the Assessment Area B, category B.1 Non Renewable Primary Energy demanded during the life cycle, B.1.2 Primary Energy for Heating, , B.1.5 Primary Energy for the Production of Domestic Hot Water. Nothing is said about how to integrate both the panels and the tanks (in the case of natural convection systems) from an architectural point of view. Even within the LEED Italy no criterion is mentioned about the architectural integration of these systems, which are instead considered in the item Energy and Atmosphere (EA), credit 1 Optimization of the Performances and Credit 2 On site Production of Renewable Energy. Although it is complex, it could be appropriate to deal with the problem of architectural integration of the thermal solar within the environmental certification systems, by defining specific requirements. Possible suggestions in this sense could be inferred from some regulations (such as the “Regulation for Sustainable Bio-Eco Building of the Tuscan Municipalities) which are mentioned and included meaningfully in the cards about the thermal solar systems which can be downloaded from the Matrix-Italy in the SCORE web site.

GREECE – As to the this theme, which includes “New Constructions,” on the basis of what is mentioned in the abstract presented in the Matrix–Greece in the web site (<http://www.scoremed.eu /themes.php?PART=2>), it is possible to infer that even in this Country, the theme of architectural integration of solar thermal systems is not dealt with effectively. More particularly, the above mentioned “Regulation for Buildings Energy Performance” (KENAK) and the “Bioclimatic Design of Building” of the Technical Chamber of Greece (TEE) devote only a small part to dealing with the thermal solar systems, without defining any criteria about their visual impact.

SPAIN – Concerning this theme, which includes “New Constructions” and “Refit Works of Recent Buildings”, on the basis of what was mentioned in the abstracts presented in the Matrix–Spain in the web site (<http://www.scoremed.eu/themes.php?PART=3>), it is possible to infer that even in Spain, the attention paid to the architectural integration of the solar thermal systems is not enough. More particularly, the HE 4 document (Energy Saving) of the “Technical Building Code” used in Spain takes into account the energy aspects of the thermal solar while leaving out the ones linked to the potential visual impact.

FRANCE – Concerning this theme, which includes “New

Constructions” and “Renovation and Refit Works of Historical Buildings,” on the basis of what is mentioned in the abstracts presented in the Matrix–France in the web site (<http://www.scoremed.eu/themes.php?PART=4>), it is possible to infer that even the more widely used certification systems used in France, of foreign origin (BREEAM or LEED) or French either national (HQE) and regional (mentioned above), deal with the energy aspects linked to the use of thermal solar systems, but the criteria for a correct architectural integration could also be considered as additional requirements or corrective factors of the existing requirements.

Even in this case, it is clear that the Partners from the various countries share views about this theme.

Criteria for a “MED Bio-Housing Quality Certificate” concerning the theme “Photovoltaics”

ITALY – Concerning this theme which includes “Renovation and Refit Works of Historical Buildings” and “Works *ex novo* in Historical Contexts,” on the basis of what is mentioned in the abstracts presented in the Matrix–Italy in the web site (<http://www.scoremed.eu/themes.php>), it is possible to infer that the above-mentioned ITACA Protocol and LEED-Italy do not provide in general effective instructions about the aesthetic/perceptive quality of the integrated photovoltaic systems. For instance, within the ITACA Protocol – light version for residential buildings concerning electric power production from renewable sources - the performance index taken into account (Criterion 1.5) is a percentage of the average yearly need for electrical energy produced with renewable energies: a useful parameter, which takes into consideration the issues linked to architectural inclusion. This type of assessment, although quite complex, is dealt with some normative and regulatory instruments mentioned above and also in the Cards presented in the Matrix of the SCORE web site. They are references to be taken into account as possible criteria for a MED Bio-Housing Quality Certificate.

GREECE – Concerning this theme, which includes “Refit Works of Recent Buildings,” it is possible to infer from the abstract presented on the Matrix–Greece in the web site (<http://www.scoremed.eu /themes.php?PART=2>), that the above-mentioned “Regulation for Buildings Energy Performance” (KENAK) and “Bioclimatic Design of Building” of the Technical Chamber of Greece (TEE) include only few and insufficient details on photovoltaic. The Greek technicians emphasize this important deficiency.

FRANCE – As to this theme, which includes “New Constructions” and “Renovation and Refit Works of Historical Buildings,” on the basis of the abstracts presented within the Matrix–France in the web site (<http://www.scoremed.eu/themes.php?PART=4>), it is possible to infer (just like for Italy and the previously mentioned solar thermal systems), the above-mentioned French systems of environmental certification of the buildings contain references to the photovoltaic only as to energy



issues, while the architectural and site integration of this solar systems are neglected. These aspects could instead be relevant judgment criteria.

SLOVENIA – Concerning this theme which includes “Renovation and Refit Works of Historical Buildings” and “Works ex novo in Historical Contexts,” on the basis of the abstracts presented in the Matrix–Slovenia of the web site (<http://www.scoremed.eu/themes.php?PART=5>), it is possible to infer that in Slovenia, an industrial association, the Slovenian Photovoltaic Industry Association plays a control function about the use of photovoltaics in existing buildings and issues quality certificate about the design and installation of this type of systems. This system of certification is deemed as interesting because it involves all the various stakeholders in the field of photovoltaics for ensuring the most extensive assessment to guarantee a real debate which is useful for unprofessional and inexperienced designers and installers.

Criteria for a “MED Bio-Housing Quality Certificate” concerning the theme: Small Wind Turbine

ITALY – Concerning this theme, which includes “New Constructions,” “Refit Works of Recent Buildings” and “Works ex novo in Historical Contexts,” on the basis of the abstracts presented on the Matrix–Italy in the web site (<http://www.scoremed.eu/themes.php>), it is possible to infer that the environmental quality certification systems of the buildings recognized on an international level and mostly used in Italy (the above-mentioned ITACA Protocol and LEED Italy) do not provide in general effective information on the aesthetic/perceptive quality of the integrate wind power systems. For instance, the “ITACA Protocol” – light version for residential building - as to the electric power production from renewable resources, the performance index taken into account (Criterion 1.5) is the percentage of the average yearly electric energy need produced with renewable resources: a useful parameter which does not take into account the issues linked to architectural inclusion. This type of assessment, although it is complex, is dealt with regulatory instruments which are mentioned in the Cards present in the Matrix (more particularly, the Card art. 53 of the “Regulation for the Bio-Ecosustainable Building” of the Tuscan municipalities it is referred to). Instruments of this kind provide information which could be efficiently included in the previously mentioned certification systems.

SPAIN – Concerning this theme, which includes “New Constructions” and “Renovation and Refit Works of Historical Buildings,” on the basis of the abstracts presented on the Matrix–Spain of the web site (<http://www.scoremed.eu/themes.php?PART=3>), it is possible to infer that even in this case, the certifications that bio-buildings recognized on an international lever provide few information about the use medium size wind power system. Same time goes for the most commonly used systems in Spain in addition to the current regulations in this Country; for instance, the Basic Procedures for Energetic Efficiency Certification in New Buildings in

implementation of the Decree 47/2010 which refers to the Technical Building Code (CTE) take into greater account the energy production technologies from renewable solar source. The greater consideration of wind power (mini and micro-wind power) within both regulatory and certification systems.

CYPRUS – Concerning this theme, which includes “New Constructions” and “Refit Works of Recent Buildings,” on the basis of the abstracts presented on the Matrix–Cyprus in the web site (<http://www.scoremed.eu/themes.php?PART=7>), no environmental certification systems are mentioned, although it is mentioned that the use of wind turbines in Cyprus is advised and regulated in non urban areas (Order 2/2006 of the Town and Country Planning Act) where however the installation is the object of a preliminary study (for powers between 30 and 100 kW), according to the requirement of Law 140(I)/ 2005 “On the assessment of the environmental effects of certain combined projects”. It is also seen that currently there are no wind turbines connected to the grid due to authorization procedures and city-planning constraints. These obstacles, evidently, do not allow even to deal with this issue, at an environmental certification system.

Criteria for a “MED Bio-Housing Quality Certificate” concerning the theme: “Biomass”

ITALY – Concerning this theme, “New constructions” and “Renovation and Refit Works of Historical Buildings,” on the basis of the abstracts presented in the Matrix–Italy of the web site (<http://www.scoremed.eu/themes.php>), it is possible to infer that in the previously mentioned ITACA Protocol (version for residential housing 2011), the use of biomass is considered as to different positive aspects concerning the management in the territorial framework, the energy costs, the use of local natural materials. It is relevant that this theme, taken into account within the environmental certification systems, is not sufficiently dealt with within the energy certification systems and their calculation software, along with the one of the Liguria Regional Government (Regolation no. 1 22 January 2009 – software “Celeste”), about the reference territory for the Province of Savona, a SCORE partner.

SPAIN – Concerning this theme, which includes “New Constructions” and “Works ex novo In Historical Contexts”, on the basis of the abstracts presented in the Matrix–Spain of the web site (<http://www.scoremed.eu/themes.php?PART=3>) it is possible to infer that, in Spain, unlike Italy, the use of biomass is taken into account in the energy certification systems as a possible alternative to the solar systems. For instance, this is happening in the “Basic Procedure for Energetic Efficiency Certification in New Buildings” (Decree no. 47/2007), which is referred to “Rules for Building Thermal Systems” (RITE) and “Technical Building Code” (CTE) (Point 2.1 - HE-4, CTE; point IT.1.2.4.6 and IT.1.2.4.7, RITE).

FRANCE – The theme of biomass is dealt with the French technicians and it includes “Renovation and Refit Works of Historical Buildings” in their Matrix (<http://www>.



[scoremed.eu/themes.php?PART=4](http://www.scoremed.eu/themes.php?PART=4)); the technicians though deemed appropriate to dictate in this case criteria for the “MED Bio-Housing Quality Certificate.”

SLOVENIA - Concerning this theme, which includes “Renovation and Refit Works of Historical Buildings” and “Works ex novo in Historical Contexts”, on the basis of the abstracts presented in the Matrix–Slovenia of the web site (<http://www.scoremed.eu/themes.php?PART=5>) it is possible to infer that the Slovenian technicians should pay more attention to the certification of wood used as fuel which is considered as a crucial point for the reliability of this type of systems.

Criteria for a “MED Bio-Housing Quality Certificate” as to the theme: “Geothermal Power”

ITALY - Concerning this theme, which includes “New constructions” and “Renovation and Refit Works of Historical Buildings”, on the basis of the abstracts presented in the Matrix–Italy in the web site (<http://www.scoremed.eu/themes.php>), it is possible to infer that in the above-mentioned ITACA Protocol, the use of geothermal probe systems which is mentioned only superficially and generically and only in relation to the reduction of the emissions in the atmosphere. It is believed that theme should find greater space within the certification systems.

SPAIN - Concerning this theme, which includes “New constructions”, on the basis of the abstract presented in the Matrix–Spain del web site (<http://www.scoremed.eu/themes.php?PART=3>) it is possible to infer that the use of geothermal probe systems is poorly considered in the certification systems; the previously mentioned “Basic Procedure for Energetic Efficiency Certification in New Buildings” (Decree 47/2007), mentions something about it and refers to “Rules for Building Thermal Systems” (RITE) and the “Technical Building Code” (CTE).

SLOVENIA - Concerning this theme, which includes “Renovation and Refit Works of Historical Buildings” and “Works ex novo in Historical Contexts,” on the basis of the abstract presented in the Matrix–Slovenia of the web site (<http://www.scoremed.eu/themes.php?PART=5>), it is possible to infer that the Slovenian technicians give great importance to a thorough regulatory control of the performances of this type of systems whose correct operation has to be ensured (some international reference EN regulations are mentioned more than the environmental certification systems).

Criteria for a “MED Bio-Housing Quality Certificate” as to the theme “Sun Screen Control”

FRANCE - Concerning this theme, which includes “New Constructions” and “Renovation and Refit Works of Historical Buildings,” on the basis of the abstracts presented in the Matrix–France in the web site (<http://www.scoremed.eu/themes.php?PART=4>) it is possible to infer that the different environmental certification systems applied in France – the previously mentioned HQE, LEED, Bream and the regional ones – take into

account the performances of the sun screen. This does not take place for the systems specifically dedicated to residential buildings and called “Habitat & Environment” which is a French certification.

Criteria for a “MED Bio-Housing Quality Certificate” including the theme “Natural Aeration”

ITALY - Concerning this theme, which includes “New Constructions”, on the basis of the abstracts presented in the Matrix–Italy del web site (<http://www.scoremed.eu/themes.php>) it is possible to infer that the natural aeration is generally dealt with by explaining the different issues, concerning internal aeration for indoor environmental quality, like for instance in the case of the LEED Italy and ITACA Protocol certification systems. For instance, the ITACA Protocol (light version for residential building) includes natural aeration in the criterion “Ventilation and Air Quality” and it is assessed only on the basis of the number of openings ensuring air change air and any presence of mechanical ventilation systems. The effects of natural aeration on internal microclimate could be considered within the certification systems also among the criteria for instance concerning thermal comfort (LEED Italy), thermal hygrometric comfort, net cooling energy (ITACA Protocol), etc.. These effects are often not easy to assess during the design and planning stage with the currently available software and wind tunnels; for this reason, a greater consideration within the certification systems could facilitate a greater dissemination of strategies for natural aeration.

GREECE - Concerning this theme, which includes “New Constructions”, on the basis of the abstract presented in the Matrix–Greece of the web site (<http://www.scoremed.eu/themes.php?PART=2>), it is possible to infer that the previously mentioned “Bioclimatic Design of Building” of the Technical Chamber of Greece (TEE), in Chapter 3, provides a detailed guide for the natural aeration techniques with information about the orientation of buildings, design criteria and selection of the most suitable devices.

SPAIN - Concerning this theme, which includes “New Constructions” and “Renovation and Refit Works of Recent Buildings”, on the basis of the abstract presented in the Matrix–Spain in web site (<http://www.scoremed.eu/themes.php?PART=3>) it is possible to infer that there are few information about ventilation of regulatory kind (for instance there are some regional ones in Andalusia) and however they are referred mostly to the healthiness of indoor air and the size of the windows. The Spanish technicians deem it necessary to deal with the theme of ventilation in the certification systems, although it is necessary to pay attention not to complicate the structure excessively. More particularly, greater attention for setting minimum values of natural aeration for public buildings is suggested.

Criteria for a “MED bio-housing quality certificate” in relation to “Natural lighting”

ITALY - In relation to this topic, analyzed as for “New



constructions” and “Renovation and refit works of historical buildings”, from what is reported in the related abstracts accessible from the Matrix – Italy of the website (<http://www.scoremed.eu/themes.php>), it is possible to deduce that natural lighting has been duly considered in present certification systems and by the ITACA Protocol in particular, which appropriately refers to it in the version on the residence 2011 as for the framework of the requirements of internal spaces (n.4.1.1.).

GREECE – In relation to this topic, analyzed as for “New constructions”, from what is reported in the related abstract accessible from the Matrix–Greece website (<http://www.scoremed.eu/themes.php?PART=2>).

it is possible to deduce that the already mentioned “Regulation for Buildings Energy Performance” (KENAK) only includes some hints on ventilation, while the “Bioclimatic Design of Building” of the Technical Chamber of Greece (TEE) develops this topic in details, dedicating a part of chapter 6 to it and providing a detailed description of lighting techniques for natural lighting and project strategies that consider the orientation, the form of the building and much more.

SPAIN – In relation to this topic, analyzed as for “New constructions”, “Refurbishments of recent buildings” and “Works ex novo in historical contexts”, according to what is reported in the related abstract accessible from the Matrix–Spain of the website (<http://www.scoremed.eu/themes.php?PART=3>), the Andalusian norms “Technical Design and Quality Requirements in Protected Housing”, 21/07/2008 are meaningful, since they include some parts related to the sizes of windows and courtyards (points 6 and 7, analyzed in the attachments of the related Card).

FRANCE – In relation to this topic, analyzed as for “New constructions” and “Renovation and refit works of historical buildings”, from what is reported in the related abstracts accessible from the Matrix–France of the website (<http://www.scoremed.eu/themes.php?PART=4>), it is possible to deduce that there are specific criteria for natural lighting in HQE and H & E (Housing & Environnement) certification systems. However, they remark the need to carry out project site controls to verify the diverging results due to the use of different software to study natural lighting, since software often give very dissimilar results.

Criteria for a “MED bio-housing quality certificate” in relation to: “Automatic control system”

ITALY - In relation to this topic, analyzed as for “New constructions” and “Works ex novo in historical contexts”, the related abstracts accessible from Matrix–Italy of the website (<http://www.scoremed.eu/themes.php>) suggest the application of the European technical norm CEN EN 1523 as a guideline to set common criteria for a MED bio-housing quality certificate.

SLOVENIA - In relation to this topic, analyzed as for

“Renovation and refit works of historical buildings” and “Works ex novo in historical contexts”, the related abstracts accessible from the Matrix–Slovenia of the website (<http://www.scoremed.eu/themes.php?PART=5>) show that there is the need to make all various automatic control software more homogeneous so that they become more compatible and integrated.

Criteria for a “MED bio-housing quality certificate” in relation to: “Enclosure”

ITALY - In relation to this topic, analyzed as for “New constructions”, “Refurbishments of recent buildings” and “Renovation and refit works of historical buildings”, from what is reported in the related abstracts accessible from the Matrix–Italy of the website (<http://www.scoremed.eu/themes.php>) it is possible to deduce that certification systems in force examine the issue of the enclosure both at national and local level. As far as the enclosure is concerned, it is very important to define parameters, which can be referred to each specific local context. In relation to that, there are various regional versions of the already mentioned ITACA Protocol. In the version of Liguria Region, references related to the enclosure of Annex A can be found. The file 1 – Energy for winter climatisation – includes indications concerning appropriate intervention strategies for opaque and glass components of the enclosure, while file 7 (Maintaining enclosure’s performances) identifies strategies to avoid the formation and the accumulation of moisture inside the enclosure. These recommendations, which are surely very useful to achieve a Ligurian housing certification, should be implemented through criteria that can better fit in all various types of urban fabrics (historic center, rural area, disused industrial area, social housing, constructions built after the war etc.) hence diversifying possible local intervention strategies, taking into account the possibility to find materials to be used in the local area, preferring renewable materials that come from recycle processes as well as innovative materials discovered thanks to the most recent technological researches.

GREECE – In relation to this topic, analyzed as for “New constructions”, from what is reported in the related abstract accessible from the Matrix–Greece of the website (<http://www.scoremed.eu/themes.php?PART=2>) it is possible to deduce that the topic is well developed in the “Bioclimatic Design of Building” of the Technical Chamber of Greece (TEE), which dedicates various sections by analyzing the different types of isolation.

SPAIN - In relation to this topic, analyzed as for “New constructions”, from what is reported in the related abstract accessible from the Matrix–Spain of the website (<http://www.scoremed.eu/themes.php?PART=3>) it is possible to deduce that lots of aspects related to sustainable design and enclosure are included in the Royal Decree 47/2007 (present Spanish certification system). However, it lacks important requirements connected to construction materials used (e.g. energy



included in the construction materials or the use of recycled materials).

SLOVENIA - In relation to this topic, analyzed as for “Renovation and refit works of historical buildings” and “Works ex novo in historical contexts”, according to what is reported in the related abstracts accessible from the Matrix–Slovenie of the website (<http://www.scoremed.eu/themes.php?PART=5>), it is important to refer to European common normative strategies, but it also stresses the difficulties met in the bureaucratic procedures to verify that these standards have been met. These procedures may frustrate operators of the sector.

CYPRUS - In relation to this topic, analyzed as for “New constructions”, some regulatory frameworks considered useful to provide a detailed description of the enclosure requirements are quoted in the related abstract accessible from the Matrix–Cyprus of the website (<http://www.scoremed.eu/themes.php?PART=7>).

Criteria for a “MED bio-housing quality certificate” in relation to the “System (heating, conditioner)”

FRANCE - In relation to this topic, analyzed as for “Refurbishments of recent buildings” and “Renovation and refit works of historical buildings”, from what is reported in the related abstracts accessible from the Matrix–France of the website (<http://www.scoremed.eu/themes.php?PART=4>) it is possible to deduce that there specific performance indications of plant engineering systems in the French national (HQE, BREEAM, LEED) or regional systems. Data related to energy balance would be important to raise awareness among design architects.

SLOVENIA - In relation to this topic, analyzed as for “Renovation and refit works of historical buildings” and “Works ex novo in historical contexts”, the related abstracts accessible from the Matrix–Slovenie of the website (<http://www.scoremed.eu/themes.php?PART=5>) stress the importance to make calculation methods more homogeneous, especially reference parameters to better compare the real performances of the different plant engineering systems.

Criteria for a “MED bio-housing quality certificate” in relation to “Eco-compatible materials”

ITALY - In relation to this topic, analyzed as for “New constructions”, “Refurbishments of recent buildings”, “Renovation and refit works of historical buildings” and “Works ex novo in historical contexts”, the related abstract accessible from the Matrix–Italy of the website (<http://www.scoremed.eu/themes.php>) shows that, in this specific case, the problem does not much lie in the certification system in itself but in its application. ITACA Protocol, for example, also in its Ligurian version, includes criteria related to the use of materials. Some points of this protocol are explicitly referred to by the Regional Programme for Social Housing, always the

Liguria region, but, for example, not those relating to the use of healthy and low energy content materials. The environmental sustainability certification LEED NC 2009 Italy also includes a series of interesting evaluation criteria of materials, indoor pollution conditions and similar. These criteria are mentioned more in details in the abstract of the reference card.

GREECE – In relation to this topic, analyzed as for “New constructions”, the related abstract accessible from the Matrix–Greece of the website (<http://www.scoremed.eu/themes.php?PART=2>) shows that the topic has been developed in some sections dedicated to that of the “Bioclimatic Design of Building” of Technical Chamber of Greece (TEE). However, a more detailed presentation containing all possible usable natural materials is considered important.

FRANCE - In relation to this topic, analyzed as for “New constructions” and “Renovation and refit works of historical buildings”, the related abstracts accessible from the Matrix–France of the website (<http://www.scoremed.eu/themes.php?PART=4>) approach a very significant aspect of environmental certification. In these certification systems, the required data to evaluate quality and performance of each material used include the acquisition of detail documentation from producers (who often cannot provide). For this reason, that is the difficulty of collecting data on a wide number of products, the issue of materials is often put aside in the field of certification. Giving a higher “weight” to material evaluation could be a solution, so that designers are induced to make wiser choices by encouraging them to ask producers to provide them with complete and updated documentation on their products.

SLOVENIA - In relation to this topic, analyzed as for “Renovation and refit works of historical buildings” and “Works ex novo in historical contexts”, the related abstracts accessible from the Matrix–Slovenie of the website (<http://www.scoremed.eu/themes.php?PART=5>) stress that an internal market of eco-compatible material has not been developed and there are no widespread certifications, that is why one has to buy imported materials from Germany and Austria, if a better guarantee on the used product is required. The diffusion of material certification systems at local level is desirable.

CYPRUS – As far as this topic is concerned, analyzed as for “New constructions” and “Refurbishments of recent buildings”, the related abstracts accessible from the Matrix–Cyprus of the website (<http://www.scoremed.eu/themes.php?PART=7>) stress the lack of certification systems and local norms as for eco-compatible materials.

Criteria for a “MED bio-housing quality certificate” in relation to “Microclimatic and environmental control through vegetation”

ITALY – As far as this topic is concerned, analyzed as



for “New constructions”, “Refurbishments of recent buildings” and “Works ex novo in historical contexts”, the related abstracts accessible from the Matrix–Italy of the website (<http://www.scoremed.eu/themes.php>) show that if assessment tools offered by leading certification bodies generally do not consider direct systems for vertical and horizontal greenery, there are, however, different voices and their points concern the integration of vegetation in the LEED Italy and Protocol Ithaca certification systems. In Itaca Protocol, for example (light residence version), the integration of the greenery (green covering and green treatment of the soil located near the constructed area) can be considered only for the calculation of two criteria. In the assessment area related to environmental burden, the performance indicator of the criteria “heat island” (category “impact on the surrounding environment”) is calculated in a ratio of area of shady or green surfaces to the total construction area (external area at issue + roofing). In the same assessment area, also the criteria concerning the soil permeability can be calculated according to the presence of greenery in the project area but if this is the case, roofing is not to be considered. Also LEED Italia does not mention any criteria related to the use of green facades but green roofing is mentioned in various site sustainability criteria in this certification system. Green roofing, together with the soil treatment by using vegetation, can be considered for the site development (habitat protection and reclamation, maximization of open spaces) to control the quantity and the quality of meteoric waters and to reduce the heat island effect.

GREECE – In relation to this topic, analyzed as for “New constructions”, the related abstract accessible from the Matrix–Greece of the website (<http://www.scoremed.eu/themes.php?PART=2>) shows that there are specific indications on the greenery in the above mentioned instruments. In particular, the “Regulation for Buildings Energy Performance” (KENAK) includes a short reference to green areas, even in open spaces not integrated with the architecture. This topic has been well developed in the “Bioclimatic Design of Building” of the Technical Chamber of Greece (TEE) instead. It refers to the integrated use of vegetation in architecture as a protection for thermal regulation and against solar radiations.

SPAIN – In relation to this topic, analyzed as for “New constructions” and “Refurbishments of recent buildings”, the related abstracts accessible from the Matrix–Spain of the website (<http://www.scoremed.eu/themes.php?PART=3>) show that, in the quoted Royal Decree 47/2007, that is the present certification system in Spain, the aspects related to the integration of the vegetation on the buildings are not adequately considered. They should actually be introduced.

CYPRUS - In relation to this topic, analyzed as for “New constructions” and “Refurbishments of recent buildings”, the related abstracts accessible from the Matrix–Cyprus

of the website (<http://www.scoremed.eu/themes.php?PART=7>), remind us of the presence of prescriptive trends on the environmental and microclimatic control made by vegetation (KDP 414/2009 is mentioned in particular).

Criteria for a “MED bio-housing quality certificate” in relation to “Water resource”

SPAIN – In relation to this topic, analyzed as for “New constructions”, the related abstract accessible from the Matrix–Spain of the website (<http://www.scoremed.eu/themes.php?PART=3>) show the general lack of elements related to water management, especially in the Decree 47/2010 (Basic Procedure for Energetic Efficiency Certification in New Buildings). Some references are present in the “Technical Building Code” (CTE) instead. Better facing the issue of certification systems is considered necessary.

FRANCE – In relation to this topic, analyzed as for “New constructions” and “Renovation and refit works of historical buildings”, the related abstracts accessible from the Matrix–France of the website (<http://www.scoremed.eu/themes.php?PART=4>) show that this aspect is duly considered in the already mentioned national and regional certifications but not in the “Habitat & Environment” system aimed at each single home. Unfortunately, the use of water management system would turn out to be more efficient especially in this type of buildings.



8. Perspectives for the future

Works carried out in the framework of the SCORE project are illustrated here in short and lead to the results described in this final report.

Among the achieved results, attention is drawn in particular to the following:

- The definition of guidelines and action plans for each *partner* and general action plans ("*Bio-construction action plans*") made possible thanks to what emerged from the work on the *Matrix*, to guarantee the diffusion and the application of energy saving solutions in the building sector and in town planning as for reference territories;
- The definition of development and research projects that need to be implemented at local, transnational and European level through the identification of potential resources to foster such projects;
- Mutual exchange of good practices at procedural, regulatory, management and educational level;
- The identification of criteria for an environmental certification system applicable in the countries of *partners* involved;
- The broad communication of the results achieved by SCORE and the ability to use the SCORE processed by individuals acting locally in the field of urban planning, building design and construction.

Another important result of the project is that it has developed a methodology that seems very effective for local government interested in creating a network among themselves and with others in the area, in order to deal effectively and in a participatory way with the theme integration of sustainable building technologies and innovative solutions in areas of high landscape value.

In this historical moment, in fact, the challenge of sustainability is no longer - at least not only - to identify the technologies and systems to be applied (there are already many, very advanced and effective), it is rather finding strategies for the concrete and widespread application of these technologies and systems, able to overcome the strong resistance and unfortunately still existing legal, regulatory, bureaucratic, productive, cultural and local resistances.

In this context, we believe that the SCORE project, having developed a run-work system and achieved significant results with positive feedback both locally and in relation to international comparison, constitutes the basis and framework for further developments privileged applications on the territories of reference area MED.

