

Project MARIE: presentation and stage of development

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ABSTRACT

Project MARIE - Mediterranean Building Rethinking for Energy Efficiency Improvement is an international strategic project from the European Union in the scope of the MED Program. The project aims to promote building energy efficiency in the Mediterranean region and overcome the main barriers to large scale improvement through the development of a common strategy adaptable to each country/region specifications, in the framework of European Union building energy efficiency policies. This article presents a description of the Project MARIE, its stage of development, and also the results achieved in the first third of the project.

Keywords: Project MARIE, MED Program, Buildings' energy refurbishment

INTRODUCTION

The Mediterranean regions, in the same capacity as Europe's most advanced States and regions, must rise and meet the highly ambitious European and national commitments ("3x20" Climate Package, recasting of the Directive on the energy performance of building...) with a strategy adapted to their climate and socioeconomic specificities. To address this challenge the Project MARIE has been created as a strategic project of the European Union, in the framework of the MED Program. The project has started in April 2011 with the collaboration of 22 institutions of 9 Mediterranean (MED) countries and it will run until the end of 2014. This paper presents a description of the Project MARIE, its objectives, framework and stage of development. Additionally, achieved results from the first third of the project are also presented.

PROJECT'S DESCRIPTION

Framework. The scope of Project MARIE is Energy Efficiency (EE) improvement in the existing Mediterranean Building Stock (MBS). The aim of the project is to exploit the opportunities presented by EU policy and directives on buildings' EE of the MED region to develop and implement a common strategy: the Mediterranean Building Energy Efficiency Strategy (MEDBEES), to create more suitable socio-economic conditions in order to meet the following challenges:

- Need for new regulations and institutional tools in response to the new EU EPBD recast.
- Lack of financial mechanisms able to stimulate energy efficient refurbishment of buildings.
- Support building sector SME to stimulate innovation in the provision of adequate services and products for energy refurbishment of buildings.

In order to response to the call for strategic projects from the MED Program, MARIE's structure has been deliberately design in a large consortium format with the participation of 22 partner institutions covering eight countries of the Med Space (Cy, Fr, It, Gr, Mt, Pt, Si and Sp) and one country of the IPA area (Me). The different nature and scale of partners and associates offers a broad coverage of the Med Space, and will permit direct capitalization in at least nine Med Regions (Andalusia, Catalonia, Provence, Alpes, Côte d'Azur, Liguria, Piedmont, Friuli Venezia Giulia, Basilicata, Umbria, Goriska, Western Macedonia) which account for a population of approx 30 millions inhabitants.



Figure 1. MARIE's geographical coverage
(Région Provence-Alpes-Côte d'Azur, 2011)

Objectives. The strategic vision of MARIE is to achieve the professional, social and economic conditions for EE improvement in the existing stock of Mediterranean Buildings, considering the latest EU policies, programs and standards. In this way, the project aims to overcome the main barriers affecting building owners, decision-makers, professionals, administrations and financial institutions by meeting the following objectives:

- To reach effective political and institutional commitments in the participating regions for the evaluation process and the strategy development in order to coordinate and harmonize the implementation of EU buildings and energy related policy. To build a procedural model to implement these commitments, creating a direct and lasting territorial impact that can be replicated elsewhere in the MED region.
- To support local Mediterranean SME's involved in the supply of innovative, energy efficient and durable high quality eco-building products and services. This will contribute to the development of a chain of added value within the MED region economy and stimulate the demand for refurbishment of buildings with local solutions and technologies.
- To ensure effective external projection of the project even in those Mediterranean countries and regions not involved as partners in MARIE. To improve building actors' energy related knowledge at all stages of the building life cycle: previous use, awareness of energy deficiencies, analysis and diagnosis of actual conditions, design and rehabilitation with the incorporation of new solutions and technologies in order to facilitate the

improvement of energy performance in existing buildings in line with EU sustainable development and energy policy.

– To promote new investment formulas and fiscal measures to stimulate action by private investors by establishing an attractive financial framework for private investors and owners. The idea is to make existing financial support mechanisms such as ERDF, Smart Cities, Elena, BEI, etc. more accessible to owners and private investors through simple, easy to apply, integrated programs, thus reinforcing friendly frameworks for investments in EE improvement.

Organization. The Project MARIE's participating partners are organised in five distinct bodies: Steering Committee (SC), Advisory Group (AG), Scientific Group (SG), Business Network (BN) and Regional Interest Groups (RIGs). The SC is the single MARIE's decision making body and its main function is to ensure project coordination at financial, management and administrative levels, supervise work progress and assure the quality of all deliverables. The AG's main function is to provide strategic advice and assessment to the project by means of yearly meetings, including a conference in Brussels in order to facilitate the participation of the EC bodies competent in EE of buildings and other EU Institutions. The role of the SG is to certify and guarantee the tests process and the project outputs. Additionally, this group is also responsible to review and validate the quality requirements for a training program to be developed in a further stage of the project. The Business Network's function is to articulate building EE Med clusters and to provide a common private position to the project. Finally, the RIGs are formed by regional policy makers, local clusters and other relevant organisations, coordinated by the AG, with the objective of reaching effective policy commitments at regional level.

Strategy. Project MARIE's approach to achieve its objectives resides in the elaboration and implementation of a Mediterranean Building Energy Efficiency Strategy (MEDBEES), which will consist in a common strategy to surpass the barriers affecting building EE improvement in the MED space, adaptable to each country/region specific characteristics and needs. In essence, the MEDBEES will provide a set of five innovative measures programs to address the barriers identified in an early stage of the project, by an Integrated Regional Barriers Analysis (IRBA) that have combined top-down bottom up analysis of both supply and demand side. The strategy will include a Target Groups Interaction Program, a Training Program, a Legislation Program, a SMEs Support Measures Program and a Financial Program. Additionally, the MEDBEES will aim to reach political commitment with local authorities in order a network of Mediterranean clusters, to boost the sustainable building sector in the Med Space. The MARIE's working plan to develop the MEDBEES consists in five working packages (WP 1-5) responsible for producing the expected outputs, and a set of transnational pilot actions (PA) to test and adjust the developed solutions.

STAGE OF DEVELOPMENT & ACHIEVED RESULTS

Over the first year of the Project MARIE, the work plan has been followed according to schedule and the first results have started to become available. At this point the main output already available is the Integrated Regional Benchmark Analysis (IRBA). As a first step towards defining the MEDBEES, WP4 and WP5 have developed Regional Benchmark Analysis (RBAs) of the demand and supply of building's energy efficiency solutions in the MED regions. The two RBAs identified barriers for energy refurbishments, and proposed general policy measures to overcome them.

The IRBA consists in the evaluation of the potential impacts of the proposed policy measures by WP4 and WP5, in terms of final energy use, through a cross analysis of the two sets of the compiled data.

Regional benchmark analysis - demand side (WP4). The RBA of the demand side for energy efficiency in buildings has identified the barriers to EE improvement of existing buildings in the participating regions, based on the state-of-the-art in terms of energy efficiency demand in buildings, based on the analysis of standardized data gathered by the participating partners covering the following subjects: building stock in the participating regions, energy consumption/efficiency per type of building and corresponding indicators and trends, legislation (national/ regional) related to energy efficiency in buildings, financial schemes (national/regional) for energy efficiency in buildings, regional barriers to energy efficiency improvement. The following table summarises the initial proposal of demand side measures to overcome the most important identified barriers (structural, financial and knowledge based) and the respective pilot activities to test them.

Table 1. Demand side proposed measures and pilot action (Project MARIE, 2012a)

Measure	Pilot Action
Legislation & Regulations: Innovation in Legislation: Energy Certification, project procedures, works management and monitoring impact	PA 1.1. Update, adapt, structure and innovate regional and local regulations and specifications in order to facilitate the EU Directive (2010/31/EU) and the energy renovation of buildings.
Planning: Designing and determining information infrastructure to register the physical and energy data from buildings in urban areas	PA 1.2. Design and Implementation of Urban Plans for Energy Efficiency Improvement in existing buildings (building catalogue)
Planning: Designing and determining diagnostic and proposal tools for planning Energy Renovation in Buildings at urban scale	PA 1.2. Design and Implementation of Urban Plans for Energy Efficiency Improvement in existing buildings (diagnostic and proposal model)
Financial: Stimulating access to finance through private investment mechanisms at building scale	PA 2.1. Third Party Financing (TPF) mechanisms.
Source: Project MARIE (2012a)	

Regional benchmark analysis - supply side (WP5). The RBA on the supply side aimed to position the construction sector of MARIE regions in the framework of EU market and competitive context. This was done through the analysis of the barriers affecting a successful exploitation of market opportunities set up by energy efficiency regulations, programs and incentive schemes launched by Regional, National and EU authorities. The adopted methodology was based on two surveys conducted by the participating partners in the respective regions: first to identify innovative solutions (*i.e.* materials, products and services) provided by MED SMEs, and second, to identify innovative cluster business best practices models adopted by MED building clusters in terms of organization of competitive chain of values. The following table summarises the proposed solutions to overcome the previously identified barriers of the supply side (structural, technical, financial, knowledge and, behavioural) and the pilot activities to evaluate the their effectiveness.

Table 2. Supply side proposed measures and pilot activities (Project MARIE, 2012b)

Measures	Pilot Actions
Awareness and Marketing	
Communication and marketing campaigns for users	PA 4.1 Pilot Awareness Campaigns for users
Communication and marketing campaigns for owners and real estate agencies (building managers)	PA 4.2 Pilot Awareness Campaign for owners
Training	
Improve the qualification along the chain of value, from experts to artisans through training courses, seminars and workshops	Training Program (WP2.3) + PA 3.3 test a “compass” which may include: Training, Coaching, Consultancy...
Give training, tools and information to companies to help them create a demand for “better solutions” for EE in buildings through training courses and workshops	Training Program + PA 3.3 - It will test a “compass” which may include: Training, Coaching, Consultancy... PA 3.2 - evolution of measures and policies at Regional, National and European level
Private participation	
Supply new opportunities to the clusters present in MED regions area, taking into account their differences	PA7 Network of Clusters pilot experience
Urban planning	
Design and determine diagnostic and proposal tools for ERB plans at urban scales	PA1.2 Diagnostic and proposal model
Legislation & regulations	
Innovation in legislation: energy certification, project procedures, works management and monitoring impact	PA1.1 Update, adapt, structure and innovate regional and local regulations and specifications in order to facilitate the EU Directive (2010/31/EU) and the energy renovation of buildings
Stimulate the Public Sector to become a driver for technological innovation with a correct use of public procurement	PA 3.2 - introduction of LCC methodology in the Public Procurement procedures; PA 3.2 - definition of a new catalogue of prices for Regional public tenders in the field of the building sector
Financial	
Stimulate access to finance through private investment mechanisms at building scale	PA 2.1 Third Party Financing (TPF) mechanisms
Develop regional investment plans for Energy Building Renovation based on Public-Private partnership mechanisms	PA 2.2 Public Private Partnership (PPP) mechanisms
Competitiveness	
Give SMEs access for applied R&D such as new technologies, materials, smart and eco-efficient solutions for buildings	PA 3.1 - Improve competitiveness and market quota of MED origin cork and wood in the refurbishment sector. PA 3.2 - Use of the LCC for the qualification of the products supplied sector PA 3.2 - Tests in real conditions of innovative products for the building sector
Services	
Promotion of new and integrated service models to complement present construction, retrofitting and renovation activities, favouring cooperative work and “global” retrofitting (= supply new typologies of services, from “Business to Business” to “Business to Consumer”)	PA 3.3 - favouring of a concentration of “B to B” support services (laboratory experience / playfield); PA3.3 linked with PA1.1 and other specific local incentives, communication (on "demand")

Integrated Regional Benchmark Analysis - Potential Impact Evaluation. The IRBA was developed to evaluate the potential impacts of the measures proposed in WP4 and WP5's RBAs, in terms of final energy use by end use in existing buildings. This was achieved by comparing the outlook of final energy use of a scenario according to the MARIE proposed measures against a "reference scenario" (i.e., scenario comparison). Figure 2 shows a simplified flow chart of the complete process followed in the IRBA. The initial stages define the inputs to be introduced in the simulation tools, which will in turn provide the results in terms of final energy use.

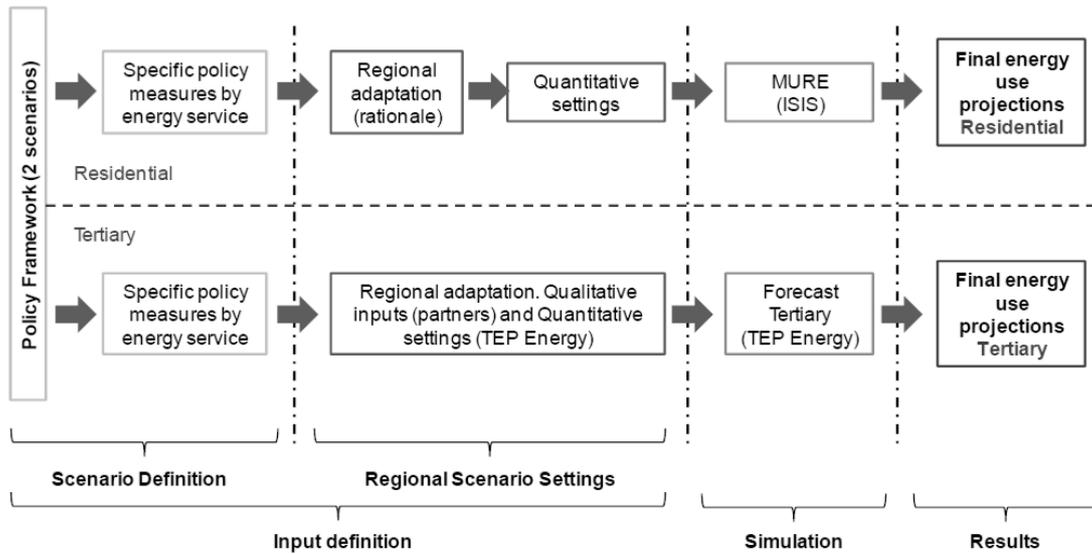


Figure 2. IRBA process review (Ortiz, Salom, and Cubi, 2012)

The general policy framework of the MARIE scenario was based on the barriers and measures compiled in the RBAs of WP4 and WP5, while the policy framework of the reference scenario (Rapid Results) was based on former national energy plans, and conceived as an opposite strategy to approach energy efficiency improvements in the existing building stock. Figure 3 illustrates the policy framework definition process.

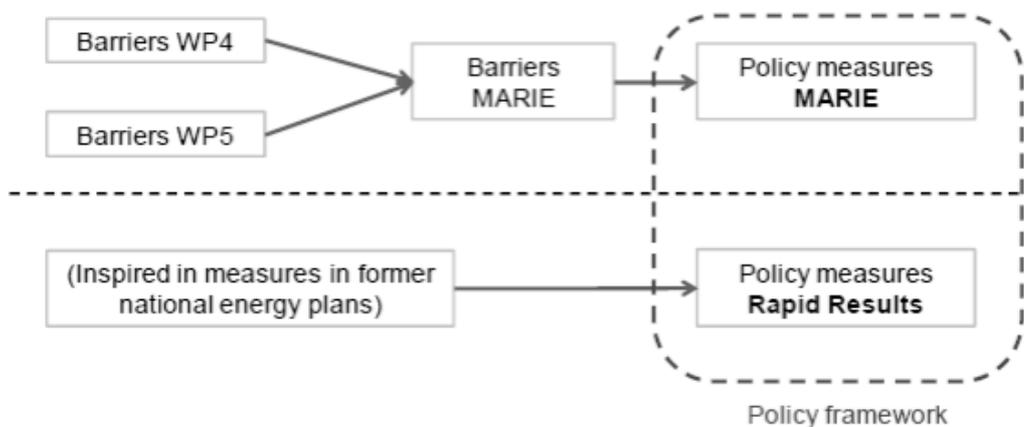


Figure 3. IRBA process review (Ortiz, Salom, and Cubi, 2012)

The tools used in the development of the potential impact evaluation of the IRBA were MURE and FORECAST Tertiary. These are bottom-up simulation models of ISIS (Rome) and TEP Energy GmbH (Zurich), respectively, for the assessment of energy policy scenarios in terms of final energy use (by sector and end use), to evaluate technical, operational and user dependent energy-efficiency measures, based on technology characteristics and their use in different scenarios. The main results obtained in the IRBA, presented in the following figures, show the final energy use for residential and tertiary buildings, per unit floor area, for a reference year and for the year of 2035, for both scenarios: MARIE and Rapid Results (RR).

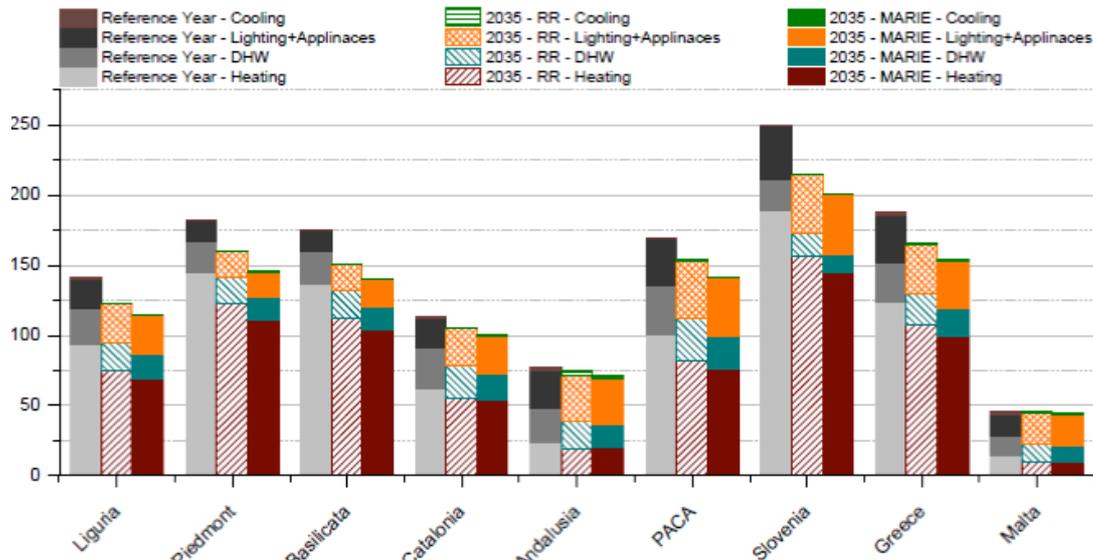


Figure 4. Scenario comparison of final energy use per square meter for each region in reference year and 2035. (Ortiz, Salom, and Cubi, 2012)

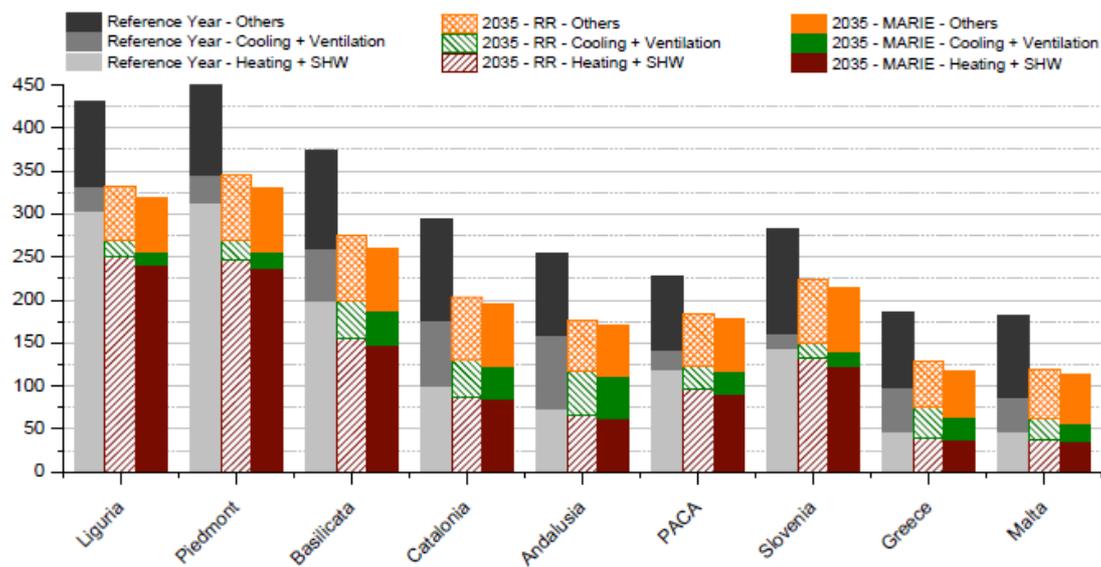


Figure 5. Scenario comparison of total final energy use per unit floor area in the tertiary sector in 2035. Existing building stock (Ortiz, Salom, and Cubi, 2012)

The results lead to the conclusion that MARIE scenario shows larger energy savings than the Rapid Results scenario in all the analyzed regions, both for the residential and the tertiary sectors. Furthermore, the MARIE scenario shows better results than the Rapid Results scenario in the long run due to the longer cycles associated to the MARIE measures (e.g., market transformation towards easier integral refurbishment). Some energy uses in some regions show better values in RR than in MARIE in the first years of outlook, however, the benefits of MARIE eventually pass those of RR, and the difference tends to increase over time. In terms of energy use, results for the residential sector show that although cooling may be a concern in terms of peak power consumption during summer, from an annual energy balance perspective, cooling remains a minor energy use in the residential sector, even in the warmest regions. On the other hand, cooling and ventilation represent a much larger share of the total final energy use in the tertiary sector, although still smaller than heating in most of the regions. The results also show that regional characteristics largely affect the dynamics of the MEDBEES impacts. Generally, the benefits of the MEDBEES in the residential sector are more rapidly seen in cold regions with a large share of centralized heating systems. The differences across regions in the evaluation results of the first draft of the MEDBEES suggest that the strategy should be both adapted and evaluated at a regional level. However, impacts of financial mechanisms on private investment are limited by the current unavailability of private funds. Therefore, implementing the MEDBEES would enable investment on energy efficiency refurbishments only to some extent. For that reason, maximizing the benefits of the MEDBEES requires more private funds than the currently available, which depends on the overall economic dynamics in the MED space. Summing up, results show that the MEDBEES is the strategy that provides the largest energy savings but it would only be capable of meeting the 2020 EU targets if the overall economy recovers rapidly. Finally, the analysis allow also to conclude that there is very limited data available at regional level, particularly for the tertiary sector which is crucial to support energy planning and decision making. To address this problem, regional energy bodies should perform comprehensive census to allow for more accurate analysis studies in the future. A common data collection protocol across regions would further ease future cross-regional studies.

CONCLUSION

This paper presents a general description of Project MARIE and the main results already achieved. Being a strategic project from the European Union in the scope of the MED Program, MARIE has been developed in a consortium format, with 22 participating partners from nine different countries, to promote the improvement of energy efficiency of existing buildings in the Mediterranean region through the development of a common strategy, MEDBEES. So far, the developed work have allowed to identify the main barriers to large scale building EE improvement through Regional Benchmark Analysis on the demand and supply sides and on the other on the supply side, and propose a set of measures to tackle them. Additionally, it has been performed a potential impact evaluation to access the proposed measures by comparing the outlook of final energy use of a scenario according to the MARIE strategic measures against a “reference scenario” based on former national energy saving plans for rapid results. The good evaluation of the first draft of the MEDBEES validate it as a sound strategy for energy refurbishment in the MED space, and encourage the MARIE consortium to continue working on its detailed definition.

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