MED workshop, "*Innovation for renewable energy and energy efficiency solutions in Mediterranean regions and cities*"

Summary of Results from Pilots

A. INTRODUCTION

The Mediterranean area has great potential for increasing renewable energy use and lowering energy efficiency to address the energy needs of both PAs and SMEs. In line with the Lisbon[1] and Goteborg[2] strategies, in the period 2007 – 2013 the MED Programme has actively addressed these concerns through the activities developed by 28 transnational projects operating in 13 countries. Mediterranean cities and regions have been developing capacity to increase use of renewable energy and tackle the energy efficiency challenge through innovative and sustainable solutions, thus boosting new economic opportunities.

The MED Programme workshop, '***Innovation for renewable energy and energy efficiency solutions in Mediterranean regions and cities'*** took place in Brussels on the 18th of June 2015. The workshop was organized by projects GRASP and EMILIE in the framework of the ***European Union Sustainable Energy Week 2015,*** and was hosted by the Delegation of the Catalonia Government to the European Union in Brussels.

The aim of the workshop was to give a synthetic overview of what has been accomplished in the implementation of technical solutions and harmonization of standards in the Energy field in the MED area, with a view to integration and

[1] To improve the area's competitiveness in a way that guarantees growth and employment for the next generations

[2] To promote territorial cohesion and environmental protection, according to the logic of sustainable development

capitalisation. The workshop highlighted the specific findings by 14 MED projects in the fields of Renewable Energy Sources (RES) and Energy Efficiency (EE). These findings integrate elements in energy performance improvement; development and evaluation of green energy tenders; creation of databases, platforms and clusters; good practices in identification of energy needs and knowledge transfer; pilot activities and monitoring; training materials; and engagement of civil society. The projects supported Mediterranean Public Procurers (PPs) and SMEs who are active in the RES and EE fields, and acknowledged them as key actors in the process of fostering the low carbon society with a bottom up approach.

Following up with a closure to the workshop, the participating projects that implemented pilots and tests with distinct output kindly shared their findings. This document has been developed by GRASP project aiming to present a summary of these findings, i.e., the main results from the pilots and test performed by the participating projects. These projects are listed below.

CO-EFFICIENT

Aims to advance innovation and available technologies for EE and use of renewable resources in operations and production processes of MED SMEs.

EMILIE

Aims to retrofit, innovate and develop solutions to make existing tertiary buildings "greener".

ENCERTICUS

ICT-based energy awareness service for energy-efficient social housing in MED area; deals with inhabitants' resource use behavior.

ENERCOAST

Aims at providing a state-of-the-art of the RE sector in solar cooling systems, tidal/ current plants, heat pumps and wind turbines plants.

E2STORMED

Faces the challenge of reducing energy consumption to make cities more sustainable, focusing on water and wastewater facilities.

GRASP

Aims to increase potential of MED Smart cities in organizing and developing Smart and Green e-Procurement processes focusing on RES and energy efficient solutions.

GREEN PARTNERSHIPS

Aims to support local administrations to overcome obstacles and effectively implement measures for energy efficient cities and regions.

MAIN

Aims to disseminate countermeasures to the Urban Heat Island effect, emphasizing smart, intelligent materials, such as cool roofs and cool pavements.

MARIE

The aim of MARIE project is to build up capacities in the Mediterranean region with a view to enhancing the energy performance of buildings.

PVNET

Aims to develop better energy policy for the promotion of REs in MED countries, targeting the best and most cost efficient use of PV technology.

REPUBLIC MED

Focuses on development and experimentation of a new method for conducting complete techno-economic studies for refurbishment of public buildings and open public spaces.

SINERGIA

Aims to increase energy performance by transfer of innovation to agro-food SMEs in the Mediterranean area

SMARTINMED

Aims to strengthen strategic cooperation between economic development players and PAs by supporting SMEs innovation capacities and development potential in RE and EE.

B. KEY WORDS

S/N	PROJECT	KEYWORDS	RESULTS KEYWORDS
1	CO-EFFICIENT at	e-Services, energy efficiency, planning, companies, collaboration, living labs, SMEs	improvement, simulation, tools
2	EMILIE et	SMEs, building, energy efficiency, innovation, heating, cooling	energy savings, emissions, forecast
3	ENCERTICUS efg	mobile application, electricity monitoring, conservation, water conservation, households	reduction, savings
4	ENERCOAST t	blue growth, renewable energy, marine-coastal areas, technologies, energy needs, solutions, priority	payback period, environmental, impacts
5	E2STORMED p	Sustainable Drainage Systems (SuDS), software, stormwater management, buildings, green roof	energy savings, emissions
6	GRASP elnt	procurement, public authorities, SMEs, database, green products, green criteria	comparisons, energy savings, tools
7	GREENPARTNERSHIPS alr	energy efficiency housing, energy efficiency public buildings, bioclimatic design, biomass, public lighting	feasibility studies, models, reduction
8	MAIN v	building materials, construction sector, criteria definition, software, thermal behavior, educational program	education, installation
9	MARIE lt	renovation, building, legislation, materials, public tenders, market, network, platform	models, tools, platform
10	PVNET mn	meteorological measurements, PV, energy consumption, domestic consumers, NEM consumers, optimisation	data, optimisation
11	REPUBLIC-MED dn	behavior profile, computational tools, building, retrofit, indicators, criteria	retrofits, optimisation
12	SINERGIA em	energy consumption, energy consumption, data, enterprises, industry, tool	energy consumption, selection
13	SMARTINMED t	company evaluation, green business model, innovation, public tender, SMEs	analysis, tools

C. GLOSSARY

RES = Renewable Energy Sources
RE = Renewable Energy
EE = Energy Efficiency
PA = Public Authority

a = adaptation
d = demonstration
e = evaluation
f = information
g = integration
l = implementation
m = monitoring, measuring
n = analysis
p = promotion
r = training
t = testing
v = development

D. PILOTS

❖ CO-EFFICIENT

PILOT 1 (Italy)

Testing and adaptation of Services with companies

- **Logistics Optimisation** eService was used for improving the daily mission planning as well as for simulation to support strategic model definitions and investment decisions with quantitative estimations of their possible impacts. Estimations show savings of 160.000 km travelled in one year.
- **Document Dematerialization** eService was used for sparing the company clerks the effort of managing large volumes of paper documents as well as making it possible to identify important energy savings at every stage of document management.
- **Distributed Planning** eService does not show immediately its energy saving potential because it seems to be oriented to better coordination of the company's network. However, eService results in energy saving mechanisms including those considered by the other two eServices. It likely presents the strongest energy efficiency improvements.

PILOT 2 (Slovenia)

Testing and adaptation of eServices with transport companies

Intensive trial for one month aims to define achievements with the transport eService in participating companies. Transport eService was used as a simulation eService with real data provided by participating companies for the testing period.
The following saving was identified:

- Estimated distance saved in 1 year: 495.860 km
- Estimated CO2 saved in 1 year: 108.000 kg

PILOT 3 (France)

Testing and adaptation of eServices with transport companies

Document Dematerialization eService was tested with mixed results: even though effective, the eService needs to be amended to specific requirements before wider implementation.

PILOT 4 (Croatia)

Testing and adaptation of eServices with companies
Document Dematerialization eService was tested with mixed results: even though effective, the eService needs to be amended to specific requirements before wider implementation

PILOT 5 (Spain)

Testing and adaptation of eServices with transport companies
Implementation of the three eServices was problematic - low diffusion of ICT in Croatia amongst SMEs, unwillingness for inter-company cooperation (even within cluster), use of eServices for activities out of scope of operations.

PILOT 6 (Italy)

Co-creation of a Frame of reference for EE, and use of renewable resources in production, operations, and testing of analytical tool developed within the project
• Logistics Optimisation eService: basis of future development of the eService has been developed. Future testing and development of the eService will be after end of project, to develop software of utility and interest for road freight transport companies. • Dematerialization has shown high potential for improvement of daily management of transport companies. Delays during deployment of pilots have not permitted to test the tool in a more extensive way in real life. • The "Objectiff CO2" scheme has received high attention from transport community. Its potential to directly produce energy and financial savings, and the synergies found of this eService with recent initiatives of the Spanish government (i.e. Spanish Registry of Carbon footprint) have motivated the companies to engage the pilot. Cumulative results of Spanish show absolute potential fuel savings of more than 600.000 litres of fuel.

PILOT 7 (Slovenia)

Co-creation of a frame of reference for EE, and use of renewable resources in production, operations, and testing of analytical tool developed within the project

The analytical tool is meant to support SMEs in improving EE and in using RES in key production processes. With help by external experts, SMEs participated in identifying and addressing their main weaknesses in EE, and the use of RES in their business processes. Results of these processes were used to define the tool.

PILOT 8 (France)

Co-creation of a Frame of reference for EE, and use of renewable resources in production, operations, and testing of analytical tool developed within the project

The analytical tool is to support SMEs in improving EE and in using RES in key production processes. With help by external experts, SMEs participated in identifying and addressing their main weaknesses in EE, and the use of RES in their business processes. Results of these processes were used to define the tool.

PILOT 9 (Croatia)

Co-creation of a Frame of reference for EE, and use of renewable resources in production, operations, and testing of analytical tool developed within the project

The analytical tool is to support SMEs in improving EE and in using RES in key production processes. With help by external experts, SMEs participated in identifying and addressing their main weaknesses in EE, and the use of RES in their business processes. Results of these processes were used to define the tool.

PILOT 10 (Spain)

Co-creation of a Frame of reference for EE, and use of renewable resources in production, operations and testing of analytical tool developed within the project

The analytical tool is to support SMEs in improving EE and in using RES in key production processes. With help by external experts, SMEs participated in identifying and addressing their main weaknesses in EE, and the use of RES in their business processes. Results of these processes were used to define the tool.

❖ EMILIE

PILOT 1 (Italy)

➢ Test solar cooling and heating technologies

- Power Installed (kW): 20 cooling/ 40 solar collectors
- Energy savings forecast based on experimental data (kWh/year)
  - 3500 (electric for cold TBC)
  - 35000 (thermal HW TBC)
- € invested/ Energy savings during a 15 years life time (€/kWh): 0,173
- CO2 emissions avoided (kg/year):8600
- Chiller Coefficient of performance (%): 65 (TBC)

On the basis of first experimental results, cooling energy savings is calculated with reference to typical compression chiller with average COP equal to 3,5. CO2 emissions avoided are calculated taking into account both partners' national electricity emission factors and a conventional gas emission factor of 202 gCO2/kWh for Hot Water production.

PILOT 2 (Croatia)

➢ Test solar cooling and heating technologies

- Power Installed (kW): 20 cooling/ 44 solar collectors
- Energy savings forecast based on experimental data (kWh/year)
- 5000 (electric for cold TBC)
- 35000 (thermal HW TBC)
- € invested/ Energy savings during a 15 years life time (€/kWh): 0,224
- CO2 emissions avoided (kg/year):8200
- Chiller Coefficient of performance (%): 54 (TBC)

On the basis of first experimental results, cooling energy savings is calculated with reference to typical compression chiller with average COP equal to 3,5. CO2 emissions avoided are calculated taking into account both partners' national electricity emission factors and a conventional gas emission factor of 202 gCO2/kWh for Hot Water production.

PILOT 3 (Spain)

➢ **To improve the performance of the HVAC system of a specific building by improving the insulation of the distribution facilities and implementing other energy efficient measures in order to increase the COP of the whole system.**
• Energy savings forecast based on experimental data (kWh/year): 13828 (Electricity TBC) • € invested /15 years Energy savings (€/kWh): 0,141 • CO2 emissions avoided (kg/year): 11160

PILOT 4 (Spain)

➢ **To evaluate and assess the energy consumption reduction in tertiary buildings by using the PCM technology in windows**
• Energy savings forecast based on experimental data (kWh/year): 12000 (Electricity, fuel heating and cooling TBC) • € invested /15 years Energy savings (€/kWh): 0,461 • CO2 emissions avoided (kg/year): 3649

PILOT 5 (France)

➢ **Test new technologies to lower building energy consumption, by energy metering actions and by empowering occupants to reduce their consumption through user friendly actions**
• Energy savings forecast based on experimental data (kWh/year): 1445 (heating and cooling TBC) • € invested /15 years Energy savings (€/kWh): 0,188 • CO2 emissions avoided (kg/year): 577

❖ ENCERTICUS

- **To provide households detailed use information in a meaningful way**
- **To engage individual households as active players in developing water and energy conservation practices**
- **To evaluate "user-friendly" and widely accessible models of energy awareness services applied in 3 categories of tenants and housing buildings**
- **To obtain conclusions about the cost-effectiveness and impact on resource use behavior change of each model**
- **To integrate monitoring models with Energy certification scheme, and to evaluate how to improve the user acceptance of the energy certificate, and its accuracy against the real energy performance of residential buildings.**

PILOT 1 (Spain)

The achieved savings in Manresa pilot site are (8 months period):

- Reduction in electricity use 6,93% (1967 kWh)
- Reduction in water use 1,86% (16,6 m3)
- Reduction in heating use 1% (1336 kWh).

PILOT 2 (Italy)

The achieved savings in Prato pilot site are (12 months period): Reduction in electricity use 10% (4082 kWh).

PILOT 3 (France)

The achieved savings in Marseille pilot site are (8 months period):

- Reduction in electricity use 1,2% (496 kWh)
- Reduction in heating use 3,78% (5256 kWh).

❖ ENERCOAST

PILOT 1 (Italy)

Testing feasibility of installation of small, vertical axis wind turbines in Marina of Rimini.

- Total capital cost 258.852,18€.
- Generally landscape problems, but minimal in this case.

PILOT 2 (Italy)

➢ **Testing feasibility of sea water heat pump to cover the heating and cooling needs of a sailing club building in city of Crotone, Italy.**

- Payback period of 2.8 years of the additional cost compared to boiler-air conditioning system.
- Discharge of warm water to the sea.
- Discharge of antifouling chemicals.

PILOT 3 (Slovenia)

➢ **Testing application solar cooling to cover the energy needs of a health care center at Bonifika Koper, Slovenia.**

- Payback period of 14,5 years with 50% co-financing by public resources.
- No or minimal negative impacts on environment

PILOT 4 (Slovenia)

➢ **Testing feasibility of sea water heat pump to cover the energy needs of the passenger terminal of port of Koper in Slovenia.**

- Payback period of 40,6 years with 50% co-financing by public resources. No significant environmental problems.

PILOT 5 (Croatia)

➢ **Examining feasibility of use of solar cooling in combination with sea water heat pumps to cover the energy needs of hotel Jadran at Rijeka, Croatia.**

- Profitable only by co-financing by public resources (25-50%).

- No major environmental concerns.

PILOT 6 (Croatia)

➢ **Examining feasibility of sea water heat pump for heating elementary school Ivan Gundulić at port Gruž, Dubrovnik, Croatia.**

- Not economically feasible even with 50% co-financing from the public resources. No major environmental concerns.

PILOT 7 (Greece)

➢ **Examining feasibility of wave energy to cover the energy needs of the auxiliary engines of ships while at berth at port of Igoumenitsa.**

- Not economically feasible.
- Negligible effects on GHG emissions, Visual obstruction, Birds
- Might be important: Noise and vibration, Wave dynamics along the shoreline

PILOT 8 (Greece)

➢ **Testing feasibility of use of floating wind turbine to cover the energy needs of three hotel units at Lassi, Cephalonia Island, Greece**

- Payback period: 10^{o} -11^{o} years.
- Uncertainty on environmental impact because of lack of data.
- Might be important: Noise, marine li

❖ E2STORMED

- **Improve EE in the urban water cycle and in buildings by promoting the use Sustainable Drainage Systems (SuDS) in MED cities.**
- **Address the critical issue of rolling out innovative technologies by promoting a transition process in the pilot cases and their regions.**
- **The main tools developed to promote this process are a Transition Manual, a Decision Support Tool (DST) and a Strategic Action Plan for each pilot.**
- **A Regional Working Group on EE in the urban water cycle has been created in each pilot city to allow the participation of the main actors related to energy, water and urban development in this transition process.**

- The transition process has achieved great engagement of local and regional stakeholders in 6 municipalities. They have understood the SuDS philosophy, and changes in urban stormwater management have already begun in most cases.
- Results of application of DST in general show that SuDS can reduce significantly the energy consumed and the emissions in urban stormwater management at the same costs or even lower than the conventional systems. In addition, they have clear social and environmental advantages.
- Finally, the results of the green roof monitoring in Benaguasil have showed that it clearly improves the building insulation, producing energy savings especially in summer. This savings are about 30% of the energy consumed in the refrigeration system in comparison with a conventional roof.

PILOT 1 (Spain)

PILOT 2 (Italy)

PILOT 3 (Malta)

PILOT 4 (Greece)

PILOT 5 (Montenegro)

PILOT 6 (Croatia)

❖ GRASP

PILOT 1 (Italy)

The current method of lowest price related to products respecting the minimum environmental requirements, was compared with the Life Cycle Cost (LCC) analysis, taking into account a tender that respects the sustainability and the environmental impact of the products purchased.

- Desktops: The purchase of a more environmental-friendly product is the most cost-efficient choice. Apart from saving on energy costs, the green product can also reduce emissions drastically through avoiding 4,187 tons of CO2 over 5 years.
- Monitors: The environmental-friendly product is the better investment since, over a 5 year period the energy costs were nearly 1/10 of the cost of the lowest-priced product. In addition, during the 5 years, 2,433 tons of CO2 were avoided, and the total life cycle cost of the environmental-friendly product was approximately 8.6 % of the total life cycle cost of the lowest priced product.

PILOT 2 (Malta)

Tender for the supply and delivery of items of Information Technology (IT) equipment for setting up of an Ultra Wide Band Laboratory at Department of Physics at University of Malta, using GRASP tools.

The environment-friendly product did not meet all necessary criteria for being a green product. In particular, the energy consumption of the lowest priced item was nearly half that of the product used to represent the green option. Therefore, it is comparatively not the more green option in all categories, negatively affecting the results. Another point is the maintenance. When there is no data for maintenance, the fields in calculation of total life cycle costs can be left as 0 with no effect to the rest of calculation. The comparison is more precise when these additional data are available, but the data are not strictly necessary.

PILOT 3 (France)

Public lighting renovation of municipality of Saint-Florent – Corsica

More than 55% energy savings in the worst case (1.87 kW = 6.825 MWh per year) Money savings are 1.517€ per year => 6 years return on investment.

PILOT 4 (Greece)

- **Renovation of a public building (school).**
- **Three scenarios were examined:**

- replacing the existing boilers with a new one
- replacing the existing fluorescent lamps with LED lamps
- installing a photovoltaic (pv) system

- 1st scenario (boilers): The difference between the two boilers was observed in price and efficiency. The results confirmed that the highest efficiency boiler, despite the fact that it was more expensive, was the best choice.
- 2nd scenario (lamps): The results confirmed that the more expensive LED Lamps were the best choice. Compared to conventional bulb, LED avoids 50,102 tons CO2.
- 3rd scenario (pv system): Case (a) carries the lower price and offers less electricity production because the pv system consists of a solar panel with highest "NOCT" index value, and lowest inverter efficiency. Case (b) the photovoltaic will operate under the "net metering" program; thus the electricity production by the pv system avoids electricity cost for the school. In the 2nd case, the equivalent avoided electricity price is 0,09572 €/kWh (under Greek Legislation).

TRANSNATIONAL TEST (Italy, Cyprus)

Commission, build and implement a pv system power rating of 992.25 kwp in public area that belongs to Municipality of Filiano (PZ), Basilicata, Italy.
Aim of test was (a) to simulate a real e-tender to build and implement a photovoltaic system in accordance to GRASP procedures, and (b) verify the difference in terms of LCC between GPP and a tender that considers only the lowest up-front price without taking into account any green specification.

The lowest-price product was not as cost-efficient as the product with the lowest sustainable-price. The final result had a negative value for the LCC, which indicates that both products have possibility to not only save money for the organizations if the energy is completely used where it is produced (as assumed in this case), but also to make money for them if there is an excess. The sustainable-price product had a lower maintenance cost than the lowest upfront-cost, and this makes it more efficient and economical.

TEST 1 (Greece)

These tests were based on 3 tenders that the Municipality finalized in the past and had "green" specs limitations. Tenders were under general IT equipment

category and the products involved were pc monitor (display), portable computer, printer.

- TENDER 1: Municipality fulfilled a tender with demand for 14 LED monitors with expected value per piece 90€.The outcome of test was that maybe the price set by the tender was a bit low according to products found in solution database.
- TENDER2: Municipality fulfilled a tender with demand for 5 LAN printers with expected value per piece 700€. From the suggestions made by the e-GPP tool, we concluded that there was a product that fulfilled most of the requirements -the noise criterion was not addressed- by a specific product imported in the tool. The suggested price was 100€ lower than the originally set by the PA. It was realized that more green criteria could be used to enrich to a more "green" product.
- TENDER3: Municipality fulfilled a tender with demand for 1 portable computer with expected value up to 1500€. From the suggestions made by the e-GPP tool, we concluded that there were 2 products that fulfilled the ergonomic limitations and also 2 that were in compliance with power consumption. Only 1 combined the 2 limitations and the suggested price was 1140€, 360€ less than the predicted one by the tender. As before, it was realized that more green criteria could be used to enrich to a more "green" product.

TEST 2 (Spain)

Tender for indoor (office) lighting. The tender was a secret bid, the procedures followed were open and the award criterion was the lowest price.

The lowest-price product was less expensive than the environmental-friendly product considering the initial purchase price (less than 1/4 of the cost); but in the end, the sustainable product's LCC was less than half the LCC of the lowest-price product.

TEST 3 (Spain)

The main objective was to compare the obtained results and the efficiency of the use of GRASP eGPP platform instead of the traditional method of procurement based on the lowest price up-front. Tender was analyzed through eGPP platform and applying GRASP methodology; green specifications were taken into account when purchasing the related product/service given in eGPP platform.

If the sustainable price is considered in the test, the selected product was FUTURE 10 ACS, provided by SME 8. In this case, the duration doesn't compensate for the higher price of the sustainable product. The selected product will need, at least, 35 years to cover the price difference.

TEST 4 (Albania)

An auction tender was tested with reserved procedures and the lowest price as the award criterion for the purchase of 7 projectors.

The environmentally friendly product saved 0,124 tons of CO2 and a total economic value 0,9 €. However, the lowest priced product saved more costs during total Life Cycle.

TEST 5 (Bosnia-Herzegovina)

Test-tender was an open procedure for selection of facade works for Administrative center of City of East Sarajevo, with the characteristics of classical method compared to characteristics of GRASP method. The award criterion was a lowest price with a technical specification containing a green criterion: a minimum performance of the investment in terms of energy consumption.

- Changes in consumption of natural gas: Passing from the unaltered building to the improved one in regards to energy consumption, the use of natural gas is less than half for the improved building. Beyond the energy saving that is due to the reduction of fuel consumption, the operation allows the reduction of CO2 emissions.
- Difference in electricity before and after the building retrofitting: in this case the consumption of energy is higher in the improved building.
- Usage of fuel oil: energy consumption for the improved building is zero, while prior to retrofitting the consumption was substantially higher (13764 l).

❖ GREENPARTNERSHIPS

PILOT 1 (Albania)

- **Providing training courses to educate the young on environmental protection and the use of alternative sources for energy production.**
  - Feasibility studies.

PILOT 2 (Bosnia and Herzegovina)

- **Feasibility study on creating fund to support energy efficient housing in cities.**
  - Increasing EE in public school and kindergarten building.

PILOT 3 (Bosnia and Herzegovina)

- **Increasing EE in Eco-schools and public administration buildings.**
  - Feasibility Study on the creation of support fund to energy efficient housing in cities.

PILOT 4 (Croatia)

- **Creating possibilities for biomass and biogas producers.**
  - Training courses to educate the young on environmental protection and the use of alternative sources for energy production.

PILOT 5 (Croatia)

Technical documentation for solar collectors installation - main design:

- **Construction engineering design (technical description, evidence of fulfilment and other requirements, control and quality assurance program, evidence of evaluation cost of construction, drawings).**
- **Mechanical engineering design (technical description, technical calculations, control and quality assurance program, evidence of evaluation cost of construction, drawings).**

Gathering all stakeholders associated with the biomass, biogas, other RES and energy efficiencies. Development of GIS model for data analysis, and monitoring RES and EE.

PILOT 6 (Croatia)

Prepared technical solution and investment proposal

- **Architectural drawings of the existing state of Primary school building**
- **Energy certificate and Energy audit report**
- **Main design of EE improvement of the building (constructional, mechanical, electrical designs)**
- **Financial calculations and investment return period**

Gathering all the stakeholders associated with the biomass, biogas, other RES and energy efficiencies. Development of GIS model for data analysis, and monitoring RES and EE. Increasing EE in public school building Primary school "Grigor Vitez", Sveti Ivan Žabno.

PILOT 7 (Cyprus)

- **To invest (if proven viable) in buying dehydrator and biomass burner.**
  - Pilot use of biomass for heating systems in public buildings.

PILOT 8 (France)

- **Micro-hydropower plant: 300 kW > 1 400 MWh/year.**
  - Pilot ihydro power plant on an irrigation chanal.

PILOT 9 (France)

- **Measurement of GES emissions.**
  - Reduce energy consumption and GES emissions in agriculture: strengthen partnerships amongst local stakeholders.

PILOT 10 (Greece)

- **Bioclimatic design of the open space in an Urban Area in Rethimnon (CR1).**
  - Feasibility study on bioclimatic design.

PILOT 11 (Greece)

- **To design appropriate public lighting infrastructure and management at old town of Rethymnon integrating energy savings, necessary level of lighting, flow regulation, other lighting conditions**
- **Replicable example to be adapted in other municipalities in the region.**
- Public lighting implementation study (CR2).

PILOT 12 (Greece)

- **Reduced Greenhouse Gas (GHG) Emissions, because it will reduce the fossil fuels required for electricity generation, and minimize operation cost for the municipality.**
- Water Pumping EE Improvements (CR3).

PILOT 13 (Italy)

- **Creation of an Environment and Energy Centre to improve the coordination of sustainable development in Province via educational training, awareness campaign, and facilitating creation of Local Partnership among public institutions and private companies.**
- Strengthening local public-private partnerships in supporting EE and RES.

PILOT 14 (Italy)

- **The energy audit is to be done with a bottom-up approach, i.e. students and professor will also take part in process, collecting data and identifying potential actions.**
- Raising awareness and implementing EE upgrading in schools.

PILOT 15 (Italy)

- **Develop common financial proposal for public building retrofitting included in 32 SEAPs. One obstacle to implement SEAP is the lack of financial resources to do the interventions listed in the Plans.**
  - Mobilisation funds for investments in sustainable energy at local level.

PILOT 16 (Italy)

- **Aims to improve knowledge and capabilities of the technicians in EE in buildings as requested by communication activities in the 32 SEAP approved by the Covenant of Mayors.**
  - Training civil society organisations in energy certification.

PILOT 17 (Montenegro)

- **Aims to set up possibilities for building the energy network for the dam of the hydro power plant Jezerščica.**
  - Prepared documentation with feasibility.

PILOT 19 (Slovenia)

- **Preparation of feasibility study for energy renovation of heritage building.**
  - Feasibility on renovation of the headquarters of KGZS Zavod Mb.

PILOT 20 (Slovenia)

- **Preparation of feasibility and business plan for investment in biomass heating for two public buildings.**
  - Prepared documentation for investments.

PILOT 21 (Spain)

- **Communication, informing and dissemination of the training and the campaign on best practices in energy use.**
  - Starting up of a "Championship for energy saving" in public buildings.

PILOT 22 (Spain)

- **Installation of smart meters in public buildings to measure decrease in use of electricity and heating,**
- **Monitoring energy consumption of public building to improve energy management,**
- **Reporting the analysis of energy consumption in different public buildings in order to decide on new public investments in EE & reduction of energy consumption, and implement solutions in abnormal consumption at higher than the recommended ratios.**

- Installation of remote control systems for energy management in public buildings participating in "championship".

PILOT 23 (Spain)

- **A prospective analysis about evolution of consumption of electricity and gas at Roca Umbert, considering all activities and uses (present and future), the solutions applied to improve EE, and what part of the demand could be covered with the production of electricity, clima, hot water and heating, from trigeneration (as from gas), so that Roca Umbert becomes a building with near zero consumption.**
- **A prospective analysis about the evolution of consumption of electricity and gas at Roca Umbert**
- **An economic study about the feasibility of technical solutions needed (co/trigeneration plant) for future investments (public and private) in a selfconsumption system, and provision of energy services to the complex of Roca Umbert and its different uses.**

- Technical and economic feasibility study on the installation of trigeneration in the form of selfconsumption and provision of energy services to Granollers.

PILOT 24 (Portugal)

- **Optimization of public lighting and renovation of classification for the public swimming pool.**

- Renewed building, optimized public lightning.

❖ MAIN

PILOT 1 (France, Greece, Italy, Spain)

Development of an educational program aimed at disseminating MAIN (MAteriaux Intelligents) building materials such as cool roofs and cool pavements, which prevent summer overheating of buildings and urban areas because of their high capability of reflecting solar radiation.

An original, and up to now missing, educational program has been developed and tested in all 4 countries of MAIN project, in 7 locations (Nice, Athens, Arezzo, Modena, Palermo, Palma, Zaragoza. A strong promotion of MAIN materials and their advantages in terms of EE, thermal comfort, sustainability has been achieved.

PILOT 2 (France, Greece, Italy, Spain)

Development of a method aimed at implementing demonstrative pilot applications of MAIN (MAteriaux Intelligents) building materials such as cool roofs and cool pavements, which prevent summer overheating of buildings and urban areas because of their high capability of reflecting solar radiation.

The method has been applied to 5 buildings (plus one small scale, fully instrumented installation), having different climates and involving both new and refurbished buildings, and different types of used materials such as paints and waterproofing membranes. A cool pavement installation, uncommon in Europe, has been included.

❖ MARIE

PILOT 1 (Italy)

Legislative framework. To provide Strategic Lines for Legislative Innovation to facilitate the building energy renovation in MED space.

- Integration of European, National, Regional and Local policies in energy efficiency in buildings in the operational legislative framework for both offer and demand.
- Efficient implementation of corresponding legislation for energy efficiency in buildings and verification of compliance with the corresponding legislation.
- Simplified administrative procedures for implementing energy efficiency refurbishments at regional and local level.

PILOT 2 (Montenegro)

Urban Plans for EE Improvement, concentrating on the design and test of an urban planning model for buildings energy renovation development.

In Andalusia, the feasibility of energy related intervention assumed by the private sector is more limited than the one referred to public buildings. The main result of this pilot is to find new ways of public private partnership (PPP).

PILOT 3 (Spain)

To increase demand for energy efficient renovation of buildings of MED territory by creating a method to develop regional investment plans for energy renovation of existing buildings by integrating all agents involved, to assure that the proposed plan is feasible, considering special case of districts with low-income residents.

Main result is the elaboration of an Investment Programme Model for Energy Renovation in Buildings that has been tested in Catalonia, and comprises an enhanced feasible replicability for most possible public and private investing lines.

PILOT 4 (Spain)

To improve the EE of the MED Building Stock by using fibreboard of regional, natural, and renewable materials i.e. cork, cellulose or wood fibre in an innovative building construction system.

PILOT 5 (Italy)

To introduce gradually the LCC (as part of LCA) method in a traditionally "conservative" market, such as building sector, helping private stakeholders to become experts of these new ways of public tenders before full introduction of complete WLCC method (when final methods are defined and agreed).

The test revealed that LCC can be an effective methodology to be used in place of the traditional economic evaluation parameters (investment costs) and together with the more traditional technical and environmental parameters (energy savings, environmental quality of materials).

PILOT 6 (France)

- **Inciting SMEs to generate and supply local demand for EE through support measures addressing their needs.**
- **Boosting local demand through innovative communication actions.**

- Renover+ website
- Long preparatory stage involving contacts with professionals and businesses
- Press relations
- Specific tools to support the professionals (Protocol of renovation called 123 réno; Training)

PILOT 7 (France)

Awareness campaigns to increase the experience and knowledge related to the main objective of the communication strategic measures.

The Illa Efficient public contest is the outstanding output of this pilot, serving as a model to develop further programmes and activities. The pilot action consists of a design competition on how to renovate a block in Barcelona.

PILOT 8 (Spain)

Training courses. To test training programme model based on real cases and best practices of ERB.

PILOT 9 (Spain)

- **To reach a high level of consensus with regional policy makers and involved local agents on ERB proposals.**
- **At regional level to enhance the inter-administrative coordination on ERB policies, and involve all private agents with role in ERB policy in region.**
- **To disseminate and share the experience with other regions developing or willing to implement this pilot.**

The Forum of Entities was created, comprising ca. 100 private and public institutions, companies, guilds, and made a commitment to develop the Catalan Strategy for EEB, called ECREE.

PILOT 10 (Spain)

MARIE Business Network, to promote cooperation and to share the results and knowledge amongst members.

Business Cooperation Plan.

PILOT 11 (Spain)

MARIE APP Platform, to integrate a database of innovative products and services to make them available in the market and promote their use.

The APP records a moderate traffic in terms of inputs and visits; the APP utilities are not developed completely, so its impact as a catalyst for cooperation is limited. For these reasons, the concept and functions of the Platform has been redefined, becoming the basis of the Cooperation Hub proposal.

❖ PVNET

- **Meteorological measurements (POA Irradiance, Ambient temperature, module temp)**
- **PV production measurements**
- **Use this data with the Net-metering optimisation tool**
- **Analyze data to determine seasonal domestic load behavior and seasonal POA irradiance and PV potential**

PILOT 1 (Cyprus)

- Successfully determined the Load profile of NEM consumers in Cyprus
- Found the seasonal solar potential of locations in Cyprus (mountainous and flat land)
- Data used to train and optimise the "NEM policy optimisation tool"

PILOT 2 (Portugal)

- Successfully determined the Load profile of domestic consumers in Portugal
- Found the seasonal solar potential of locations in Algarve (mountainous & flat land)
- Data used to train and optimise the "NEM policy optimisation tool"

PILOT 3 (Slovenia)

- Successfully determined the Load profile of domestic consumers in Slovenia
- Found the seasonal solar potential of locations in Slovenia (mountainous & flat land)
- Data used to train and optimise the "NEM policy optimisation tool"

❖ REPUBLIC MED (selected)

PILOT 1 (Croatia)

Demonstration of method in a primary school of Zadar. Conclusions on technical and financial benefits produced by more accurate building energy analysis taking into account local climate and end-users behaviour profiles (as recommended by new directive 2010/31/EC and its supportive regulation 244/2012/EC.

Identification of optimum retrofit based on the suggested numerical approach:

- Envelope retrofits include a thermal insulation with 8 cm of mineral wool on walls and 14 cm of mineral wool in flat roof
- Replacement of the few existing old metal windows with new PVC windows (Uw=1.4 W/m2K).
- Replacement of old standard boiler with condensing boiler, replacement of three-speed pump with variable-speed drive (VSD pump), added pipe insulation and added thermostatic radiator valves, mechanical ventilation units are integrated in the VRF system and are simulated assuming sensible heat recovery of 75%.
- Compensation of futile load.

PILOT 2 (Croatia)

Demonstration of method for Urban Heat Island (UHI) mitigation purposes. Introduction of microclimate and social (comfort and air quality) indicators and design criteria to ensure better living conditions in urban context.

Optimal orientation and selection of trees, grass and cool pavements to ensure:

- Minimization of mean temperature at noon of the hottest day of the year
- Improvement of thermal comfort at noon of the hottest day of the year.
- At least no reduction of mean air temperature on the typical winter day.
- At least no deterioration of thermal comfort on the typical winter day.
- Retain wind-speed at acceptable levels (to avoid draught discomfort)

PILOT 3 (Greece)

Demonstration of method in primary school of Piraeus. Conclusions on technical and financial benefits produced by more accurate building energy

analysis taking into account local climate and end-users behaviour profiles (as recommended by new directive 2010/31/EC and its supportive regulation 244/2012/EC).

Description of suggested retrofit technologies/techniques:
Windows and glass doors with U = 3 W/ m²K
New 21 W LED lights in classes A' and B' floor and in the Computer Class according to T.O.T.E.E. 20701/1-2010 3rd Edition.
New gas boiler with efficiency factor 0,93
Split A/C units with COP 3,5

PILOT 4 (Greece)

Demonstration of method for Urban Heat Island (UHI) mitigation purposes. Introduction of microclimate and social (comfort and air quality) indicators and design criteria to ensure better living conditions in urban context.

Optimal orientation and selection of trees, grass and cool pavements to ensure:

- Minimization of mean temperature at noon of the hottest day of the year
- Improvement of thermal comfort at noon of the hottest day of the year.
- At least no reduction of mean air temperature on the typical winter day.
- At least no deterioration of thermal comfort on the typical winter day.
- Retain wind-speed at acceptable levels (to avoid draught discomfort)

❖ SINERGIA

Energy monitoring, energy consumption evaluation

42 different agrofood enterprises energy consumption data and selection of reference values to identify sectorial benchmark about energy consumption.

PILOT 1 (Croatia)

PILOT 2 (Slovenia)

PILOT 3 (Italy)

PILOT 4 (France)

PILOT 5 (Greece)

PILOT 6 (Spain)

❖ SMARTINMED

PILOT 1 (Andalusia, Rhones Alpes, Toscana, Lombardia, Piemonte, Croatia, Western Macedonia, Attiki)

Test SMARTINMED BUSINESS MODEL TOOL to perform company evaluation. Test real strategies to improve company competitiveness and job level capacity in medium & long term.

- SMARTinMED tool is translated in a tool kit (APP) to be easily used by SMEs and clusters, built on real Mediterranean experiences and devoted to RE and EE, providing immediate feedback and solution to business
- A SWOT analysis on competitiveness of MED SMEs
- A useful insight on the introduction or improvement of public support measures and tools for SMEs focused on business model innovation