



Malaga Jacinto Benavente Building



Energy
Efficiency
in Low
Income Housing
in the Mediterranean

THE PILOT PROJECT

Regional context

Malaga is city in the Autonomous Community of Andalusia, Spain with an urban area of 71.18 km² & a density of 81.2 inhabitants por Ha. With a population of 568,507 in 2010, it is the second most populated city in Andalusia and the sixth largest in Spain. Malaga enjoys a subtropical climate. It has one of the warmest winters in Europe. Its average annual temperature is 23 °C (73 °F) during the day (one of the highest results in Europe) and 13 °C (55 °F) at night.

Pilot description

Situated in the northern area of the city (urban), the “Viviendas Jacinto Benavente” building (owned by the Municipal Institute of Housing (IMV))and currently used as special regime social housing based on renting, is a typical model of Social Housing huge building of the ‘80s. No specific group is targetedfor this pilot, but residents must present the following features: no housing ownership; present an income level lower than the minimum “Public Income Indicator” (IPREM), which corresponds to the minimum established salary.



Objectives of the pilot project

- Improve two grades of energy class (from Grade F to Grade D).
- Achieve this improvement with an investment lower than 30.000 € per dwelling.

Energy efficiency solutions

- 1.- Solar thermal with cogeneration for heating sanitary water
- 2.- External thermal insulation of roof
- 3.- External thermal insulation of the floor over the crawl space
- 4.- External thermal insulation of walls
- 5.- Improving natural cross-ventilation through the opening of the central patio

Innovative financial mechanisms

Our proposal is a financial mechanism that could be managed by an Energy Services Company (ESCO) or building cooperatives. It combines various different individual mechanisms including: REVOLVING FUNDS, PUBLIC GRANTS, LOAN GUARANTEES and SOFT LOANS.

The main advantages of this financial mechanism include: – High leveraging effect of financial mechanisms used, Social implication, Potential project continuity, Economic and market development, improving Energy performance on highly inefficient building stock.

At the same time, we are working on establishing voluntary agreements with some of the private organisations collaborating in the project.



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Málaga City Council
Tel: 951 928 833
programaseuropeos14@malaga.eu



VALENCIA
Calle Fontaneres nº 65
Avda. Pio XII nº 49



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Regional context

Valencia is a city located in the Comunitat Valenciana (Spain). It has an urban area of 134,65km² and a density of 5,926.72 hab./km². Valencia is Spain's third largest metropolitan area, with a population ranging from 1.7 to 2.3 million, with around 809,000 inhabitants in the administrative centre.

Valencia has a typical Mediterranean climate, characterized by very mild winters and hot summers. The average annual temperature in the city is around 22.3 °C during the day and 13.4 °C at night, and the average temperature in January is 11.5°C and in August 25.5 °C.

Pilot description

Building A : FONTANARES

The building is located in an urban area within the neighbourhood of Patraix. Over 65% of buildings in the neighbourhood were built between 1940 and 1980. The average size of homes located in the area is 98m² and the selected apartment building has a total of 28 dwellings. The majority of residents are retirees (86%) who receive a state pension which generally is less than the minimal level of income. 95% of the residents are homeowners, the remaining 5%, rent.



Building B : PIO XII

The building is located in a urban area within the neighbourhood of Campanar. Over 65% of buildings in the neighbourhood were built between 1970 and 1990. The average size of homes located in the area is 106m² and the selected apartment building has a total of 28 dwellings. The majority of residents are retirees (76%) who receive a state pension which generally is less than the minimal level of income. 85% of residents are homeowners, the remaining, 15%, rent.

Objectives of the pilot project

- Improve the energy classification of the buildings by two grades (from Grade F to Grade D).
- Achieve this improvement with an investment lower than 30 000 € per dwelling.

Energy efficiency solutions

- 1.- External thermal insulation of the walls
- 2.- External insulation of the roof
- 3.- Actions focused on improving the windows will be studied
- 4.- Focus on improving the inhabitants behavior related to energy consumption

Innovative financial mechanisms

The project works on providing possibilities on using core instruments such as: preferential loans, subsidies, grants, third party financing or financing through rental/sale of common elements of the building. Complementary to these mechanisms, a reduced level of VAT is applicable for all retrofit works in homes (10% instead of 21% which is the general type).

Besides these measures, consumers lack sufficient knowledge to enable them to make informed decisions in relation to their investment in energy efficiency. The objective is offer information in an easily accessible and understandable way.



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Valencian Institute of Edification (IVE)
Tel: +34 963 986 505
Email: rehabilitacion@five.es



Malta

Malta harbour area
(Vittoriosa / Kalkara / Senglea)
Malta Pembroke
Gozo



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THE PILOT PROJECT

Regional context

Malta is the smallest and the least populated country in the European Union. Located in the Mediterranean Sea, just south of Sicily, the Maltese archipelago has an area of only 316 km² and a population of around 400.000, making it one of the most densely-populated country in the world. Malta is the largest island. Valletta, the capital, is the cultural, administrative and commercial centre of the country. Gozo is the second largest populated island, and is topographically quite different from Malta. The other islands are uninhabited. The Maltese archipelago has a typical Mediterranean marine climate with hot dry summers and mild wet winters, accompanied by high humidity levels throughout the year.

Pilot description

The Maltese pilot consists of 35 dwellings from various areas of Malta and Gozo. These are privately owned and were selected on the basis of a public call for applications. Participants must be beneficiaries of the government's Energy Voucher Scheme, which is restricted to low income owners who would have been subjected to a detailed scrutiny by the relevant government department. The pilot includes two main categories of construction: mainly terraced houses with two floors, as well as a number of individual apartments forming part of a larger block.



Objectives of the pilot project

- To implement energy-saving technologies and construction techniques in low income housing
- To assess the cost-effectiveness of the various technologies and techniques
- To identify any barriers with energy-efficient technologies and measures to tackle them
- To demonstrate the effectiveness of energy-efficient technologies and measures and promote greater uptake in low income housing

Energy efficiency solutions

- 1.- Building envelope (roof insulation, roof shading, use of reflective paint on roof, wall insulation)
- 2.- Openings (double-glazing, second window in addition to existing window, UV film)
- 3.- Lighting (use of energy-efficient lighting, skylights, etc.)
- 4.- Water heating (solar water heaters, instant water heaters, etc.)
- 5.- Space heating and cooling systems (high-efficiency systems, ceiling fans, ventilation systems, etc.)
- 6.- Photovoltaic panels

Innovative financial mechanisms

The maximum value of each grant is €7,000 (maximum investment per dwelling 30.000€). MIEMA will cover 90% of costs of equipment and works, while the beneficiary will be required to finance the remaining 10% of the costs through one of the following options:

1. A cash contribution through the use of a local loft bank loan.
2. A contribution in kind as labour in the upgrading activities, either by the beneficiary or by a third party on their behalf.



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Malta Intelligent Energy
Management Agency (MIEMA)
Tel: +356 7928 8508
Email: Brian.warrington@miema.org



Cyprus

Lefkosia, Limassol, Larnaca,
Pafos and Ammochostos



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THE PILOT PROJECT

Regional context

Cyprus is the largest island in the eastern Mediterranean with a population of around 800,000 inhabitants. The island's main economic activities are tourism, clothing, craft exports and merchant shipping. Cyprus has an intense Mediterranean climate with hot dry summers from mid-May to mid-September and rainy, rather changeable, winters from November to mid-March. These are separated by short autumn and spring seasons with very changeable weather conditions. Temperatures can range from 36°C in July to 10 °C in January, with much colder conditions being registered in higher parts of the Troodos Mountains.

Pilot description

In Cyprus, dwellings have been selected that are located in the territories of Local Authorities that have undertaken climate change commitments e.g. have signed either the "Pact of Islands" or the "Covenant of mayors". 15 Local Authorities have been selected in total, 11 of which are located in urban areas and 4 in rural areas. The pilots have been selected through an open call of interest that has been announced through various media channels. In total, 25 owned low income households will be retrofitted during the project implementation phase (24 single houses and 1 apartment).



The annual income of the households varies between 10,000 and 30,000 Euros. Most of the families selected have 1-4 children below 18 years of age. The selected houses were built between 1978 and 1995 and range from 100 to 150m² in size. The most common characteristics of the dwellings include: the use of old solar thermal water heaters, the lack of thermal insulation and dampness.

Objectives of the pilot project

- A decrease in total energy consumption of 40%
- Improve the energy classification of the buildings by two grades
- It is estimated that more than 50,000 kWh/year (final energy consumption) will be saved and the carbon emission reduction will be more than 43,700 kg CO₂/year (using a standard emission factor)

Energy efficiency solutions

- 1.- External thermal insulation of roof
- 2.- Replacement of single glazing with double glazing
- 3.- Energy efficient fire place installation
- 4.- Solar thermal water heater replacement
- 5.- Installation of external blinds/shutters

Innovative financial mechanisms

- A contribution of 15% by the Cypriot Local Authorities for each dwelling.
- The purchase and installation of 25 smart meters by the Electricity Authority of Cyprus.

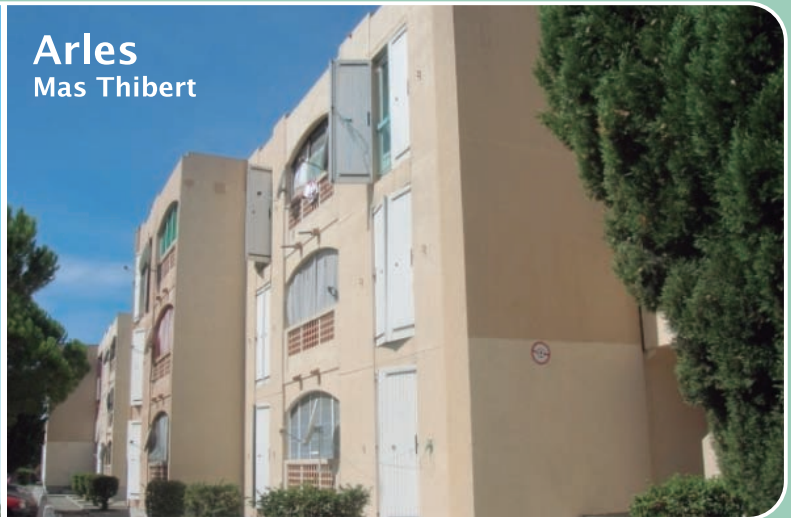


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Cyprus Energy Agency
Tel: +357 22667716
Email: info@cea.org.cy



Arles Mas Thibert



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THE PILOT PROJECT

Regional context

Arles enjoys a Mediterranean climate. Arles, though not located on the Mediterranean Sea itself, sits along the bank of the Rhône River only some 40km north, and has similar climate as Marseille.

It gets nearly 3,000 hours of sunshine annually. In January and February, the coldest period of the year, the average temperature remains above 5°C. However, during winter and early spring, the mistral winds from the north make the area rather chilly and windy. The mistral wind is usually accompanied by clear and fresh weather, and it plays an important role in the local climate. Its average speed during the day can reach about fifty km/hour and it usually blows during the winter and spring, though it occurs in all seasons.

Pilot description

The pilot building is located in a small village, Mas Thibert, 18 km from the city centre of Arles. It is in a rural area in Camargues. The social housing building consists of 30 rented dwellings, all less than 90 m². In order to rent an apartment the residents have to have an income below a level defined by the french law. The main energy source used for heating / cooling in the building is oil.



Objectives of the pilot project

- Decrease in total energy consumption: 77% or 164 kWh/m²/year
- An increase in the energy classification (from Grade D to Grade A)

Energy efficiency solutions

- 1.- External insulation in EPS, under the floor, on the building walls and the roof terrace
- 2.- Replacement of windows with double glazing
- 3.- Installation of ground source heat pumps (low enthalpy geothermal energy) for the heating system
- 4.- Domestic Hot Water Solar Heating
- 5.- Installation of shading systems for summer comfort



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Habitat 13
Tel: +33 91 12 71 36
Email: gdescoqs@13habitat.fr



Frattamaggiore
City centre



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THE PILOT PROJECT

Regional context

The city of Frattamaggiore is located in the Campania Region, near Naples. It has a population of 30,108 inhabitants and is 5.32 km² in size, with a very high population density (5.659 people per km²). Frattamaggiore forms part of the huge neapolitan hinterland that has almost 3 million inhabitants and spans an area of approximately 1,170 km².

Frattamaggiore has a typical Mediterranean climate with mild, rainy winters and hot, dry summers, but it is refreshed by the sea breeze. Average temperatures range from 10.8 °C in Winter and 24.2 °C in Summer.

Pilot description

The houses are located on the ground floor of a multi-storey building (up to 5 floors) with a roof terrace. They were built in 1986 and have never been refurbished. The property is owned by the Municipality of Frattamaggiore and the houses are currently used as social housing. The residents rent the properties from the Municipality and they have a very low level of income.



Objectives of the pilot project

- A decrease in total energy consumption of 40%
- Achieve a 20% reduction in energy costs

Energy efficiency solutions

- 1.- Solar heating for domestic hot water
- 2.- Photovoltaic Systems
- 3.- External Insulation of walls
- 4.- Passive systems for heating and cooling

Innovative financial mechanisms

External stakeholders who provide resources for the project (supply of equipment and materials, labor, etc..) will be placed in a training program that would be an advantage for participation in future social housing energy efficiency contracts.

This will be possible thanks to the collaboration with the IACP Napoli (owner of 65,000 dwellings, many of them are not adequate regards to energy efficiency) through an agreement in which the IACP is committed to introduce, in the calls for energy efficiency workings, policies aimed at rewarding companies that can demonstrate work experience (such as the participation in the project ELIH-MED) and specialised knowledge through training done by ENEA.

The Municipality of Frattamaggiore will ask for additional funds from the Kyoto Fund, in particular for the installation of renewable energy plants and for energy savings and increased efficiency in energy end-use.



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Municipality of Frattamaggiore

Tel: +39 081 4207311

Email:

bartolomeo.sciannimanica@fastwebnet.it



Genoa

Piazzale Adriatico N° 3 + 4
Lungo Bisagno Dalmazia



THE PILOT PROJECT

Regional context

Genoa is a city located between the sea and mountains with a population of about 610,000 inhabitants with approximately 311,000 houses. The peculiar geographical configuration of the city of Genoa “sandwiched” between the coast and ranges of hills and mountains, gives the city its unique landscape and has strongly influenced its urban development and infrastructure system. The selected area has a Mediterranean climate but is heavily influenced by a flow of cold air from the mountains. This area is one of the coldest areas of the City.

Pilot description

The selected area for the pilot projects is located in Valbisagno. The selected buildings are in Genoa, Piazzale Adriatico (36 dwellings), and Lungo Bisagno Dalmazia (9 dwellings). The LIH building is located within a homogeneous area of about ten similar buildings. The block was built in 1953 and it represents a typical urbanization from the post Second World War period. The owner of all the selected dwellings is the Municipality of Genoa. There are several kinds of households: e.g. families, young couples and elderly people.



Objectives of the pilot project

- Improve the energy classification of the buildings by two grades: Piazzale Adriatico: from Grade F to Grade C; Lungobisagno Dalmazia: from Grade F to Grade B
- Achieve this improvement with an investment lower than 30.000 € per dwellings
- Make inhabitants aware of energy efficiency and what they can do to improve it, through participative actions
- Open a communication and information centre "Green Building", open to the entire city (citizens, schools, etc.) and tourists (already carried out and in operation)

Energy efficiency solutions

- 1.- External thermal insulation of roofs
- 2.- External thermal insulation of perimeter walls
- 3.- Total replacement of windows
- 4.- Partial replacement of blinds/shutters

Innovative financial mechanisms

- Request for funding from the national instrument "Urban Enhancement Agreements" to complete the energy refurbishments, in order to achieve the highest level of energy certification.
- Study of the possibility of involving the ESCO CNA (National Confederation of Crafts and Small and Medium Enterprise) to carry out possible further action on the Pilot.
- Synergies with the CELSIUS European Project (Combined Efficient Large Scale Integrated Urban System). Production of energy using the pressure gap (expansion) from gas pipeline distribution network through turbo-expander and construction of an experimental network of district heating and cooling in Val Bisagno.



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City of Genoa
Tel: +39 010 557 2911
Email: ggandino@comune.genova.it



Sardinia

Province of Sassari (Alghero, Sassari)

Province of Oristano (Arborea)

Province of Carbonia-Iglesias
(Perdaxius, Fluminimaggioere,
Iglesias, Musei)



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Regional context

Sardinia is the second largest island in the Mediterranean. It has an area of 24,089,89 Km², with 1,671,001 inhabitants and a density of 69.37 inhabitants/sq km. The region is mainly mountainous and is characterized by mountains of medium height, whose peaks are all below the 2,000 meters. The west coast of Sardinia is affected by the mistral winds with storms, intense rainfall and cloudiness. The Tyrrhenian coast is often cloudy with abundant rainfall. The lack of rain should be highlighted, particularly in the south.

Pilot description

The pilot will be carried out in the Province of Sassari (Alghero, Sassari). Particularly in the northern part of the Island, the rural areas include parts of the territory devoted to agricultural purposes, subdivided into three basic systems: the Piana of the Nurra (Alghero and Sassari), the rural villages and the forestry- environmental areas. The Piana of the Nurra (Alghero and Sassari) is a large, almost flat area in the north northwest of the city centre whilst the rural village area is characterized by small settlements with very few facilities and services for the population.



The buildings identified for the pilot are located exclusively in these first two systems, within the areas of the reform of the land reclamation carried out mainly in the 50s and 60s of the last century. The houses are all rural buildings, small houses with 1 or 2 storeys, dating back to the 50s and 60s. They are often located in a field of roughly 70,000 m² to 150,000 m² in size. The owner of the properties is the LAORE Sardegna Agency. The tenants contribute an annual rent of about 40 to 400 euros, depending on several factors.

Objectives of the pilot project

- A decrease in total energy consumption of 40%
- Achieve this improvement in energy efficiency with an investment of less than 10.000 per dwelling

Energy efficiency solutions

- 1.- Roof insulation
- 2.- Replacement of windows

Innovative financial mechanisms

In Sardinia various options are being considered:

- The first is the ESCO model which takes advantage of the technical and economic potential offered by the pilot project.
- The second is the use of Voluntary Agreements involving construction companies who consider this project as a possibility to combine the building refurbishment with professional trainings for their industrial sector workers.
- Finally, the Regional Project Sardinia CO₂.zero could provide a contribution to the budget for the communication and capitalization plan. The money currently allotted to this WP would then be freed up to be used on the implementation of the pilot project.



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AGENZIA LAORE SARDEGNA

Tel: +39 079 2558261

Email: massimo.rocchitta@gmail.com



Kavala and Komotini

City and capital of the region
of East Macedonia and Thrace



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THE PILOT PROJECT

Regional context

The Region of East Macedonia and Thrace is located on the north-eastern edge of Greece and encompasses three regional units of Thrace (Evros, Rodopi, Xanthi) and two of East Macedonia (Drama, Kavala). The Region covers a total area of 14.157 km² and a population of approximately 606,170, corresponding to 5.6% of the total population of the country. Komotini is the administrative center of the Region of East Macedonia and Thrace. The city stands at an altitude of 32–38m on the Thracian plain near the foothills of the Rhodope Mountains. The climate of the region is characterized with cold, damp winters and hot, dry summers. Kavala is the second largest city in northern Greece. Kavala has a humid subtropical climate that borders on a semi-arid climate with annual average precipitation of 460mm. Snowfalls are sporadic, but occur, more or less, every year.

Pilot description

The pilot project concerns two of OEK's social housing settlements, chosen in Kavala and Komotini and reaching a total of 114 dwellings. "KOMOTINI III" includes 57 dwellings out of 72 housing units (apartments). It comprises 4 Blocks (10 buildings) of two different typologies. There are 1-bed, 2-bed and 3-bed apartments, each of three-storeys. "KAVALA V" includes 57 dwellings out of 72 maisonettes. The housing units are arranged in 10 'series' and consist of three different typologies: 52m² - single storey , 85.1m² - maisonettes and 103,5m² - maisonettes.



Objectives of the pilot project

- Average primary energy saving of 30–40% (in heating, cooling, DHW) and average upgrade of energy class of between +1 to +2 categories in each settlement
 - Investment Cost lower than 30.000 € per dwelling
-

Energy efficiency solutions

- 1.– Ground floor insulation.
 - 2.– External Wall insulation.
 - 3.– Replacement of windows with double glazing.
 - 4.– Roof insulation.
 - 5.– Solar hot water collectors.
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Innovative financial mechanisms

Greek partners will try to make use of Voluntary Agreements as an innovative financial mechanism whereby, the industry and relevant stakeholders can provide new technologies and materials to reduce prices, or 100% privately funded in some cases???, to be implemented on a large scale on the dwellings. This mechanism provides the products' suppliers and involved stakeholders marketing opportunities and gives them the opportunity to test technologies or materials in real-building conditions. CRES has already implemented this mechanism in the national pilot project "Green Neighbourhood" which concerns a Low Income housing development.



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Region of East Macedonia and Thrace
Tel: +30 25313 52317
Email: slarisis@mou.gr