



Energy Rehabilitation in Buildings Located in Urban Areas - Lisbon - Portugal

(project supported by SAVE)

An integrated approach was adopted with the definition of a common methodology to lead to the introduction of energy-efficient measures in terms of energy savings and comfort in several social housing quarters in Lisbon (Portugal), Athens (Greece), Milan (Italy) and Martorell (Spain).

Target Groups	Sector	Field
<ul style="list-style-type: none"> - Local authority - Regional authorities - Decision makers 	<ul style="list-style-type: none"> - Buildings (including municipal properties) 	<ul style="list-style-type: none"> - Equipment / appliances - Information

ANALYSIS

There is a large number of existing buildings responsible for a significant energy consumption.

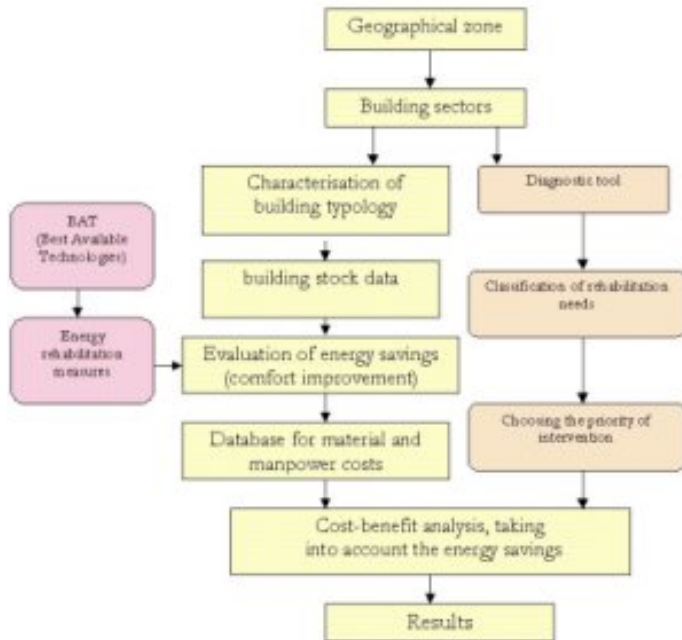
Besides, many buildings need rehabilitation works due to ageing or other factors.

Throughout several countries in Europe some general rehabilitation programmes are currently going on, improving the living conditions in many buildings and contributing to better towns. It is, therefore, the right moment to take into account energy, comfort and environmental factors and to integrate them in the renovation process. The potential of energy conservation is quite important and the rehabilitation process can contribute to the improvement of thermal comfort in these buildings.

This SAVE Project focussed on an intervention methodology that can help managers of building rehabilitation programmes to include energy issues in the building rehabilitation process in urban areas in the Southern Europe and to incorporate the best practices of projects developed in these countries.

Energy rehabilitation studies/measures were assessed for a large group of social housing buildings located in Southern Europe. The proposed intervention methodology together with the Decision-Maker Tool developed can help managers of building rehabilitation programmes to include energy issues in the building rehabilitation process in Southern Europe urban areas.

This Save project was launched in December 1997 and had a duration of eighteen month.



Energy rehabilitation methodology
- cost benefit analysis and rehabilitation priorities

Cover of the Maxibrochure: Energy Rehabilitation Methodology for Buildings Located in Urban Areas

COST AND BENEFITS

A cost benefit analysis as well as an evaluation of the priorities of the energy rehabilitation can be assessed by using the Decision-Maker Tool using a Geographic Information System (GIS).

The priority for energy rehabilitation can be calculated for the building envelope and for the heating and cooling systems or plants. By selecting a specific building from a given building typology, the decision-maker can obtain a group of energy rehabilitation measures for this building typology.

Then, in an interactive way, the program asks the user for the area of intervention (m²) for each measure (for one building or for a group of buildings) and automatically it updates the file of this typology, containing the energetic and economical analysis. This enables the manager to visualise the cost, the energy saving and the simple payback period for each building energy rehabilitation measure.

A cost/benefit analysis of the studied social buildings in Lisbon allowed to identify two very interesting energy rehabilitation measures as shown in the table below:

Energy rehabilitation measures	Measures Cost [Euros/m ²]	Energy Savings [MJ/m ² .year]	Simple Pay-back [years]
Roof thermal insulation	13	234	2
External thermal insulation	15	181	3
Opaque facades external thermal insulation	40	174	9
Replacement of single by double glazed windows	75	154	19
Replacement of single by double glazed windows with the frames replacement	155	174	36
"Sunspaces"	165	163	40

PARTNERSHIP

This project was co-ordinated/led by ADENE - Agência para a Energia

The active participation/collaboration of the following partners, contributed to the success of this project:

DI.Tec - Politecnico de Milano

Institut Català d'Energia (ICAEN)

National Laboratory of Civil Engineering (LNEC)

University of Athens

RECOMMENDATIONS

Energy and environment issues should deserve due consideration since the beginning of the design phase of the buildings, because the options taken at that stage will positively influence the energy performance and internal comfort conditions and will minimise the environmental impact. Those actions, if implemented since the beginning, are generally less expensive than at later stages of the construction process, including when the building rehabilitation is envisaged.

The majority of the existing buildings, in particular the residential ones, in Southern European urban areas are far away from this optimal scenario and are responsible for a significant energy consumption. Many of them are being now submitted to general rehabilitation programmes. This creates a good opportunity to improve also the energy performance through adequate energy rehabilitation measures integrated in larger rehabilitation schemes, reducing costs and making those measures more justified from the economical point of view.

The intervention methodology adopted in this project gives the managers of housing rehabilitation programmes, a tool to evaluate in a proper way the opportunity and the interest of including the energy component in them.

The methodology has been tested in different urban areas, located in different countries with encouraging results, as shown in the case studies selected. The presentation of the methodology and case studies is complemented with some information on the main building characteristics that may lead to a low thermal building performance and to high energy consumptions levels and on some of the technical solutions currently adopted in building energy rehabilitation. The benefits and costs can be easily quantified and the challenge is essentially a question of financial allocation of the available resources.

TO KNOW MORE

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USEFUL INFORMATION

List of Internet sites

[Maxibrochure \(DRAFT\)](#) / <http://ageen.no.sapo.pt/>

[Web site of ADENE](#) / <http://www.adene.pt>

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