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DEMOHOUSE

Design and Management Options for improving the energy performance of Housing

SPECIFIC TARGETED RESEARCH OR INNOVATION PROJECT

Thematic Priority 6

Deliverable 13 (Final report)

End report on new management strategies and processes

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Executive Summary

Introduction

This report takes the results of Deliverable 1A (State of the Art) and Deliverable 11 (State of the art in management strategies and processes) as its point of departure. These results have been used to develop the problems solving strategies, which have been presented and discussed in a series of workshops with local actors and expert interviews with key actors in the participating countries. The outcome of the workshops and interviews, as well as the direct input and output, have been described in this report. Based on this outcome, three types of strategies have been developed:

- Participative decision-making processes for energy efficient renovation and project development.
- Energy efficient housing management and energy labelling.
- Strategies to overcome financial barriers in energy efficient building.

The scope of this report encompasses the organisation, management and activities of the participating housing organisations in the in DEMOHOUSE countries Greece, Denmark, Spain and the Basque Country and Hungary.

Barriers and opportunities for energy efficient renovation and project development

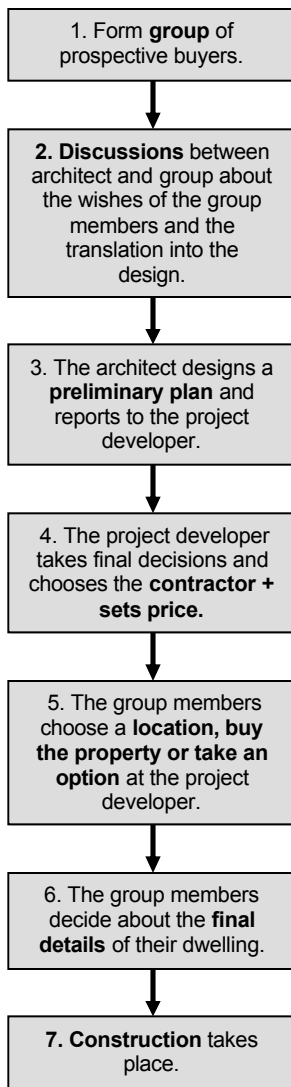
Energy efficient renovation and project development is usually accompanied with certain barriers and opportunities. In general, most factors that are regarded as barriers, can be an opportunity as well depending on the target and actor. For example:

- Knowledge: *lack of knowledge/technical know-how* can be a barrier for certain actors in specific steps of the building process, while *gaining experience / gaining competitive advantage* can be an opportunity for these actors at the same time.
- Profitability: *increased height of investment* is regarded as a barrier, while *increased market value* at the same time can be an opportunity.
- Financial consequences for the tenants: *rent increase* (barrier) versus *lower living costs* (opportunity).
- Marketability: *need for extra promotional effort* (barrier) versus *higher appeal to potential buyers and enter new markets* (opportunities).

Participative decision-making processes for energy efficient renovation and project development

The quality and nature of the collaboration and decision-making between the stakeholders in an energy efficient building project can have a significant impact on the feasibility and results of the project. Moreover, occupants can play a very important role in success or failure of the project when renovating occupied dwellings, as is denoted in Deliverable D1 (State of the Art). In order to increase feasibility and to maximise the improvement of the energy performance after completion, it is important to address possible bottlenecks at the side of the present or future occupants from an early stage of the project.

In the scope of WP3, a method for participative decision-making in energy efficient renovation and project development has been developed.



Steps in the participative decision-making process for project development.

The method is formed around the active involvement of future or present tenants (in case of renovation) or prospective buyers (in case of project development) in an early stage of the process. The core of the method is to form a reservoir of potential clients (either of future or present tenants or prospective buyers) and to organise meetings with the developer and the architect in order to create a 'pseudo'-tenant or 'pseudo'-owner.

The formation of this reservoir has to meet certain requirements, in order to form a group that has the intention to rent a dwelling (in case of renovation) or has the power to buy (in case of project development), that is interested in the location and that is enthusiastic about the work-plan for the new development. This work plan can for instance include energy conservation ambitions or ecological principles. The potential clients are found and selected by marketing procedures, for instance ads in newspapers, distribution of brochures to real estate agencies etc.

The first step is to prepare a start-up document. After a group of future or present tenants or prospective buyers has been formed, an architect is selected. Additionally, a multi disciplinary team can be formed, with experts in the field of eco-building, health and comfort, communication and, for example, social services.

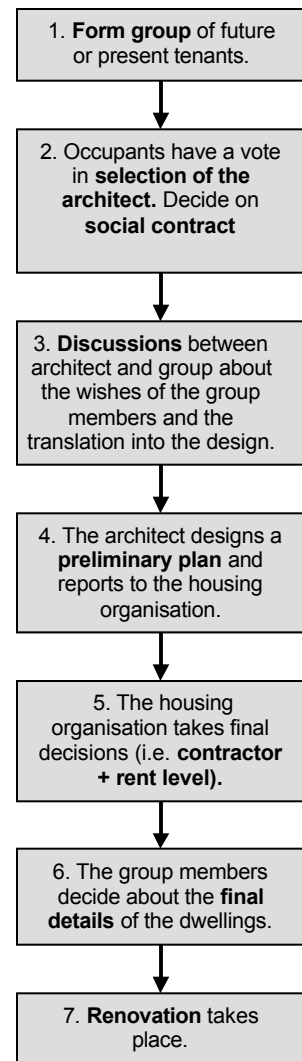
The architect works in about 6 collective sessions towards the design: location study, functional plan, set of requirements for houses, preliminary design, details including materials and installations, cost consequences. The architect translates ideas and reports to the

future or present tenants or prospective buyers. The housing organisation or project developer is responsible for final decisions and negotiates with contractors. A test dwelling and excursions can be used to evaluate the occupants' wishes and behaviour concerning the retrofitting installations.

The participation is guaranteed in a so called 'social contract' that recognises these fundamental conditions:

- discussion is possible about the goals and strategies of the planning process;
- all information that is needed in the planning process is available to all participants, and translated for non specialists, so information is also accessible;
- users and non-specialists have the right of professional guidance;
- the procedure is organised in phases with fixed moments of decision making and decision makers have to motivate non-compliance with the ideas of participants.

For energy efficient renovation, a participative decision-making method has potential of improving the quality of the design and technical solutions and can increase the willingness to cooperate at the side of the tenants. For energy efficient project development, a participative decision-making



The steps of the participative decision-making process for renovation.

method has potential of selling the project in an earlier stage and can minimise the financial risk for the developer. Also, this type of involvement is likely to speed up the design and construction process, which is cost efficient. When clients are involved and turn into prospective buyers, they will prefer a short period of commissioning and construction. The moment to sell the planned development is after the completion of the plans and setting of a reliable construction price. This method supports short turnover periods, client-oriented designs and social involvement. Additionally, participative decision-making is a way to promote user friendly designs and direct involvement of occupants can help to develop occupant behaviour that is more adapted to the needs of sustainable housing.

The main issue regarding the employment of a participative decision-making processes in the DEMOHOUSE countries is related to cultural aspects such as the persistence of landownership and the change in mindset that has to be evoked in order for the process to be successful. An important stimulant for its introduction can be to have the process linked to environmental friendly initiatives in general in order to raise the awareness of the stakeholders.

Energy efficient housing management and energy labelling

Housing organisations employ housing management to facilitate and structure maintenance activities and technical improvements. Considerations that play a role in housing management are, for example, the need to avoid vacancies, to keep the housing stock in line with the present and future occupants' demands and to keep the housing stock in a proper physical state. In order to improve the energy performance of the stock, the aspect 'energy performance' has to be incorporated in this housing management. The housing management method presented in this report, consists of a number of steps that facilitate the integration of energy efficiency in the decision-making process. The housing organisation can use these steps in their own housing management. The method takes advantage of the European EPBD (Energy Performance of Buildings Directive) legislation.

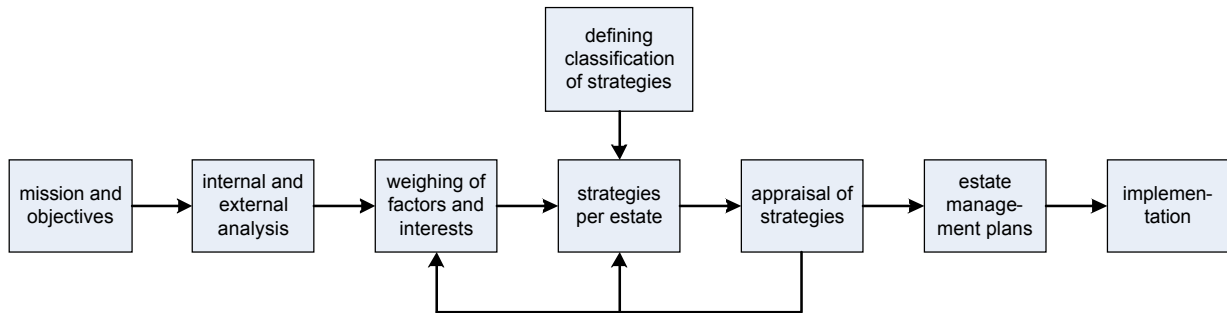
An important part of housing management consists of the development of strategies for the housing estates (the term 'housing estate' is understood to mean one housing block, but of course one can also use a small part or segment of the stock instead as the unit to develop strategies for.) A strategy for a housing estate describes the future approach for the dwellings in it. For example, the dwellings are going to be sold, the façade of the block is going to be renovated, there will not be any significant actions for the next 5 years, etc.

To define housing estate strategies, the use of 'labels' has proven to be an efficient way to decide about investments in parts of the housing stock. When deciding upon the future of an individual housing estate, labels can be attached to that housing estate and together these labels form the strategy that will be employed for it. The label is in fact a very short description of one strategy, and together, the labels are the answer to the question: "What are we going to do with the dwellings in this housing estate?"

The labels related to energy performance can be defined using performance level A, B, C, D etc. Labels indicating comfort-levels or quality levels of indoor climate are appropriate examples concerning the aspects resulting from energy conservation measures. In this approach, not the energy performance itself (i.e. EPBD energy label) but related aspects like thermal comfort level, safety, health and indoor climate could find a place. For example, the placement of high efficiency glazing improves the energy performance but also increases the thermal comfort level and the security level of the dwelling. Examples of domains, their labels and examples of actual measures resulting from it are listed in the next table.

Domain	Examples of labels	Explanation and examples of actual measures
General policy	<ul style="list-style-type: none"> • Continuation (“do nothing special”) • Improve (for same target group) • Reposition (for new target group) • Demolish (+ new construction) • Selling 	<p>These labels set the general approach for the housing estate.</p> <p><i>For example: place rooftop apartments, renovation, offer present tenants to buy his dwelling, upgrade maintenance level, change façade, etc.</i></p>
Target group	<ul style="list-style-type: none"> • All occupants • Under 26 years • The handicapped • The elderly • 1-2 persons • Small families (2-4 persons) • Large families (>4 persons) 	<p>The target group is an important aspect. On the one hand, the dwellings of an estate more or less determine the target group it can accommodate, on the other hand the housing association may have to provide dwellings for distinct target groups and has to find suitable estates for this.</p> <p><i>For example: split or merge dwellings, improve service level, place elevator (for target group the elderly), etc.</i></p>
Quality level	<ul style="list-style-type: none"> • Basic • Basic plus • Luxurious 	<p>By distinguishing different quality levels, one can determine the maintenance level, the measures that have to be taken at turnover, the service level, the rent level, etc.</p>
Remaining exploitation period	<ul style="list-style-type: none"> • < 5 years • 5 to 10 years • 10 to 25 years • > 25 years 	<p>The remaining exploitation period can be used to, for example, determine the appropriate maintenance level of the housing estate. For instance, when the housing estate will be demolished within 5 years, no important technical measures will be taken and the maintenance level will probably be lowered.</p>
Living environment	<ul style="list-style-type: none"> • Improve liveability • Improve safety level • Improve service level (i.e. shops) 	<p><i>For example: introduce caretaker, enclose estate entrance, introduce ‘green’ in the area, etc.</i></p>
Energy performance	<ul style="list-style-type: none"> • EPBD label (A – G) • Quality level of indoor climate • Comfort level • Energy costs to rent ratio (%) 	<p><i>For example: replace open heater by high efficiency boiler, place central heating, place double glazing, improve insulation level, lower energy costs, couple the increase of rent level to the height of the dwellings’ energy costs (total living expenses), use sustainable energy source for the estate/neighbourhood, etc.</i></p>

The process to develop housing management is related to the strategic planning process. In housing management, this process model can be used to develop the strategies to improve the energy performance of the housing estates.



Model for developing housing management

In each of the steps of the housing management process, energy efficiency can be integrated. For the five most important steps, this would result in:

Mission and objectives — In this step, the general goals of the housing organisation are formulated. In the framework of DEMOHOUSE, the objective to improve the energy performance of the housing stock would not be out of place. The EPBD energy labelling (energy label ‘A - G’) is a very efficient means to formulate objectives with. For example: “The average EPBD energy label of our housing stock should be at least energy-label C in 2015”.

Internal and external analysis — In this step the current state of affairs of the entire housing stock will be analysed, concerning the maintenance level, the vacancy rates, the need for improvements, and of course the current energy performance of the housing estates, for example by determining the average EPBD energy label per housing estate and with that, the energy performance of the entire housing stock. Additionally, it might prove to be useful to analyse external developments, for example the developments on the housing market and the energy market.

Strategies — In this important step, the strategies for the housing estates will be appointed by using labels. One can develop strategies for those housing estates that need urgent attention only (resulting from the analysis), or one can develop strategies for the entire housing stock. Please refer to the table for examples of the use of energy related labels in this step.

Test — In order to know whether the sum of the strategies will actually contribute to the general objectives, one has to test the strategies regarding the financial consequences, the consequences for the energy performance of the stock, the rent levels, the resulting number of dwellings for lower income groups, etc.

Implementation — After the strategies have been determined, they need to be translated in maintenance plans and actual measures.

The integration of energy-efficiency in the housing management of the housing associations in the DEMOHOUSE countries is at the moment just starting. Moreover, the housing management of the participating housing associations varies in great extent in structure and complexity. The method presented in this report is regarded as potentially useful during the workshops. Nevertheless, the integration of EPBD labelling as an instrument for strategic decision-making in housing management needs to develop over time. In this process, government support seems to be vital.

Strategies to overcome financial barriers in energy efficient building

In Deliverable 1C (Barriers of sustainable and energy conscious renovation related to the pilot projects), the greatest barrier for energy efficient renovation in the participating

countries was found to be financial barrier. In Deliverable 11 (State of the art in management strategies and processes), a similar conclusion has been drawn. Based on the findings in D11, this D13 report targets the employment of outsourcing and third party financing. Therefore, the concepts lease and energy performance contracting have been applied to the local practice regarding energy efficient renovation and project development in the participating countries.

These two strategies are rather innovative and therefore not much experience is gained in housing in Europe yet. Although the collaboration between a housing organisation and an Energy Services Company (ESCO) is a new phenomenon in Europe, in many countries ESCOs are common in the utility sector (i.e. industrial facilities or office buildings). While not much put into practice in housing in Europe yet, outsourcing of energy efficiency to an ESCO may be a potential breakthrough in the present impasse that housing organisations in social housing are caught in.

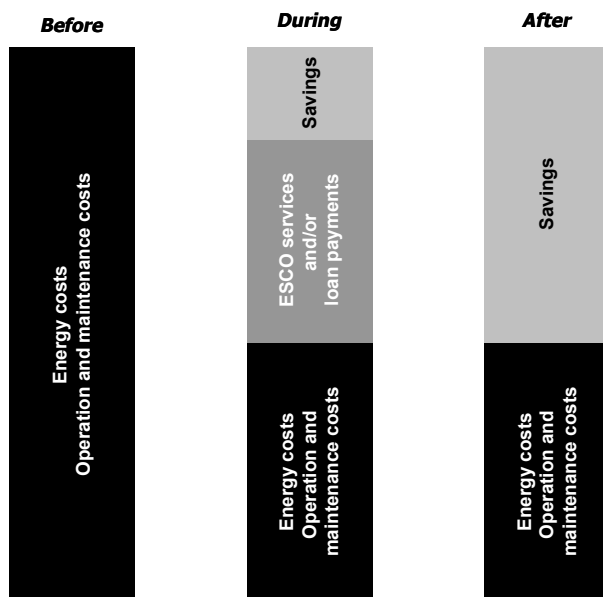
A housing organisation can lease a HVAC installation from a specialized lease company, usually an energy (supply) company. This company usually takes care of maintenance as well. If the lease company is an energy company, energy supply could be included in the contract as well. In some countries, lease of energy efficient equipment is only possible for specific parts of the HVAC installation, for example the boiler that could be seen as a separate entity in the dwelling. Usually insulation measures cannot be separated from the dwelling and, therefore, often cannot be leased.

In rented housing, a distinction is made between the ownership of the dwelling and the ownership of the leased equipment. The tenant pays the rent to the housing organisation, while the lease price of the leased equipment is included in his energy bill. This HVAC equipment is taken out of the rent contract between the tenant and the housing organisation.

In energy performance contracting, a housing organisation outsources design, financing, construction, exploitation, maintenance and operation, billing and sometimes also energy procurement to an ESCO. One could say that the ESCO 'buys' the energy-exploitation of the housing estate from the housing organisation, because it expects to be able to cover its investments with the saved energy.

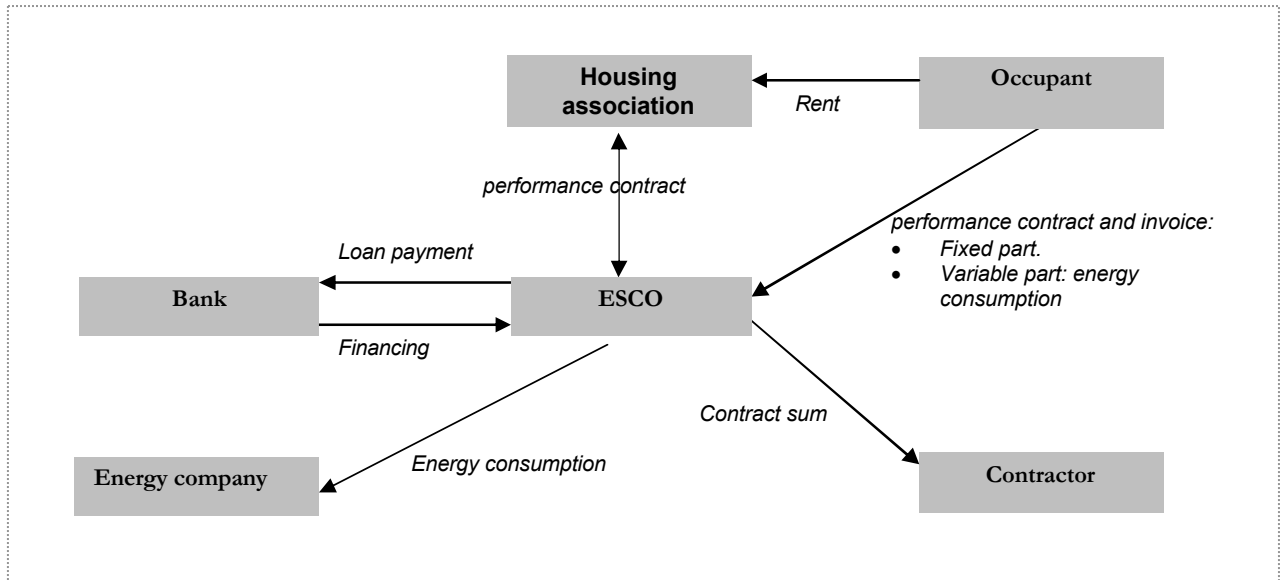
The activities of an ESCO are usually based on the achieved energy conservation performance, hence referred to as energy performance contracting. Energy Performance Contracting is based on collaboration between a housing organisation and an ESCO. This collaboration is put into a

contract, usually based on a guaranteed energy saving for the duration of the contract. This guaranteed energy saving can be achieved by the ESCO, because it highly improves the energy performance of the dwellings by installing much more energy efficient HVAC installations and possible by taking measures such as replacement of outdated heaters and insulation of the roof/facades as well. The collaboration is beneficial for the housing organisation as well as for the ESCO, as is shown in the Figure.



Cost and benefit structure before, during and after energy performance contracting.

Energy performance contracting distinguishes itself from lease-constructions, by the fact that an ESCO offers a wider range of services (including energy management, consultancy, etc) and could take care of for example insulation measures as well, while lease is aimed at financing, construction and maintenance of energy efficient equipment that is 'separable' from the dwelling, such as PV and a high efficiency boiler (usually only the installation, not the insulation). The services and equipment provided by the ESCO are usually financed out of the energy savings and often the ESCOs fee is performance based. Energy performance contracting in rented housing is complicated because of the split-incentive problem. In the next Figure, a model is presented of the cash flows in energy performance contracting in rented housing.



Cash flows in energy performance contracting in rented housing

In order to meet the specific demands from rented housing and project development, the strategies leases and energy performance contracting have been shaped towards the context in Denmark / Hungary (rented housing) and Greece /Spain (project development. As yet, most actors don't seem to have adequate knowledge concerning the benefits and implementation of these financial strategies. Here, an important task for the national governments in Europe is present in providing information, procedures and protocols and for example by supplying standard contracts for energy performance contracting, in order to stimulate the energy performance contracting business.

Regarding the implementation of the financial strategies in the DEMOHOUSE countries, still a number of steps have to be taken in order for these strategies to become 'business as usual'. In Greece and Spain, placing the ownership of parts of a dwelling in other hands than the owner-occupier meets resistance. In these countries, ownership of property and land are regarded as high values. As not much experience is gained with these strategies yet, lack of confidence in the strategies is present. At the same time, lease and energy performance contracting in project development are regarded in Spain and Greece as very promising strategies, because they potentially decrease the risk and increase the financing possibilities.

Regarding implementation of the financial strategies in rented housing in Hungary and Denmark, one has to take into account that the foremost target of the tenants is keeping the rent as low as

possible. As the energy savings and thus lower energy costs will be less certain than the rent increase will be. Therefore, the housing organisation, in collaboration with the lease company or ESCO, can consider guaranteeing the savings, in order to guarantee the lower living expenses. Another point of attention in rented housing concerns the complex flows of money between the several actors. It is vital to maintain a transparent structure to interlace the rent, the costs and benefits of buying and selling energy, energy billing, loan payments and maintenance and operation costs.