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Training Programme:

The stages of deep energy renovation

Topic II

Co-funded by
the European Union

Stages of approaching households to upgrade the energy efficiency of their homes

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Arguments

It is important that households understand the benefits of energy efficiency upgrades to their property:

Presenting to owners the positive impacts of an energy upgrade of their property, both in terms of long-term savings and in the short-term improvement of the quality of their living.

In both leases of old houses and sales of old houses, energy quality criteria have now been introduced by the parties concerned. A different selling or rental price is demanded by the owner of an energy-efficient property.

Among the forthcoming pan-European reforms are those of mandatory energy upgrading. One will not be able to buy or sell a property if it does not belong to a lower energy class.

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Recording owners' needs

It is important to record the needs of the owners:

- We listen carefully and record the needs of the household, e.g., the owner may complain that cold air comes in through the window frames in winter, or that the north wall is not accessible on cold days, and so on.

- These observations will help in the correct planning of intervention measures.

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Options’ presentation

We list for owners what interventions are feasible to achieve energy upgrades:

- At the top of the pyramid of energy upgrading, taking into account the costs and benefits, is the solar water heater, followed by the insulation of the roof, walls, pilot house, installation of air conditioning, heating system (gas/gas boiler, heat pump), and finally the replacement of windows.
- If the household carries out a deep renovation of the house, the replacement of the windows and doors must precede the replacement of the heating system.
- The installation of photovoltaic panels is in a secondary position due to the cost of installation and the specificity of installation sites.
- Unless one owns an entire rooftop, one cannot easily install such panels.

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Options’ presentation

There are also some lower efficiency measures in terms of energy savings, but also lower costs, such as:

- Installation of thermostatic radiator heads (switches placed on the radiators of e.g., small area or low traffic/use rooms, through which we can adjust the heat extracted from them to be lower).
- installation of shading systems (awnings).
- Replacing energy-intensive light bulbs with economical LED bulbs.

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Advice on each energy improvement action

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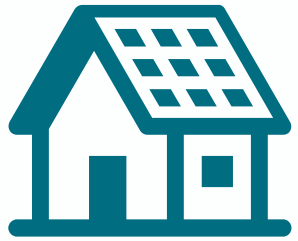
Hot water for use with a solar water heater installation

- The basic requirement for the installation of a solar water heater is the existence of space on the roof (if it is not a replacement for an old one.
- In case our property is located at a low level and our roof is several meters higher, there will certainly be a concern about unnecessary water consumption until the hot water reaches our tap.
- In this case, we suggest installing a small circulator to recirculate the cold water until the hot water reaches us.
- This is a small automation without any particular cost. According to the regulation, the capacity of the tank is determined according to the number of occupants.



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External roof thermal insulation

If the property is located on the last level (floor) and we are going to proceed with the thermal insulation of the roof, the following should be taken into account:

- Owners should be aware that, according to the current Building Energy Performance Regulation, the minimum thickness of insulation material (which is usually extruded polystyrene sheets) is 7 cm.
- In addition, the thermal insulation boards are covered with some lightweight concrete (about 8 cm thick), and finally, the damp-proofing is applied. All these materials to be encapsulated will require some perimeter building, possibly or the 'shaping' of a staircase door. It is also possible that solar panels may need to be elevated.

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Pilotis thermal insulation

In case the property is located on the first floor and underneath it is an open pilot, and we are going to proceed with the thermal insulation of the floor from the outside, the following should be taken into account:

- Owners should be aware that, according to the current Building Energy Performance Regulation, the minimum thickness of insulation material (which is usually extruded polystyrene sheets) is 7 cm. In addition, the insulation boards are covered with thin layers of adhesive and coating. This means that the free height of the pilot will be reduced by about 8 cm. If the existing height of the cockpit is low enough, it may cause problems for the passage of vehicles (if the cockpit is used as a parking area).

- In addition, if there are light fixtures on the roof of the cockpit, an electrician will have to remove them and reinstall them after the insulation has been applied.

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Shell thermal insulation

This is the external thermal insulation of walls with expanded polystyrene sheets. According to the current Energy Performance of Buildings Regulation, the minimum thickness of the insulation material is 6 cm. In addition, the insulation boards are covered with thin layers of adhesive and coating. The final thickness of the external thermal insulation is approximately 7 cm. The additional work that will be required is as follows:

- ✓ If there are external taps on balconies, a plumbing crew will need to extend these pipes to the new (after the application of the thermal insulation) external level.
- ✓ If there are light fixtures, switches, or sockets on the walls, an electrical crew will need to remove these and reinstall them after the application of the thermal insulation.

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Shell thermal insulation

- If there are windows, the existing marble floors will need to be extended or, preferably, replaced if combined with frame replacement.
- If there are external opening covers, replacement of the hinges with larger ones will be required to allow them to open fully after the application of the insulation.
- Where there are suspended external air conditioning units, a refrigeration crew will need to remove these and reinstall them after the application of the thermal insulation, with the possible need to replace their bases with new, larger ones.
- Finally, new baseboards will need to be installed.

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Shell thermal insulation

For this intervention, owners should also be aware of the following:

- If scaffolding is required, a small-scale permit should be obtained. In this case, a macro-legality check will be carried out. If in a facade, where external thermal insulation is to be applied, there are different openings in terms of locations or dimensions, compared to the corresponding drawings of the approved building permit, a regularization will be required under the respective law. This means payment of a fine and an engineer's fee. In addition, if a regularisation is required due to the openings, the whole apartment will have to be checked for possible overruns.

- Also, if the apartment is ground floor and the external wall is adjacent to the pavement, it is prohibited to install external thermal insulation for the first 3.00m of height.

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Frames replacement

- This is a job without specifics. The specifications of the frames should be in accordance with the minimum requirements of the current Energy Performance of Buildings Regulation.
- If heavy-duty roller shutters are fitted and there is a desire to fit electric motors (instead of a manual crank), some installation will be required by an electrical workshop.

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Heating and cooling system

If it is an apartment in a block of flats in which the owner can be cut off from the central heating system of the building and wishes to have it independent, there are some alternatives. However, we inform owners that:

- Oil burners have been abolished, i.e., the installation of an independent heating system with an oil burner is not an energy improvement action.
- The use of heating systems such as boilers is considered to be prohibitive due to high electricity consumption.

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Heating and cooling system

Installation of a stand-alone gas plant

- Such a heating system requires the existence of a gas network in the area of the property. An application must be made to the gas company in advance in order to route a pipe for the gas supply and install a meter up to the entrance of the building. From the meter to the gas unit, a plumbing crew will need to install a pipe to supply this with gas delay in utility bills.

- If the central heating system is with columns, without autonomy, it is necessary to remove the old pipework and construct a new one from the existing radiators to the gas unit. If the old heating system had autonomy, no new pipework for the radiators is required.

- If there is no gas network in the area of the property, and if the owner wishes, there is the option of installing LPG cylinders. Usually, the cylinders are placed outside, minimising the risks in case of leakage.

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Heating and cooling system

Heat pump installation

- With the heat pump, it is possible to ensure heating and cooling at the same time, as long as instead of radiators, fan-coil floor water. This solution has advantages in heating and disadvantages in cooling.

- The pump can supply, instead of floor fan-coil, split (ceiling) units. These have advantages in cooling and disadvantages in heating. If the pump is only used for heating using radiators, an additional water tank of at least 500 liters capacity will be required.

- The heat pump runs on electricity (an expensive product in our time). It has a relatively high purchase cost, requires space for its installation. Also, fan-coils have an increased purchase cost.

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Heating and cooling system

Placement of split-type air conditioning units

These are the air conditioners known to everyone, which are mounted on walls at the highest points.

- Each unit is accompanied by an external unit, which is usually placed on a balcony.

- They provide heating and cooling at the same time. They are inferior in terms of heating because they are installed at a higher level.

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Inventory of the current situation (by energy ambassadors)

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Energy systems

α/ αx	Record	Exist		Type	Power/capacity	Age
		Yes	No			
1	Hot water for use			Electric water heater	X	
				Solar panel water heater	E.g. 160lt	E.g. 2 years
2	Heating system			Central oil burner	E.g. 210.000 kcal	
				Autonomous oil burner	E.g. 34.000 kcal	
				Central gas burner	E.g. 210.000 kcal	
				Central gas burner	E.g. 34.000 kcal	
				Air conditioners	E.g. 1 item 12.000 BTU and 2 items 9.000 BTU	
				Heat pumps		
3	Frames			Wooden with single glazing		
				Wooden with double glazing	X	
				Aluminium with single glazing	X	
				Aluminium with double glazing	X	
4	Shading systems				X	

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Location of property

- We record the exact address of the property and the floor on which it is located. Note that we focus on individual apartments because it is usually almost impossible to get the co-owners of an entire building to agree on the common goal of energy efficiency.

- We orientate the property and at the same time record and measure the openings e.g. north is the facade with two balcony doors of 1.10m x 2.15m and a window of 1.00m x 1.20m and the balcony of the facade has a porch above it (i.e. balcony of the upper level); south is the uncovered elevation; west, it borders another apartment of the same block of flats; east, it borders another apartment building. Also, we record a number of bedrooms.

- It would be very important to also secure a copy of the floor plan of the floor to which our apartment belongs, if available.

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Identification of desired interventions - final information to owners

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Informing owners

Owners should be aware that all this data is collected for an energy inspector to conduct a first audit and classify the property according to its energy class.

After the desired interventions, the energy inspector will calculate the energy savings. If the results of the energy improvement are satisfactory (an energy upgrade for at least three categories), a costing based on the interventions is carried out.

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Owners' agreement

If the owners agree to continue the procedure, the energy inspector should visit the property himself/herself and carry out detailed measurements in order to issue an energy certificate having taken all the parameters (shading, barriers, etc.).
The inspector is a civil engineer or an architect, he/she can, at the same time, check legal issues of the property because the area of the property mentioned in the energy certificate must be identical to the one mentioned in the building permit plan.

Owners are informed of the cost of the interventions and the fees of an energy inspector and a civil engineer or architect who will carry out the legitimacy check of the property.

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Final stage

- Owners should be informed about any financial support operation programme, if it is available. Depending on income criteria, they can receive the respective subsidy.
- Energy auditor fees, small-scale permit fees, and potential settlement fees are usually subsidised.
- In the case of receiving any financial support programme, energy retrofit needs to meet the programme requirements, so the interventions should be as many as necessary to meet this target.
- The basic steps and supporting documents are described.

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The main stages of energy renovation

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Stage 1: Gathering information, assessing and deciding

The steps of Stage 1 may include, among others:

I. Conducting a thermographic audit to determine heat loss from the building envelope (not necessary...).

II. Discussion with other owners/occupants (the decision should be consistent with the Bylaws). In the case of multi-family buildings, a resolution of the general meeting and the authorisation of a responsible person to carry out.

III. Estimation of the preliminary cost of implementing the energy upgrade.

IV. Mapping the different financing options (e.g. grants, loans) and understanding the conditions for their use.

V. Identify potential construction companies and contractors that could carry out the energy upgrade of the building.

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Stage 2: Preparing the energy upgrade

Energy performance certificate

Issue of Energy Performance Certificate with the implementation of an energy inspection. The Energy Performance Certificate is a "road map", which will explain what work needs to be done in order to achieve maximum energy savings. The energy audit of the building is carried out by a certified energy inspector.

Technical inspection

A technical inspection of the building by a qualified engineer. The purpose of this inspection is to determine the degree of deterioration and safety of the building. The engineer will also investigate whether the building in question complies with the requirements of the various funding programmes, with an emphasis on possible arbitrary measures.

Technical report

Preparation of a technical report, which will present all the works to be carried out for the energy upgrade of the building. The required works will be derived both from the Energy Performance Certificate and from the technical audit carried out.

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Stage 3: Financing the energy upgrade

The specific steps include, among others:

I. Financing the energy upgrade, which can be implemented either through owner/occupant equity or through alternative means, such as, but not limited to, grants through existing programs or loans.

II. Selection of the construction company and contractor on the basis of technical and financial bids. It should be noted that the issuance of any permits that may be required for the implementation of the energy upgrade works should be initiated.

III. Start of construction work on the basis of the contract concluded with the construction company.

IV. Implementation of the construction works on the basis of the contract that has been concluded regarding the works envisaged, the materials to be selected and the implementation schedule. Upon completion of all the works, the acceptance and delivery act is signed, certifying that the energy upgrade works have been completed in accordance with the requirements of the contract.

V. Receipt of funding in the case of participation in a specific programme by submitting the necessary documents in accordance with the provisions for participation in that programme.

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Thank you!

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