CEESEN-BENDER

Building intErventions in vulNerable Districts against Energy poveRty

Deliverable 2.1

Guidelines for facilitation of communication between building managers and homeowners on building renovation process

Dissemination Level: Public

WP2 Reinforcing and adapting the governance and decision-making of building management actors to support the energy renovation of private multi-apartment buildings

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Background of the CEESEN-BENDER project

The main goal of the project "Building intErventions in vulNerable Districts against Energy poveRty" (i.e. CEESEN-BENDER), launched on September 1 2023, is **to empower and support vulnerable homeowners and tenants living in buildings built after the Second World War and before 1990's in 5 CEE countries**: Croatia, Slovenia, Estonia, Poland, and Romania. The project will help them through the renovation process by identifying the main obstacles and creating trustworthy support services that include homeowners, their associations, and building managers.

Coordinated by Society for Sustainable Development Design (DOOR), the project CEESEN-BENDER brings together leading European researchers and experts in field from six countries: **Croatia** (Society for Sustainable Development Design / DOOR, Medjimurje Energy Agency Ltd. / MENEA, EUROLAND Ltd. / Euroland, GP STANORAD Ltd. / GP STANORAD), **Estonia** (University of Tartu / UTARTU, Tartu Regional Energy Agency / TREA, The Estonian Union of Co-operative Housing Associations / EKYL), **Slovenia** (Local Energy Agency Spodnje Podravje / LEASP), **Romania** (Alba Local Energy Agency / ALEA, Municipality of Alba Iulia / ALBA IULIA), **Poland** (Mazovia Energy Agency / MAE, Housing Cooperative Warszawska Spółdzielnia Mieszkaniowa - The Warsaw Housing Cooperative / WSM), **Germany** (Climate Alliance) in addition to **Central Eastern European Sustainable Energy Network** (CEESEN).

The project CEESEN-BENDER is carried out from September 2023 until August 2026 and has a total budget of €1,85 million, of which €1,75 million is funded from the European Union's Programme for the Environment and Climate Action (LIFE 2021-2027) under grant agreement n° LIFE 101120994.

As stated, the **main objective** of CEESEN-BENDER is to empower and support vulnerable homeowners and renters living in multiapartment buildings (MABs) through the renovation process by identifying the main obstacles, and creating trustworthy support services that include homeowners, their associations, and building managers.

Therefore, the **detailed objectives** for CEESEN-BENDER are stated below:

- The project will analyse the ownership structure and physical characteristics of buildings in the pilot sites in targeted regions to comprehensively understand the obstacles that impede or halt homeowner associations, landlords, and property managers from pursuing energy renovations.
- Project partners will identify both legislation and financial, and technical administrative obstacles for the renovation in pilot countries. The identification of obstacles from the homeowners' perspective will help the creation of tailor-made solutions not only for homeowners but also for building managers, landlords, municipalities and other relevant stakeholders involved in the renovation process.

- Through the project, methods and tools that can be used to address different aspects of energy poverty will be developed. This includes:
    - Data gathering on energy poverty in the pilot sites;
    - A digital tool identifying buildings with high levels of energy poor households in the greatest need of renovation;
    - A model of potential savings in buildings undergoing renovation, and a tool for calculating the return on investment for energy renovations.

- 5 Pilot area roadmaps will be developed that prioritize building renovation based on their potential for maximizing emissions reduction via energy savings as well as an increase of quality of life and wellbeing for vulnerable homeowners.

- Within the 5 pilot areas, at least 30 building-level roadmaps will be created that specify the technical details for renovations. These pilot buildings will be supported in the entire pre-construction phase, drawing of plans, applying for permits, audits or other requirements and for financing. Plans will call for the decarbonization of the heating and cooling supply and integration of renewable energy sources (RES), to produce energy to cover its own consumption.

- Also, a support system for homeowners, municipalities, and other large owners of multiapartment buildings (MABs) in targeted regions will be created to speed up the renovation process, by:
    - Advising at least 3.500 homeowners, landlords and building managers on legal, financial, technical and other aspects of energy renovations.
    - Advocating for changes of regulatory requirements and policies to lower the costs and time needed for the preparatory phase of projects.
    - Train at least 30 energy professionals on energy poverty and related topics.

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Executive Summary

The aim of this Deliverable is to provide the building managers (or homeowner associations) quality recommendations on how to better, faster and easier communicate the energy renovation process with the included target groups (homeowners and tenants). To achieve the mentioned, this document, firstly, highlights the differences between unrenovated and renovated buildings in terms of their negative and positive sides. The further (sub)chapters elaborate the building renovation with special emphasis on the steps and financial options, key stakeholders and main obstacles and challenges of the process. Also, ideas on starting a dialogue with the target groups, as well as considering their emotional, social and financial states are included into the document as well. Finally, one of the main topics is the energy poverty, its characteristics and consequences, whereby addressing it with a special level of empathy is, also, presented. The last part of the document is reserved for recommended activities with the aim of raising awareness about the steps and positive effects of the energy renovation of multiapartment buildings (MABs).

This Deliverable is a compilation of various theoretical approaches, knowledge of the authors, as well as expertise and experiences of the partner consortium of the project CEESEN-BENDER.

1. Introduction and relevance of the Deliverable

Climate change is rapidly changing our climate and society, endangering habitability of the planet. The carbon-based transport solutions, growing industry, manufacturing and processing activities, as well as increased living comfort cause negative impacts on the environment. This includes polluted air, soil and water, overcrowded and forgotten waste landfills and significantly impaired health. To address these challenges and ensure better living conditions for current and future generations, the European Union created the European Green Deal, a document that will transform Europe into a clean, green and resource-efficient economy. The European Green Deal presents the first and main step into transforming the current economy into a climate neutral one, ensuring, thereby, benefits such as new innovation opportunities, green investments and jobs, better health conditions and overall wellbeing of the population (European Commission, 2024).

To achieve the goal of climate neutrality, the Member States committed themselves, to reduce the GHG emissions (mainly CO_2) by at least 55% until 2030, compared to the levels from 1990. The realization of the set target is planned and conducted through actions and interventions in various sectors, out of which the most significant are (European Commission, 2024):

- Sustainable transport infrastructure and solutions
- Green industrial transition
- Clean energy systems
- Energy efficient building renovations
- Preservation of nature and biodiversity
- Global climate cooperation.

Among major polluters (transport and industry sectors) are public and private buildings with their energy inefficient construction and permeable carpentry. Research shows that the building stock of the European Union consumes approximately from 40 to 42% of primary energy and produces around 36% of the Union's GHG emissions (European Environment Agency, 2023; Končalović et al., 2022). In addition to the mentioned, to reduce the current energy consumption rates in the building stock and decarbonize the heating, cooling and electricity sectors, it is crucial to foster the energy renovation of buildings (both public and private), through the implementation of more efficient renovation methods and solutions, construction of new, carbon neutral buildings, changes in human behavior, affordability of funding, strengthening the capacity of skilled workers, as well as better legal and administrative support. Thereby, doubling the annual energy renovation rates and initiating deep energy renovation can lead to the reduction of energy consumption by 60% until 2030 (European Environment Agency, 2023).

Although energy renovation (mainly, deep renovation) is observed as a positive step forward offering benefits such as financial savings, social inclusion and better environmental, as well as health conditions, it still faces various limitations. High initial

costs, insecurity of the homeowners and tenants, fluctuating energy prices, inadequate or unavailable professional staff, lack of know-how are some of the main limiting factors that slow down the renovation process (Končalović et al., 2022). Apart from the mentioned, emotions such as fear, insecurity, shame and distrust, as well as the social and financial status of the homeowners and tenants shape their perception of the energy renovation process. They often see it as an expensive, administrative exhausting and long-lasting activity, which is, primarily, considered the obligation of the building managers and other management authorities (homeowner associations, building representatives, national, regional and local public authorities).

Since the energy renovation includes different types of participants of the process – for example, the suppliers of works and services (architects, contactors, installers) and the demanders of works and services (homeowners and tenants), it is difficult to reconcile their different opinions and attitudes towards the process itself. The main challenges occur on the demand side, meaning among the homeowners and tenants, where a certain negative opinion about the energy renovation process can be encountered. This may occur due to lack of relevant and detailed information, distrust towards the responsible authorities or fear of higher financial burdens during the energy renovation process.

In order to tackle the mentioned obstacles and increase the energy renovation rates of the building stock, a project consortium consisting of 10 partner organizations from 6 Central and Eastern European countries (Croatia, Estonia, Germany, Poland, Romania and Slovenia) started to implement the project **CEESEN-BENDER - Building intErventions in vulNerable Districts against Energy poveRty**, with the main focus on multiapartment buildings (MABs) built after the Second World War and before the 1990's. Thereby, the aim of the project is to empower and support vulnerable homeowners and tenants from the mentioned buildings and help them in the energy renovation process through various awareness raising activities, created tools, developed documents and conducted trainings.

In most cases the main responsible authority for starting the energy renovation process are the building managers. During the process, usually the building managers communicate with the building representatives about the necessary renovation needs of the buildings, prepare the required documentation, apply the project for funding (conventional, subsidized, or other) and lead the renovation activities. Nevertheless, on this path they encounter many obstacles such as lack of time, funding, professional staff and motivation, but the most significant barriers of the energy renovation relate to human behavior and the negative vision that the homeowners and tenants have about the process itself. Emotional, social and financial states of the people living in MABs very often hinder the process and cause delays of energy renovations of buildings. One way to tackle the mentioned issue is to enhance the communication between the building managers, homeowners and tenants, whereby, it is important to emphasize all the benefits of the energy renovation, explain the process in detail and offer different

possibilities, having in mind the afore-mentioned characteristics of the renovation beneficiaries.

In order to manage the communication process more easily, one of the documents which will result from the activities of the project **CEESEN-BENDER** are the **Guidelines for facilitation of communication between building managers and homeowners on building renovation process**. This document offers recommendations for the building managers on how to start, lead and successfully conclude the communication about the energy renovation process, addressing, thereby, the following topics:

- Highlighting the differences between unrenovated and renovated buildings
- Discussing the issue of energy poverty in MABs
- Conducting the energy renovation process with its main steps, involved key stakeholders and target groups, as well as obstacles
- Including the involved parties into the application process through dialogues and awareness raising activities.

Development methodology

Following the mentioned, this document was developed in cooperation of the project partner organizations from different Central and Eastern European countries (Croatia, Estonia, Germany, Poland, Romania and Slovenia), which provided extensive inputs through the planned project tasks. Their relevant knowledge, expertise and experience in the fields of energy renovation, energy poverty and communication with the homeowners and tenants (with special emphasis on vulnerable households) were the starting point on which the **Guidelines for facilitation of communication between building managers and homeowners on building renovation process** are based.

In addition to that, the document was supplemented with additional data collected through the implementation of tasks planned within the project **CEESEN-BENDER**, out of which the most significant are the following:

- T2.1 Analysing the overall context of the selected buildings in pilot sites
- T2.2 Awareness raising for homeowners and landlords, as well as building managers
- T2.3 Q&A sessions for homeowners and landlords
- T2.5 Identifying renovated demonstration building(s).

Within the mentioned tasks, inputs from the project partner organizations were gathered through collaborative tools, such as shared Excel and Word documents for analysing the characteristics of unrenovated and renovated buildings, workshops and sessions with corresponding reports about the addressed topics, questions and conclusions, as well as discussions with the building representatives of the renovated buildings.

The **Guidelines** are, also, a result of communication and cooperation with the local building managers, who shared their knowledge and experience in working with the homeowners and tenants in their buildings. The main highlighted topics are focused on energy renovation of buildings and issues that arise during the process, opinions of the

homeowners and tenants about the building managers and the energy renovation itself, as well as interest and motivation of both parties (the building managers, as well as homeowners and tenants) for implementing the energy renovation process.

The **Guidelines for facilitation of communication between building managers and homeowners on building renovation process** present a supporting document that will help the building managers to establish an easier, quicker and better communication with the homeowners and tenants (especially the vulnerable households), as well as provide recommendations for motivating the homeowners and tenants for participating in the energy renovation process. These **Guidelines** are, also, an overview of the main issues and dilemmas which the homeowners and tenants are facing in their decision-making process on whether to engage their building in energy renovations. Finally, their purpose is to summarize the knowledge and experiences from the project partner organizations from Croatia, Estonia, Germany, Poland, Romania and Slovenia and, in the future, serve as a practical roadmap in addressing the methods and ways of involving different stakeholders into the energy renovation process.

2. Living in unrenovated and renovated buildings

In their everyday lives, people spend most of the time in various buildings (residential, commercial, educational, healthcare, recreational and other). While staying in these facilities and depending on the season of the year (summer or winter months), people consume different kinds of energy to make their stay more comfortable. The consumption of cooling energy during the warmer periods, as well as electric and heating energy in the winter season leaves traces on the environment and turns the building stock into one of the largest GHG emitters in the European Union.

Related to the mentioned, today almost 75% of the entire building stock is energy inefficient, with a large amount of different kinds of energy being wasted and lost (European Commission, 2020). This is, especially, visible in the residential buildings, where the mixture of energy consumption for different kinds of activities (such as cooking, washing, cleaning, ironing, heating/cooling), household appliances and lighting, as well as poorly executed construction with old and permeable carpentry results with energy losses, increased costs and unhealthy living conditions. To minimize and, even, prevent significant energy losses and improve the living conditions, more and more residential buildings are renovated with efficient materials and smart solutions, which strengthen their initial construction and better their performances (European Commission, 2020).

Energy renovation can, in general, be defined as a set of various interventions on a building, from the simple ones such as maintenance, repair and routine upgrades to more complex modernization, retrofit, restoration and rehabilitation. Thereby, the process itself includes various measures implemented in or on different elements of the building, as shown in Table 1 (Economidou, 2024).

Table 1: Types of measures within an energy renovation of a building

Elements of the building structure	Renovation measure
Building envelope	• Insulation of external walls, roofs, lofts and floors • Replacement of carpentry (windows and doors) • Draught proofing • Installation of solar shading systems • Employment of natural ventilation and passive solar heating/cooling techniques
Technical systems	• Replacement of inefficient boilers with condensing gas boilers • Improvement of mechanical ventilation, air-conditioning, lightning, auxiliary systems • Installation of heat recovery systems • Improvement of emission/distribution systems • Installation of building controls and micro cogeneration systems
Heat generation systems	• Installation of biomass boilers, thermal solar systems and ground/water/air source heat pumps

Electricity generation systems	• Employment of photovoltaic systems, micro-wind generation systems and micro-hydro systems
Other measures	• Replacement of the current appliances with energy efficient and smart ones

Source: Economidou, M., Energy renovation, 2024 (https://e3p.jrc.ec.europa.eu/articles/energy-renovation)

Furthermore, one of the main positive effects of the energy renovation are different energy savings achieved, whether through a stronger and less permeable insulation, renewed energy systems for generating electricity, heating/cooling or by replaced old, inefficient house appliances with smart ones. Thereby, it is important to highlight that every renovation measure has different impacts on the living conditions in the building, as well as generates different levels of savings for the homeowners and tenants.

In order to get a better insight in to the differences between the unrenovated and renovated buildings, the following subchapters summarize their main negative and positive characteristics.

2.1. What are the main negative sides of living in unrenovated buildings?

Unrenovated buildings, typically, combine several characteristics. First, their **physical state** is old, leaking, permeable and with low performance ability. This, mostly, refers to the buildings' envelope (meaning external walls and carpentry), which is characterized by no or very thin/poorly executed insulation, as well as old, unmaintained and poorly placed carpentry, enabling, thereby, high losses of heating/cooling energy. Second, the **internal electricity** and **heating/cooling systems** (mostly the installations, plumbing, lightning and pipes) are outdated, with very low performances, causing leaks and clogging, as well as high reparation costs (mostly, due to lack of the appropriate replacement parts). Third are the **electrical devices** (kitchen appliances, bathroom appliances, computers, television sets, electric heaters, cleaning devices and other) and **heating/cooling appliances** (air-conditioners, radiators, gas and oil furnaces, various heaters and other) that have low efficiency, with high usage of energy and great GHG emission ratios.

Apart from the mentioned, unrenovated buildings very often show **signs of wear**, which are characterized by peeling paint, cracked walls, chipped floors, as well as mold and water marks on the ceilings and in the corners of the rooms. Usually, the flooring is made of shag carpeting, linoleum and old hardwood that is worn down and damaged. Such buildings can experience **settling** or **shifting** (due to their initial structure made of brittle materials without iron reinforcement as support), resulting, thereby, with uneven floors, cracks in the foundation and walls that are out of plumb. The **poorly executed construction**, also, implies leaking roofs, which cause moisture penetration into apartments and formation of mold and water marks inside the rooms. Due to **poor ventilation** or **lack of modern moisture control systems**, many buildings have musty or stale odors, which seep into walls, furniture and clothes of the residents living in the apartments.

Furthermore, the state of such buildings **does not correspond** to the **new construction regulations**, which prescribe energy efficiency and safety measures. Therefore, most buildings do not have fire escapes, ramps for people with disabilities, green elements, mobility solutions or other additional measures, which increase their value.

The described characteristics have various consequences on the living conditions in the such buildings. Substantial **energy losses** and **inefficient usage of appliances** result in increased energy costs, which, very often, exceed the household income. Also, **human behavior** and the inability to properly implement and use energy efficient appliances or adequately ventilate the rooms after the replacement of the existing carpentry, result with the appearance of mold, pungent odors and spread of diseases. Related to the latter, unrenovated buildings, also, have **negative impacts** on the **human health.** In the colder months bad insulation of the building envelope causes passage of outdoor, cold air into the apartments, decreasing, thereby, the indoor temperatures and comfort of the stay. Also, in the warmer months, when the air-conditioners lower the indoor temperature, the same leaves the rooms through the bare walls or unevenly installed insulation. Furthermore, the usage of energy inefficient devices (old electric kitchen appliances) and improper installations (gas pipes and furnaces) can cause shocks and emissions of CO_2 and CO, which are highly toxic when breathing.

When considering health issues, it is important to highlight that poor living conditions result with various **diseases** and **conditions** such as respirator and cardiovascular diseases, muscle tremors, vertigos, allergies, arthritis and, in extreme cases, tumors and cancers. Also, negative impacts on human health are visible through **mental states** such as chronic fatigue, listlessness, stress, lack of sleep, anxiety and depression, as well as **emotions** in the form of sadness, shame, exclusion, concern, confusion, anger and rage. Additionally, living in unrenovated buildings undermines the **social status** of the homeowners and tenants, whereby the society forms a perception of them as poor and incapable of securing themselves better living conditions. Prejudices are formed and the society excludes such people from the joint activities and communities. Finally, old, inefficient and outdated states of the buildings and their energy systems, with negative impacts on the environment and high energy costs **decrease** the overall **value of the real estate**, as well as the neighborhood, making it difficult for the homeowners to sell or rent their apartments.

One of the phenomena that is often related to unrenovated buildings is poverty, a state where a lack of usual or socially acceptable amount of money and material possessions is visible, and, closely related to it, **energy poverty** (Britannica, 2024). Although many countries still do not have an adequate definition of energy poverty, it is agreed that the term itself combines the following several factors (European Parliament, 2023):

- Low income
- High energy expenses
- Poor energy efficiency in buildings.

Furthermore, in European regulations energy poverty can be understood as a situation where a household suffers from lack of access to essential energy services that provide decent living and health standards, as well as cover basic human needs such as

heating/cooling, hot water, lightning and usage of power appliances. In other words, an energy poor household is the one, that cannot meet its domestic energy needs. In most cases, people affected by energy poverty suffer from inadequate comfort and sanitary conditions, unsuitable indoor temperatures, deficient air quality and exposure to harmful chemicals and materials. Such living conditions, as mentioned before, lead to lower productivity, health problems and higher mortality, as well as significant psychological stress related to the fact that the people are unable to pay their energy bills (European Parliament, 2023).

Related to the mentioned and according to Eurostat, Figure 1 presents some energy poverty trends in the 27 member states of the European Union (in the past 4 to 5 years) (Eurostat, 2024).

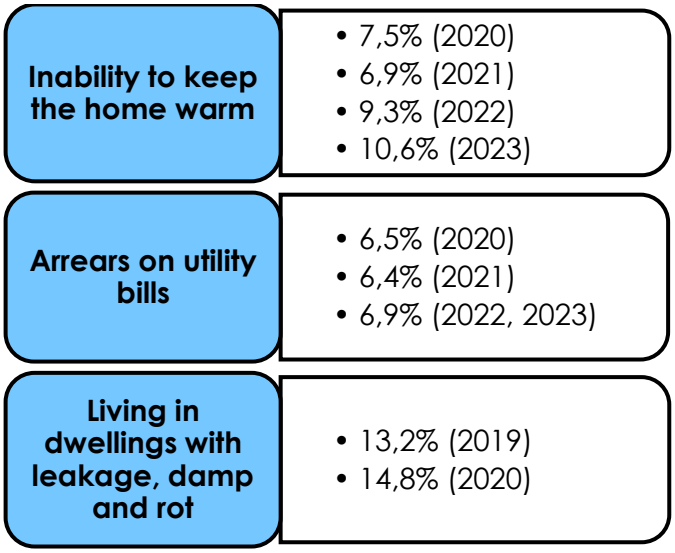

Figure 1: Trends in the energy poverty characteristics in 27 EU member states (from 2019/2020 until 2023)

Source: Eurostat.eu, 2024 (https://ec.europa.eu/eurostat/databrowser/view/ILC_MDES01/default/table?lang=en ; https://ec.europa.eu/eurostat/databrowser/view/ILC_MDES07$DEFAULTVIEW/default/table?lang=en ; https://ec.europa.eu/eurostat/databrowser/view/ILC_MDHO01__custom_3065177/default/table?lang=en)

As shown in the Figure above, certain aspects of energy poverty have worsened in the last couple of years. From 2020 until 2023 the percentage of population that was unable to provide warmth to their homes raised from 7,5% to 10,6%, which is a tremendous jump in only 4 years. Looking at the second aspect, the arrears on bills for utilities such as electricity, heating/cooling and water had an insignificant increase from 6,5% to 6,9% until 2023. Finally, the percentage of population living in buildings with leakage of the roof, damp walls, floors and foundation, as well as rot in the window frames and floors increased from 13,2% in 2019 to 14,8% in 2020 (*no later data were available).

Although energy poverty is a growing issue, it can be properly addressed through various regulatory solutions such as improvement of existing energy and social policies,

regulation of energy prices and taxes, as well as introduction of social tariffs for energy poor households (European Parliament, 2023). Apart from the mentioned, energy poverty can be mitigated with improvements of the buildings' efficiency (in the form of energy renovation with various green measures), usage of renewable energy sources (RES) to cover the energy demand after improving the buildings' envelope and upgrading the technical infrastructure of the same (Habitat for Humanity, 2022).

2.2. What are the main positive sides of living in renovated buildings?

As already mentioned, energy renovation includes interventions (mostly of construction, installation or service nature) of varying scope in or on different elements of the buildings, starting from the envelope and technical systems, all the way to the usage of electrical, heating/cooling and other appliances and devices. There are two main types of energy renovation:

1. **Partial energy renovation** – a process in which only some specific elements or systems of the building are upgraded or improved. This mostly includes measures such as:
    - Upgrading the insulation
    - Replacing windows
    - Improving heating/cooling and ventilation systems
    - Upgrading lightning and installing RES solutions.

    The aim of these interventions is to provide high energy efficiency to certain elements of the buildings which can reduce energy demand, lower the energy costs and improve the living comfort, but, at the same time, being less invasive and costly.

2. **Deep energy renovation** – an extensive approach in upgrading the buildings' performances, which includes different parts of the buildings themselves and addresses multiple aspects of energy use. The process, mostly, includes measures such as:
    - Comprehensive insulation
    - Replacing windows and doors
    - Installing or upgrading the heating/cooling and ventilation systems
    - Installing RES solutions
    - Modernizing lightning and electrical system
    - Improving air quality in the apartments.

    The is aim to transform the building into a highly energy efficient space, by significantly reducing the energy demand and its costs, improving the living conditions and having a highly positive impact on the environment. This type of renovation is often costly at the beginning, but offers long-term savings and environmental benefits.

Benefits of the renovated buildings

The renovation process delivers numerous advantages for the building stock, society and environment in general. The **energy efficiency** of the buildings is **higher** and **improved** due to a more **durable envelope**, meaning insulation of walls, roofs and floors for minimizing heat losses, as well as efficiency of the windows and doors with double or, even, triple glazed glass and insulated frames, which reduce drafts and heat transfer. Furthermore, **modern heating/cooling** and **ventilation systems** such as heat pumps and energy ventilators ensure better temperature control, higher air quality and minimize losses in the warmer and colder months. Apart from the mentioned, energy renovation implies, also, the usage of **RES**, mostly the sun and wind. Therefore, the installation of solar panels and small wind turbines (in regions with sufficient wind) for electricity production and increase of energy independence is very common.

Also, the energy renovation is more and more carried out through materials which **reduce GHG emissions** (mostly CO_2) and **enhance the living comfort** in the buildings. Regarding the latter, renovated buildings offer more consistent indoor temperatures by reducing fluctuations, imply soundproofing measures in the forms of upgraded windows and insulation to reduce outside and noise between apartments/rooms and ensure improved indoor air quality with modern ventilation systems which improve air circulation and reduce pollutants. In addition to the mentioned, renovation measures imply the usage of **smart technologies** such as thermostats for heating/cooling optimization, monitoring systems (better known as smart meters) to track and control energy consumption and automated lightning with motion sensors and timers for reduction of unnecessary energy usage.

Furthermore, renovated buildings often have **green elements**, such as green roofs and terraces to improve their insulation and reduce stormwater runoff, as well as water and landscaping elements in the forms of rainwater collection systems, drought-resistant plants and irrigation systems that contribute to the reduction of water consumption. As for the aesthetic appearance, renovated buildings have **modernized interiors** with better lightning and undergo structural upgrades and foundation strengthening.

Apart from the mentioned, such buildings provide various other benefits for the homeowners and tenants. First, the **energy consumption** is **lower** and the losses are minimized, therefore the energy bills for electricity, heating/cooling and water are, also, lower. Within this, the maintenance needs of the building are not frequent and, therefore, those **costs decrease** over time. Second, at the beginning the renovation process implies higher investment costs, but in long-terms the reduced energy consumption and costs generate **savings** which exceed the initial investments. Third, renovated buildings are **in compliance with the modern standards**, **building codes** and **regulations**, ensure safety, accessibility and energy efficiency to their residents and are appropriate for certification. Fourth, due to better air quality and energy usage, the **health conditions** in the buildings are **enhanced** and have a **positive impact** on the physical, mental and emotional states of the people living in them, enabling them a less stressful and more pleasant life.

Regarding the **impact on the environment**, it is well known that rational energy consumption leads to lower GHG emissions, improves the air quality in general, preserves the biodiversity, protects the air, soil and water and mitigates the climate change consequences that are more and more visible. One of the biggest benefits of energy renovation is the **increased real estate value** of the building and the neighborhood in general. A fresh appearance, modern technologies, environmental awareness, improved technical systems and healthier living comfort ensure higher demand by making the buildings more attractive to potential buyers or renters and the apartment owners more competitive on the market. Also, renovation encourages further construction and expansion of buildings which have similar or the same physical and technical characteristics, what leads to formation of modern, energy neutral and aesthetically appealing neighborhoods, with a better social status and image in the public.

Partial and deep renovation can, also, boost **innovation investments** in the entire construction chain, starting from the designers and manufacturers of the materials and technologies, through the building managers (or homeowner associations), all the way to the tenants. On the other hand, such investments require extensive competences, technical knowledge, skilled workers, companies with experience in deep renovations and high volumes of eco- and efficient materials that are either very expensive, or in shortage (Buildings Performance Institute Europe, 2021). In addition, the improvement of the existing building stock leads to preservation of the resources, better waste management and urban planning, cost-effectiveness, bridging material shortages, preserving the historical and cultural value, as well as social stability.

Finally, energy renovation (especially deep renovation) cumulates more benefits and savings over a longer period of time. This happens due to the fact that some renovation measures have a longer lifespan and generate savings for decades. This effect is especially important for households which fight with **energy poverty**. In these cases, the savings will be visible in even lower energy bills than in the case of non-vulnerable households. Also, through its measures and activities, deep renovation can protect households from becoming energy poor and, even, lift households out of the energy poor status. Related to the mentioned, due to today's rising energy prices and availability of fossil fuels, it becomes more urgent to protect the most vulnerable groups by reducing air pollution, improving their health and living conditions, as well as reducing their sensitivity to the volatility of energy prices (Buildings Performance Institute Europe, 2021).

As evident from the above, the energy renovation of buildings is a mixture of simple and complex activities, that generate various benefits for the residents of the buildings and the society in general. However, for the process to be successful, it is necessary to take the prescribed steps that lead to all available financing opportunities and define the main obstacles, while taking into account the needs of the involved stakeholders.

3. Building renovation process

In the Central and Eastern Europe many MABs are built after the Second World War and before the 1990's, meaning that their construction, by now, is old, worn-out and inefficient. In order to modernize the neighborhoods and motivate the people to stay or settle in these areas, the countries are investing more and more intensively into the energy renovation and presenting their renovated buildings as demonstrations sites to foster the same trend in other parts of the Central and Eastern Europe.

Some of the most representative demonstration buildings were collected from the partner organizations of the project CEESEN-BENDER in order to compare the structural, technical and technological solutions within the renovation process in the 5 (out of 6) countries, as well as to share the knowledge, practices and experiences with the energy renovation among the partner organizations. The following Table 2 summarizes the characteristics of the 5 demonstration buildings from the 5 (out of 6) countries of the project (Croatia, Estonia, Poland, Romania and Slovenia).

Table 2: Demonstration buildings of the project CEESEN-BENDER

Country / Characteristic	Croatia	Estonia	Poland	Romania	Slovenia
Ownership	100% private	100% private	92,5% private, 7,5% public	100% private	90% private, 10% public
Year of construction	1970	1964	1974	1978	1989
Size and number of floors	4.134,49 m^2, 3 floors, 49 apartments + 8 business premises with average area of 57 m^2	1.776,40 m^2, 4 floors, 32 apartments with average area of 42,3 m^2	1.907,52 m^2 4 floors + basement, 40 apartments with average area of 46,66 m^2	5.215 m^2 4 floors, 64 apartments with average area of 70 m^2	5.798,20 m^2 8 floors, 64 apartments with average area of 56,80 m^2
Energy efficiency class	B	A	N/A	A	N/A
Renovation data	Thermal insulation of the envelope, replacement of external carpentry, replacement of indoor lightning	Thermal insulation of the envelope, replacement of external carpentry, apartment central heating control with room-based control (thermostats), replacement of indoor lightning, installation of a PV plant	Thermal insulation of the envelope, replacement of external carpentry, installed heat pumps, PV plant, modernization of the water supply system, replacement of the electrical installations	Thermal insulation of the envelope, replacement of external carpentry	Thermal insulation of the envelope, replacement of external carpentry

Source: Project CEESEN-BENDER, WP2: T2.5 Identifying renovated demonstration building(s), 2024

As evident from Table 2, all demonstration buildings were built before the 1990's and count an average gross building area of around 3.700 m^2. The average apartment area of all 5 buildings is around 55 m^2 and most of them are rated as "A" energy efficiency class. Regarding the conducted renovation interventions, all presented buildings have new thermal insulation and replaced external carpentry, while a few of them replaced, also, the lightning systems, installed PV plants and modernized the heating and water supply systems.

Although the demonstration buildings offer their residents benefits in the form of energy and financial savings, improved technical systems, lover maintenance costs, improved comfort and enhanced building aesthetics, the renovation process opened, also, various challenges. Thereby, the most significant was the lack of financial sources that were invested in the renovation. Also, the resistance of homeowners and tenants, modifications of the construction projects and exhausting administrative procedures were faced. Finally, most countries experienced lack of the professional, technical staff (mostly, architects/designers, contractors and supervisors) and, due to their absence the renovation projects got delayed or had to be changed.

As visible from the mentioned, the energy renovation can carry many benefits and positive sides, but, also, raises many obstacles for all included parties. Therefore, in order for the process to be easier to implement, there are steps and activities that can lead to more successful results. They include procedures and financial options, identification of the main challenges, inclusion of and dialogue with the stakeholders and target groups, as well as appreciation of the emotional states and fostering empathy among the involved parties.

3.1. Procedures and possibilities of the energy renovation of MABs

The key to a successful implementation of every activity or process is the timely and correct inclusion of all involved parties. Thereby the main opening move is to have a direct and honest communication where all the positive and negative sides of the activity or process are explained and the parties get the possibility to have a quality discussion about their preferences and thoughts.

Whether or not to start the energy renovation on a MAB is a big decision, mostly because it involves various stakeholders such as the building managers, homeowners and their associations, tenants, consultants, technical staff, financial institutions and other, which all have their unique thoughts, needs, emotional states and possibilities for entering such an activity. In order to implement the process more easily and less painful, there are some steps (shown in Figure 2 below) that the involved parties can follow.

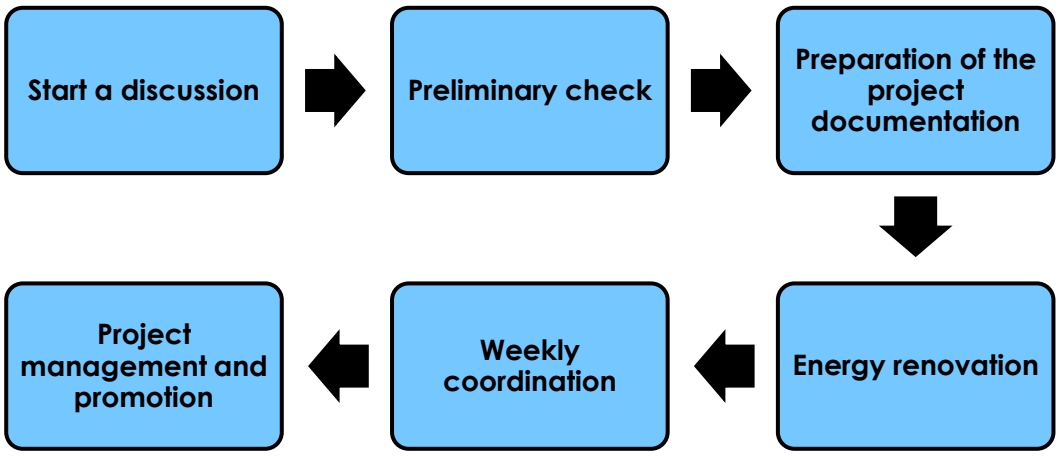

Figure 2: Key steps of the energy renovation process

Source: Medjimurje Energy Agency Ltd. (MENEA), 2024
(According to the national Call "Energy efficiency of multiapartment buildings" open by the Ministry of Physical Planning, Construction and State Assets of the Republic of Croatia ; https://mpgi.gov.hr/energetska-obnova-visestambenih-zgrada-14464/14464)

Related to the mentioned, the steps from Figure 2 should be implemented as follows:

1. **Start a discussion** – organize a meeting with the building managers, homeowner associations or homeowners themselves and the tenants to define the needs of the residents and the building itself. It is important to identify the current issues of the buildings' construction and technical systems targeted for renovation, define the financial sources and capabilities of the residents and the financing model (whether the renovation can be financed from private, public or combined sources).

2. **Preliminary check** – in case the renovation will be financed from public or combined sources, it is necessary to have a preliminary check of the building. This depends on the conditions of the call that the building is going to be applied on, but can involve the following information: the area used for housing, number of residential units or apartments, form of management (building manager, homeowner association, other), architectural entity and unheated area. In case the building meets the conditions, it can be applied to the chosen call for renovation.

3. **Preparation of the project documentation** – for the renovation to be implemented properly, it is necessary to prepare the main documents – energy certificate/permit and report before the renovation (if they are requested in the conditions of the call), main project design with all files and studies ("before" and "after" drawings of the renovated parts) and energy certificate/permit and report after the renovation (if they are requested in the conditions of the call). Apart from the mentioned, each call can prescribe different documentation needed for the application of the building.

4. **Energy renovation** – this is the most significant step, the process itself, which includes the implementation of energy efficient measures, the usage of RES and

involvement of horizontal measures. Some of the main measures that are, usually, funded by national calls and most implemented are:

- Renovation of the buildings' envelope (increase of the thermal protection of the building, waterproofing and drainage, installation of green roofs and facades)
- Installation of new or replacement of the existing technical systems of the building (heating/cooling, ventilation, domestic hot water, indoor lightning)
- Promotion of RES in the production of energy (heat pumps, wood chip boilers, PV plants)
- Automatization and safety measures
- Measures for green mobility and accessibility for people with disabilities.

5. **Weekly coordination** – to avoid potential issues during the renovation, it is necessary to have weekly coordination meetings with all involved parties (the management of the building, residents, technical and supporting staff). This way problems such as installation of bad quality materials, hiding of poorly implemented or unimplemented works, as well as false calculation can be prevented on time. Also, these meetings help the project management to keep track of all works, news, issues and changes of the project, as well as to ensure the necessary financing model for the same.

6. **Project management and promotion** – in case the project is funded by public or combined funds, it is obligatory to fill out all the necessary documentation for the application to the chosen call, coordinate all project activities and ensure that the deadlines are kept as planned, as well as to promote the project among the public to make it more visible and gather potential new applicants. This step can also be implemented while financing the renovation with private funds.

One of the key steps in starting the energy renovation of a building is finding the appropriate financing source. There are many financing options that the included parties can use to successfully implement the renovation, from private funds that are being collected by the homeowners and tenants themselves, over public funds allocated by national, regional or local authorities (ministries, environmental and energy funds, green associations), to funding from banks, development agencies and other financial institutions.

Since the project CEESEN-BENDER gathers organizations from 6 different countries, out of which 5 provide information on their pilot locations, it is expected that each of them uses different financing calls, programs and tenders when starting the energy renovation process. In order to have a better insight into the mentioned financing options, the countries of the project CEESEN-BENDER (Croatia, Estonia, Poland, Romania and Slovenia) gathered data on the, currently available, instruments, programs and other sources suitable for financing the energy renovation of MABs. The summarized overview is presented in the figure below.

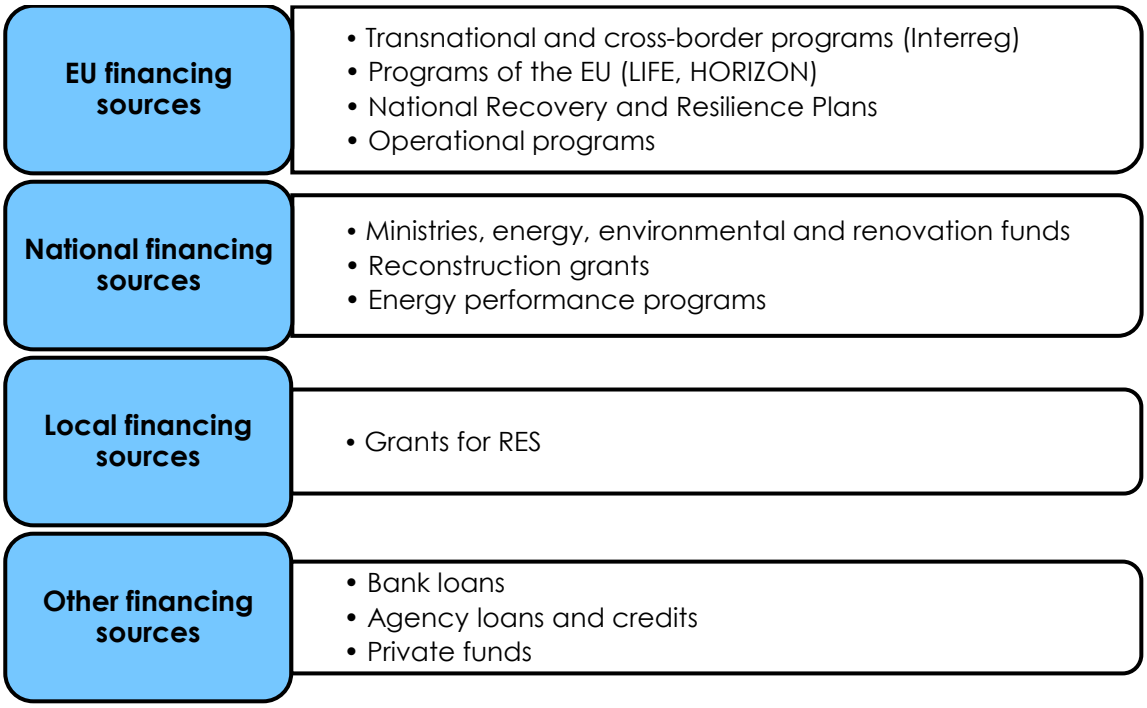

Figure 3: Financing sources for the energy renovation in the CEESEN-BENDER countries

Source: Project CEESEN-BENDER, WP2: T2.1 Analysing the overall context of the selected buildings in pilot sites, T2.5 Identifying renovated demonstration building(s), 2024

Apart from the mentioned, there are various other financing sources that can be used for energy renovation purposes. Some of them are traditional (such as grants, subsidies, soft loans and leasing), growing (mostly, energy performance contracts, service agreements, obligations and commercial loans), as well as new and innovative (tariffs, crowdfunding and energy efficient mortgages). To get better access to the financing mechanisms, appliers can use different supporting organizations and tools, such as One-Stop Shops (OSS), whose main task is to assist appliers and guide them to through the steps of the energy renovation process (Economidou et al., 2019).

3.2. Involving key stakeholders

Before making a final decision whether or not to start the energy renovation of a MAB, it is important to define the main stakeholders involved. Since the process itself can be long-lasting, exhausting, expensive and administratively complicated, it is important to consider human and behavioral factors that, very often, can represent one of the main obstacles. Non-monetary factors that influence the stakeholders' decisions on energy renovation include their perception of the improved living and building conditions, level of effort and disruptions required to complete the renovation, as well as uncertainties of the outcomes. Understanding the stakeholders' motives and considering their thoughts can help in the design of policies and measures that lead to increased rates of energy efficiency renovations, foster better communication between the included parties and tailor more accessible funding solutions for the specific target groups (European Environment Agency, 2023).

According to the mentioned, stakeholders can be considered as all parties involved in the energy renovation process, whether they are the residents of the building, management authority, technical staff which performs the renovation tasks, financing institution that provides the funds or a supporting organization for advice and consultation. Every mentioned stakeholder has its unique vision and benefits that he/she wants to achieve, as well as tasks which he/she is obligated to carry out within the renovation process. Therefore, we can define the following stakeholders and their tasks as the most significant ones:

1. **Homeowners and landlords** – they are the most influential stakeholder, since they are paying for the renovation. These stakeholders are divided into 2 groups – the ones that live in their own apartments and the ones that are renting them (European Environment Agency, 2023). In case they are living in their own apartments, consuming the energy and paying the utility bills, they can decide to engage in the energy renovation in case it will lower their energy costs, generate savings and increase the living comfort. On the other hand, if they are renting their apartments, they are not consuming the energy nor paying the utility bills themselves but can still provide their tenants better living conditions and contribute to the increase of the real estate value. Of course, in case of a renovation, they provide the financial sources (if needed), communicate with the building manager or building representative and participate in the decision-making process.

2. **Tenants** – they are the ones living in the apartments, consuming the energy and paying the utility bills. In case their homeowner or landlord decides to engage into a renovation process, the financial burden will not be, strictly, on them, but the construction activities can cause them stress, anxiety, fear of the unknown and other negative emotional states. Therefore, it is crucial to establish an honest and direct communication, where they will be informed about all aspects of the renovation.

3. **Building representatives** – their main task is to represent the thoughts, decisions and needs of the tenants. They are in constant communication with the building managers, tenants, technical staff and supporting organizations and foster the energy renovation process. Building representatives, usually in cooperation with the management authority, apply the building for funding (in case of public funds) or collect the funds from the tenants (in case of private funds). In some cases, they are the ones initiating the process and convincing the tenants to participate.

4. **Building managers** – in some cases the function is carried out by the homeowner associations. They manage the buildings joint account, collect the reserves from the tenants and maintain the building. During the renovation process, they communicate with the building representative and technical staff, coordinate and supervise all activities and, at the end, pay the involved constructors, financial and supporting organizations. In case the renovation is financed from

public or combined funds, they apply the building to the call or tender, as well as guide the building representative through the renovation process.

5. **Technical staff** – architects/designers, constructors, engineers, material suppliers, which supply the technical knowledge, shape the scope of the renovation and affect the future energy consumption. Their main task is to carry out the works, advise building representatives and provide technical and practical expertise on the materials, technologies and techniques used during the renovation (European Environment Agency, 2023).

6. **Supporting organizations** – mostly sectoral or energy agencies, which advise during the application process, lead the renovation project, coordinate all activities, communicate with the building managers (or homeowner associations), building representatives, technical staff and financial institutions. In addition to that, they organize educational workshops and Q&A sessions, as well as provide guidance for the open calls and tenders regarding the energy renovation. Apart from the mentioned, One-Stop Shops (OSS) are advisory organizations that can facilitate access to various financial instruments and help the applicants to select the best technical staff. Among others, their task is to promote the energy renovation solutions, guarantee the quality of service and help the technical staff to connect with the potential clients (European Environment Agency, 2023).

7. **Financial institutions** – banks, development agencies and funds that provide loans and credits for energy renovation projects, as well as open call and tenders for applications of such projects

8. **National, regional and local authorities** – they can support the energy renovation through better shaped national, regional and local policies, subsidies and tenders, as well as educational events

9. **Others** – in cases of energy poor households, centers for social welfare can help in the communication process with vulnerable tenants, they identify households with the greatest need for renovation and foster the process among the most critical tenants.

As mentioned before, human and behavioral factors present the main obstacles, which influence the outcome of the renovation. The way in which the homeowners and tenants behave after the process is finished will define the potential benefits and long-term financial and energy savings. One of the key points when speaking about their behavior are the individual and specific situations of each homeowner and tenant (meaning social status, financial possibilities, level of education, type of employment), which influence their decision-making process and determine their behavior after the energy renovation is finished (European Environment Agency, 2023).

3.3. Identifying the main obstacles and challenges

In the previous chapters it was indicated that the energy renovation process generates many benefits for all involved stakeholders. Whether those are energy savings and lower costs, environmental protection, improved living conditions, enhanced aesthetics of the building or increased real estate value, renovated buildings have positive effects once the process is finished. But as any other activity involving different kinds of individuals, energy renovation faces, also, many obstacles. The process itself is long-lasting and administratively exhausting, especially for the stakeholders directly involved into its implementation (mostly, building managers, homeowners and tenants) and, therefore, it is crucial to establish an open and honest communication, with the aim of facing all potential threats and finding joint solutions to address them.

In a complex activity such as the energy renovation, most of the obstacles raise up due to human emotions and behavior, their social and financial status, as well as possible negative experiences with construction works in the past. On order to tackle the challenges, it is necessary to first, identify which are the ones, causing the biggest delays in the energy renovation and to establish well organized reaction systems to tackle them. Related to the mentioned, Table 3 shows the most common barriers that can occur before and during the energy renovation of MABs, coming from the homeowners and tenants.

Table 3: Barriers in the energy renovation of MABs (homeowners and tenants)

Objective barriers	
Financial risks and questions	Imply lack of finances, high investment costs and the questions around the profitability of the process. Aversion towards taking risks and falling into debt (in case of borrowing the financial sources) are significant hinderers. Also, lack of financial sources (such as subsidies, loans and credits) and long return on investment (ROI) period can, also, slow the process.
Lack of professional staff	The inability to find good and responsible technical and supporting staff can cause demotivation for starting the renovation. Quality technical staff can be overbooked or hard to find and the supporting staff can be uninterested in case their profit from the job is low.
Administrative procedures	In case of using public funds, they imply large amounts of documentation that needs to be filled out and certificates/permits that have to be obtained. Also, the application to a call/tender can be on a "first come, first serve" basis.
Duration of the process	Implies the timeframes and deadlines for the application procedures and the works themselves. This is often connected to the inability to find qualified technical staff or hiring unprofessional contractors, what results with delays in the works.

Subjective barriers	
Social status	Implies the gender, age, educational background, type and status of employment and overall welfare of the homeowners and tenants. In communities with lower educational levels and part-time employment, the need and interest in energy renovation tend to be lower compared to communities with highly educated and well employed residents. Also, if the building is located in a bad neighborhood with dilapidated buildings, "peer pressure" is the biggest hinderer.
Emotional and mental states	Positive and negative emotions and feelings can determine the decision-making process of the homeowners and tenants. Also, mental states such as depression, stress and anxiety often have negative impacts on the thinking process, whereby the person does not perceive the outcomes of an activity in an objective way.
Uncertainties about the outcomes	Connected to the above, fear of the unknown and uncertainties can result in the homeowners and tenants to perceive the possible outcomes as negative and having a bad effect on the building's quality, generating health risks and insufficient savings. Also, the long-term waiting for benefits increases the aversion and fear whether or not they will be visible at all.
Interruptions in the lifestyle	Many residents are influenced by the perceived level of effort and disruption the renovation can cause in their everyday lives. If the process is perceived as extensively long and complicated, it can result in abandoning the idea of the renovation at all.

Source: Medjimurje Energy Agency Ltd. (MENEA), 2024
European Environment Agency, Accelerating the energy efficiency renovation of residential buildings – a behavioural approach, 2023
(https://www.eea.europa.eu/publications/accelerating-the-energy-efficiency)

Apart from the mentioned, barriers occur, also, on the side of the contractors, which are highly influenced by the culture and social status on their workplace, as well as the lack of skilled workers, which can advise the homeowners and tenants on energy efficiency measures. Also, their personal commitment to energy efficiency and environmental protection appears to be a motivator for promoting the energy renovation of MABs (European Environment Agency, 2023).

Nevertheless, the mentioned obstacles and challenges can be mitigated and prevented by establishing a better communication between the two main involved parties – the building managers (or homeowner associations), homeowners and tenants. All the, above mentioned, barriers occur due to lack of quality information and knowledge about the energy renovation, meaning its procedures, activities and benefits. To start mitigating aversion of the homeowners and tenants, it is important to highlight the main benefits the process is going to generate, such as improved living

conditions and home's appearance, increased real estate value and possibility to sell or rent the apartment for a higher price. Furthermore, several cost savings such as energy consumption, maintenance and technical repairments of the systems, as well as minimizing the possibility for complains can, also, represent some of the drivers towards the energy renovation. In some cases, the most environmentally engaged homeowners and tenants can see the renovation as their social responsibility, whereby they want to provide themselves or their tenants good accommodation with, at the same time, preserving the environment. Such people will most likely, implement different kinds of energy efficiency measures (insulate the envelope with eco-materials, install RES systems and use high energy efficient appliances) in order to decrease their negative footprint on the environment, preserve the biodiversity and eliminate the, current, energy carriers from their consumption (European Environment Agency, 2023).

One of the biggest influences that can lead to positive thinking is "peer pressure". Although it can, also, be a barrier, it is not a secret that people exchange knowledge and experiences with their peers and form a certain opinion based on what they hear. Communicating with people they trust helps them to range positive and negative aspects of every process or activity and make an easier decision whether or not they want to get involved. In the terms of energy renovation, suggestions and advice from family, friends and neighbors can help the homeowners and tenants to evaluate what is socially approved and acceptable behavior, which can lead their thinking process towards accepting the renovation as a positive and necessary activity (European Environment Agency, 2023).

Apart from the mentioned, barriers can be mitigated by giving timely, detailed and honest information about the renovation process. Organizing educational events, Q&A sessions and consultations gives the homeowners and tenants the impression that the process does not need to be faced alone, but that they have the support and guidance from professionals. Furthermore, offering help in the search for financial sources, technical staff and choosing the best energy efficiency measures is often crucial to start a renovation.

In any case, whether the decision about the energy renovation is positive or negative, it is desirable to have an honest discussion, where the needs, thoughts and dilemmas of all involved parties are taken into account. Confidential communication where both the building managers (or homeowner associations) and the homeowners and tenants feel the need to express their thoughts, fears, problems and plans can foster not only the decision-making process, but also deepen their relation and set the basis for a better cooperation in the future.

3.4. Dialogue with the target groups

In the previous chapters it is mentioned that the energy renovation includes different kinds of stakeholders (whether they are on the "supply side" such as the building managers (or homeowner associations), technical staff, supporting organizations, financial institutions and national, regional and local authorities, or on the "demand side" such as the homeowners, tenants and their representatives), which have their own

needs and preferences when it comes to the renovation process. Nevertheless, the most important bond in this process is the one between the building managers (or homeowner associations) and the homeowners and tenants because they are directly involved into the process of application, coordination of the activities, financing and, at the end, use the results of their cooperation.

Since the energy renovation is aimed at improving the living conditions of the homeowners and tenants and they are the ones who are directly "consuming" the characteristics of the energy renovated building, meaning living in it, using the technical systems and appliances, they are the end target groups of the process. In the previous chapters, it was indicated that these target groups have many dilemmas, issues and concerns when it comes to starting the renovation process. Their financial and social status, emotional and mental states, as well as lack of information and knowledge causes not only delays in the process, but, also, with the renovation never starting at all. Therefore, it is crucial to maintain a continuous communication before, during and, even, after the activity, with the aim of tackling the main barriers and fostering positive thoughts about the energy renovation.

When communicating large investments such as the energy renovation, it is important that the building managers (or homeowners associations) keep in mind the following key points:

- Psychological and socio-economic characteristics of the target groups, such as emotional states (fear, anxiety, distrust, sensitivity to disruptions) and socio-economic situations (level of income, housing security and demographical differences)

- Main concerns of the target groups regarding the renovation costs, duration and quality of works, impact on the lifestyle, living conditions, fear of displacement (moving out permanently and inability to return after the renovation) and communication gaps (lack of clarity or transparency about the renovation and expectations, unclear understanding of the activities and deadlines).

Regarding the mentioned, there are several strategies the building managers (or homeowners associations) can use in order to establish a better dialogue with the target groups. Some of the most used are the following:

1. **Pre-renovation activities**
    - Organize workshops and Q&A sessions that explain the renovation process in a simple way, using practical examples, "before" and "after" photos and exchange of experience. Allow the target groups to ask questions and share their concerns.
    - Foster personalized communication tailored for the individual needs of the group.

2. **Building trust**
    - Explain the deadlines and outcomes of each phase of the renovation, regularly update the target groups with information on the progress, issues, changes and, eventual, delays.
    - Provide a clear cost breakdown and communicate how the renovation will lead to long-term benefits in the future.
    - Set expectations for various disruptions caused by the renovation and indicate that they are planned to be addressed.

3. **Participation of the target groups**
    - Involve the target groups in all aspects of the renovation that may impact their lifestyles. Let them express their emotions, thoughts and ideas regarding the improvements in or on the building.
    - Organize focus groups and have regular meetings to discuss the renovation plans, share concerns and receive feedback. It is important to have a two-way dialogue and make the target groups feel more included into the process. This can be used in the pre-renovation activities to gather ideas about the possible interventions on the building and the possible financial options (brainstorming).

4. **Post-renovation activities**
    - Maintain communication to ensure the target groups' satisfaction and address any remaining concerns.
    - Offer support services such as moving assistance, temporary accommodation and compensation for inconvenience (in case the target groups are required to move during the renovation).
    - Hold an event once the renovation is finalized to celebrate the improvements and success of all involved parties.

To ensure an effective dialogue it is important to be consistent and reliable. This means to share timely, transparent and detailed information on the entire renovation process, as well as avoid mixed messages and confusing information. Also, active listening and validation of the target groups' feelings and thoughts, as well as acknowledging their discomfort with the changes helps in building mutual trust and deepens the relation. To maintain a consistent and ongoing communication, it is preferable to use various feedback mechanisms (such as surveys, interviews, meetings), so the target groups get the chance to express their positive and negative emotional states and are included into the decision-making process.

As already mentioned, one of the best ways to motivate individuals for energy renovation is to involve people they know and trust into the process. If the shared information is supported by the target groups' families, friends, neighbors and people they generally trust, the dialogue itself is more likely to be successful.

To make the target groups more appreciated, it is good to involve them in the renovation process more actively. This can be achieved by the various inclusion methods in the following stages:

- **Decision-making** – allow the target groups to actively participate on meetings with the building and project managers, as well as contractors to discuss the renovations' scope and impact
- **Workshops and Q&A sessions** – offer the possibility to organize gatherings and educate the target groups about the renovation process, its challenges and benefits
- **Monitoring** – target groups can be involved into monitoring of the renovation process, including quality and deadline checks
- **Highlighting benefits** – during the process highlight the joint benefits the renovation will have for every included party, to help in understanding the energy renovation as a joint mission.

Finally, focusing on a clear, transparent and honest communication, as well as actively involving the target groups into the renovation process builds trust, reduces the resistance level and ensures better cooperation. By feeling safe, heard and understood, the target groups will more likely support and participate in the improvements of their buildings and show the building managers (or homeowner associations) that they value their efforts to ensure better and more comfortable living conditions.

Nevertheless, in a complex process like this, objective and rational thinking is not enough. Building managers (or homeowners associations) have to understand that the social status and emotional states of the target groups play a significant role in their decision-making process and the final opinion whether or not the energy renovation is the right path. Therefore, having and emphatic approach by considering all doubts and states of the target groups is crucial to successfully complete the communication process.

3.5. Emotional states and the role of empathy

Communicating the energy renovation is, especially, hard if the household suffers from energy poverty. As already mentioned, energy poverty can be characterized as an interaction between low incomes, un-rational energy consumption and high energy prices and mixed with other factors such as demographic and social aspects of the target groups. In order to achieve the wanted results, the parties must show mutual empathy and understand the vulnerabilities of one another.

Empathy can, in general, be defined as the ability to emotionally understand other peoples' feelings, see things from their point of view and imagine ourselves in their situation. Basically, it is the mental state of putting ourselves into someone's position and feeling their emotions. Empathizing with other is essential for keeping healthy relationships and communication. Some of the main signs whether or not a person is capable to be empathic are the following (Cherry, 2024):

- Good ability to listen to other peoples' problems
- Thinking about how other people feel and react in certain situations
- Giving sincere, thoughtful advice and support

- Possibility to care deeply about other people
- Recognizing whether a person is dishonest or not.

Furthermore, there are 3 main types of empathy. First, affective empathy is the ability to understand another person's emotions and respond in the right way. Second, somatic empathy involves physical reactions as a response to another person's experiences or emotional states. And third, cognitive empathy includes understanding another person's mental states and their thoughts in response to a certain situation. Being able to feel empathic rises many benefits such as strengthening relationships, building social connections, regulating own emotional states, promoting helping behavior, noticing other peoples' needs and suffering, as well as acquiring skills to adequately respond to certain unpleasant and emotional situations (Cherry, 2024).

In terms of energy poverty, empathy can have a significant impact in addressing the negative consequences. Namely, many studies have shown the direct impact of poor housing conditions on the health of the inhabitants. Low temperatures are often associated with increased cardiovascular and respiratory problems, arthritis, rheumatism and weakness of the immune systems. Mold and dampness are harmful to health as they cause bad respiratory conditions and asthma, while potential appearance of radon or formaldehyde results with increased risk of cancer. Apart from the physical, energy poverty causes, also, issues with mental health and taking on certain behavior characteristics such as wearing coats indoors, sleeping with pets or living in only one room to keep warm (Charlier&Legendre, 2023).

The mentioned behaviors often create a sense of shame, anxiety and depression. The most critical cases of energy poor households experience, also, humiliation, stigmatism and disrespect on a daily basis from various sources (neighbors, colleagues, suppliers, sometimes, even, authorities). Some of the situations when such feelings occur are the disconnection by the energy supplier, debts regarding utility bills, inability to wash clothes or dishes due to the lack of hot water, spending the evening in the dark because of the unpaid electricity bill, as well as inability to prepare a warm and fresh meal. Except from the mentioned emotional states, in such cases people feel helpless and incapable of managing the situation (Grossmann&Trubina, 2021).

Stigmatism and disrespect from others cause loss of self-respect and confidence, as well as self-doubt. Most people feel ashamed of the situation they are in and try to hide it from others. Finally, the realization that a "normal" life is not possible leads to a bad self-image, total isolation from the public and severe mental diseases (Grossmann&Trubina, 2021).

Confronted with the inability to provide themselves and their families with decent living conditions, not many people seek help, as they are embarrassed to discuss such sensitive matters with others. Nevertheless, some of them want to be helped to mitigate and, even, get out of the poverty state, so they often turn to families, friends and institutions. Whether to borrow money, wash clothes, get warm or have a decent meal, people know they can count on their loved ones. The possibility to confide to someone they trust raises their confidence and enhances positive thoughts that they do not face this trouble alone. Apart from the families and friends, a good confession subject are

various institutions that can offer advice and support in different ways. But even in these situations, the feeling of dependency is bigger and the self-esteem is lower. Very often this leads to difficult family relations, fights with institutions and feelings of anger, anxiety and low self-respect (Grossmann&Trubina, 2021).

Related to the mentioned, the described emotional states of energy poor households can be mitigated through careful dialogues and advice. Active listening and understanding the emotional states of energy poor households help the neediest individuals to open up about their problems and share their fears. As stated at the beginning, empathy can open many doors if the people see that the interlocutor is capable of feeling compassion, takes their emotions into account and tries his/her best to be supportive. This is often hard, especially if one party is not in the same life situation as the other, but informing about different consequences and giving positive examples of households who won the battle against energy poverty can mitigate the feelings of loneliness, self-loathing and hopelessness. The key in these situations is to be objective, honest and cooperate with professional staff such as the centers for social welfare. If possible, support groups and household visits can help in fostering the communication process and willingness to make a significant change in the current lifestyle.

4. Awareness raising as part of the renovation process

To generate desired results, every good communication process needs to be organized in a professional and motivating way. Just simple conversation with explanations of the activities is, often, not enough to persuade the target groups to start thinking about the energy renovation. Therefore, there are other ways of awareness raising which individually or combined lead to more effective results and positive thinking. Such activities can be divided into classical ones such as workshops and Q&A sessions, as well as into innovative, meaning focus groups, networking and other. In order to have a better insight into the various types of awareness raising activities, they are presented in Figure 4 below.

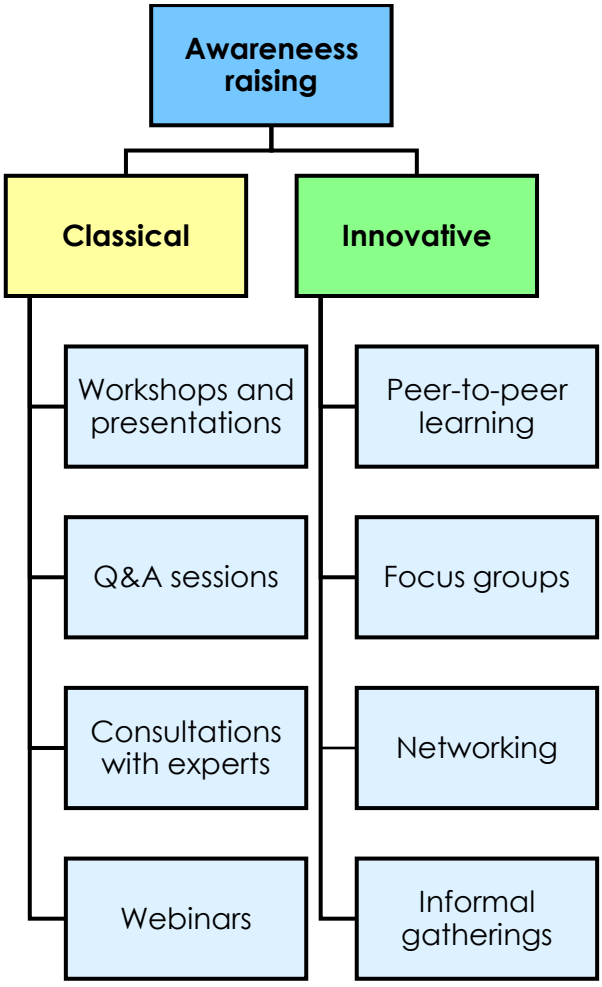

Figure 4: Types of awareness raising activities

Source: Medjimurje Energy Agency Ltd. (MENEA), 2024

Although classical awareness raising activities are the most used because they gather the biggest audience and have the best reach, in some cases innovative approaches might have better effect, since they focus on smaller, more concentrated groups. To better understand the benefits of innovative awareness raising activities, short explanations of them are presented below:

- **Peer-to-peer learning** – a mutual training strategy that involves participants if the same level to collaborative learning. It enables to share ideas with peers and the opportunity to teach and be thought. It can be organized in forms of action groups, debates, discussion groups, coaching, peer mentoring, lunch and learning activities and peer performance reviews. Some of the benefits are connectivity and collaboration, increased productivity, knowledge-sharing, and cost-effectiveness (Gupta, 2022).

- **Focus groups** – a research method that brings together small groups of people to answer questions in a moderated setting. The participants are chosen due to demographic, socio-economic of professional characteristics. Focus groups are less time-consuming and inexpensive and their results are comprehensible and have strong validity (George, 2021).

- **Networking** – an exchange of information and ideas among people with common professional or special interests. It is used to expand circles of acquaintances, increase awareness of news and gather additional knowledge in a certain field. It occurs spontaneously when two or more like-minded individuals meet (Kagan, 2024).

- **Informal gatherings** – they are more free form than formal gatherings, but rely on common understanding between participants. They allow more interaction, creativity and are best suited to a more relaxed setting. Some of the occasions when they are, mostly, used are when the topic requires brainstorming and discussion, providing feedback or seeking input, as well as when the same group of people meets often. Due to their casual aspects and no formal agenda, they can occur during various daily activities (Indeed Editorial Team, 2023).

Apart from the mentioned, other awareness raising activities can be using crucial messengers as advisors and media campaigns to indicate the benefits of a certain process (in this case the energy renovation). Crucial messengers in such situations can be energy consultants or agencies and building managers (or homeowner associations). Furthermore, tailoring key messages for different target groups helps to overcome barriers they face before, during and after the renovation process. This way step-by-step renovations can be promoted among young homeowners and tenants, since these are less costly and easier to implement. On the other hand, large scale renovations may suit better to the daily routine of elderly homeowners (European Environment Agency, 2023).

Finally, post-renovation trainings are an essential aspect of energy renovation, as they help to ensure that the measures are implemented and used properly. Providing training about the new installed technologies and systems has proven to be effective in addressing the insecurity of the target groups and helps reduce the energy consumption. Furthermore, providing training to the technical staff which carries out the renovation ensures that the measures are implemented correctly and all benefits are about to be realized. This, also, addresses the issue of hiring unskilled installers and contractors, whose low knowledge can lead to poorly installed renovation measures and reduced energy efficiency potential (European Environment Agency, 2023).

Apart from the practical activities, the project CEESEN-BENDER implies, also, awareness raising in the forms of workshops and Q&A sessions for building managers (or homeowner associations), homeowners and tenants. The mentioned activities are aimed at discussing the topics of air quality measurements, technical solutions for energy renovations, positive and negative effects of the process, as well as possible financing solutions for such projects. Also, they give the participants the possibility to raise questions, share their concerns and discuss the topics of energy efficiency with a wider group led by professionals. Some of the main issues that have arisen during the workshops (that were collected from the partner organizations of the project CEESEN-BENDER) are connected to dissatisfactions with the approach of the national authorities towards financing the renovation projects, insufficient and inaccessible financial options, lack of transparency from energy providers and bad living conditions due to old and dilapidated buildings. Furthermore, the participants of the workshops and Q&A sessions expressed concerns regarding poor communication with the technical staff and the need to pick reliable contractors, which can support the process from the planning and designing phase up to the works themselves, especially regarding the set deadlines and cost estimates.

In order to mitigate the participants' negative perspectives, the workshops and Q&A sessions aimed to highlight the benefits of energy renovated MABs, starting from improved living conditions (such as air quality with CO_2 emissions, relative humidity and indoor temperature), more efficient technical systems, insulation of the envelope and higher building performances in general. Furthermore, soft measures and energy saving tips such as use of energy efficient systems and appliances were shared to foster behavioral changes and contribute to a more rational use of energy, as well as better cost management and adjustment. Topics related to the use of developed tools for comparison of energy providers, building prioritization and return on investment (ROI), as well as starting discussions about the potential for creating energy communities were used to mitigate the negative emotions related to energy renovations and bad effects of energy poverty in MABs. Also, to ensure a deeper trust level and communication, the participants (mainly homeowners and tenants) were offered services in forms of consultations, advice and project progress updates from supporting organizations, expert visits to energy poor households for support and presenting opportunities, site visits to energy renovated buildings to show best practice examples, as well as presentations of energy efficient technical systems and equipment for sharing information and experiences.

Finally, the overall aim of these gatherings is to give the participants the chance to express their thoughts and dilemmas, as well as to guide them through the decision-making process regarding the energy renovation. These activities should help to foster better collaboration between the building managers (or homeowner associations), supporting organizations and target groups, shape their mutual trust and strengthen their collaboration.

5. Conclusion

Residential buildings are proven to be one of the biggest polluters in the world. Their worn-out construction, permeable carpentry and outdated systems result with GHG emissions, high losses of energy, increased costs for utilities and maintenance, health issues and conditions, social isolation, decreased real estate value and bad emotional states of the residents. To tackle the mentioned issues, more and more buildings undergo the energy renovation process to increase their energy efficiency level.

Measures and techniques such as insulation of the buildings' envelope, replacement of the technical systems, installation of RES and greening of the building and its surrounding has multiple benefits not only for the homeowners and tenants, but also for all other stakeholders involved into the process, as well as significant positive impacts on the environment. Energy savings, decreased costs, better living and health conditions and comfort are just some of the main benefits that, ultimately, result with improved physical and mental states of the residents, as well as increased real estate value of their properties.

Nevertheless, the energy renovation is not a simple process. It involves significant financial, human and time resources, as well as effort, patience and initiative that not everyone is willing to show. Apart from the mentioned, the renovation implies the cooperation of different stakeholders such as homeowners and tenants, their representatives, building managers (or homeowner associations), technical and supporting staff, financial institutions, national, regional and local authorities and others, which do not, always, have the same view and expectations of the process.

The lack of information and knowledge often leads to barriers such as uncertainty, fear, anger, distrust, resistance and disinterest. These human and behavioral challenges can be mitigated by honest communication and awareness raising, which opens up the possibilities to share knowledge, express emotions and dilemmas, as well as to jointly find solutions for the presented problems and go through the energy renovation process together. Motivation is especially difficult when the household is confronted with energy poverty, meaning the inability to cover the basic energy expenses due to insufficient incomes and low energy efficiency. In these cases, a special empathic approach is needed, having in mind the emotions, social and financial states, as well as possible negative reactions of the target groups.

Finally, the financial burden, lack of adequate technical staff, complicated administrative procedures and, even, insufficient financing options can demotivate the target groups from engaging in the renovation. Therefore, is it crucial to form constructive support systems that, through communication, awareness raising activities, sharing knowledge, experiences and expertise, as well as practical examples shape the joint opinion of the homeowners and tenants and motivate them to be more productive, considerate and open about the new changes that the energy renovation brings them.

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