Socio-economic analysis of the residential building stock in Budapest

Projekt: Budapest CARES - Climate Agency for Renovation of homES
Deliverable number:
Work package: Residential building renovation master plan with renovation package
Lead partner: F4Ster
Authors: Éva Gerőházi, Nóra Katona, Hanna Szemző, József Hegedüs, Nóra Teller
Date: 31.05.2024
Status: draft

This project has received funding from the H2020 Research and Innovation Programme under the grant agreement n°101036519.

Disclaimer

Table of Contents

1 EXECUTIVE SUMMARY 4
2 INTRODUCTION 6
3 METHODOLOGY 6
4 RESULTS 8
4.1 Main technical characteristics of the surveyed housing stock 8
4.1.1 General characteristics 8
4.1.2 The worst performing building stock 12
4.2 Main social characteristics of the surveyed households 14
4.3 Who are the active property owners? 15
4.4 Renovation needs 17
4.4.1 Family houses 18
4.4.2 Apartments 19
4.4.3 Multi-family buildings 19
4.5 Financial scope of interventions 20
4.5.1 Willingness to pay for the renovation of family houses and flats 21
4.5.2 Willingness to pay for the energy efficient renovation of common spaces 21
4.6 Energy poverty 23
4.6.1 Not able to keep home adequately warm 23
4.6.2 Having arrears 25
4.6.3 Having high rate of energy costs 25
4.7 Roles of the Climate Agency 27

1 Executive summary

The current study summarizes the findings of an in-person household survey that was implemented in October-November 2023 in Budapest. The survey, which is representative for the housing stock of Budapest, aimed at gaining insight into the attitude of homeowners about the energy efficient interventions in their flats and buildings.

The survey shed light on the generally passive attitude of homeowners when they were asked about planning any type of renovation measures in the next 5 years or consider it necessary to implement energy efficient projects in their property. Only 6% of the owners both in the family houses and the multi-family apartment buildings (MFABs) plan to implement any type of interventions in the coming 5 years in their house or flat, most of which are not even energy related. They are typically about painting the walls and upgrading the kitchen and the bathroom. In case we add to this number those, who at least would find necessary to implement energy efficient interventions in the house or in the flat, then this rate goes up to 28.8% in the family house sector and 20.3% with regard to the apartments in multi-family buildings. Thus, 71-80% of the respondents are not considering any type of interventions (be it energy related or not). In the case of multi-family apartment buildings, about 40% of the owners realized the need to make interventions in the common parts of the building, which means that the majority of owners could not mention anything as a technical need.

This overall passive approach can be caused by two major factors according to our hypothesis:

- 1) the autumn of 2023 was the peak of inflation in Hungary after a year of economic decline, thus people might have been devaluing their financial possibilities.
- 2) additionally, the results of the survey show that people tend to overestimate the physical state of their buildings, which keeps them from supporting interventions (e.g. about 40% of multi-family apartment owners consider that their building meets the current energy standards or good enough not to necessitate interventions).

The detailed analysis highlighted, that the reasons behind being ‘active’ (planing or considering interventions) are different in the three main sectors: in the family housing sector the more active are not better off, but live in buildings that are ina worse technical state and their major reason for renovation is to fix the deficiencies and replace the systems that are broken. Thus, the major cause of their ‘activism’ is a technical necessity. In case of the flats of multi-family buildings income and accumulated savings become much more important and the purpose of the interventions are more about increasing the comfort level of the flat. Thus ‘activism’ in this sector is more desire driven. With regard to the multi-family buildings, the need for the renovation of common spaces comes from technical needs again: those respondents tend to complain more about the building, who live in a building of worse condition.

The general reluctance towards renovation is reflected by the fact that only 15.4% of the multi-family building residents reported willingness to financially contribute to the energy efficient renovation of their buildings. As it was mentioned before, about 40% of them think such an intervention is not necessary as the building has good enough energy characteristics, while about 10% would contribute in case a high (at least 50%) subsidy would be available, and 20% would not enter into the renovation even with subsidies due to the complete lack of household’s financial resources.

The situation in case of family houses and multi-family flats seems to be a bit better, as about 12-15% of the complete segment would start an energy efficient intervention in case 30-40% subsidy would be available. All together it may mean 120-150,000 households.

In order to gain a better understanding about the housing stock in Budapest, we defined seven major housing segments : 1) family houses built before 1946, 2) family houses built between 1946-1990, 3) family houses built after 1991, 4) multi-family buildings built before 1946, 5) multi-family buildings built between 1946-1990, 6) multi-family buildings built after 1991 and 7) buildings built by prefabricated panel technologies. 80% of the housing stock in Budapest belongs to the last four categories, thus are multi-family apartment buildings (MFABs).

Each of these segments have somewhat different characteristics. The ones built after 1991 are in the best physical state and have the most favorable social composition as well (regarding education and financial state of households). Buildings built between 1946-1990 are very diverse both socially and technically and can have different characteristics based on which area of Budapest they are located and how deeply they are renovated. Panel buildings in general reflect the strong average of all buildings both regarding their technical state and social attributes. Buildings built before 1946 are in the worst technical state in general (according to the judgment of the owners), but while it generates affordability problems in the case of family houses (highest rate of energy poverty), it seems to be more manageable on household level in the multi-apartment building sector. The number of apartments is the highest in the multi-apartment building sector constructed before 1946 (a bit higher than in the panel building sector). This housing stock is also very special for the cityscape of Budapest, and it seems that the owners of these apartments are the most open to renovations. This means that 25.67% of them plan or desire interventions inside their flats, 46.68% would consider renovations that are necessary on building level, and the residents of this sector are the most receptive to technical assistance with regard to technical and organisational issues.

Even if each of the seven sectors have their specialties, we have to emphasize that all of them include tens of thousands of households that have somewhat different approaches, financial and technical capacities. Thus in case limited public funds are available, it won’t be the housing segment that decisive from a social point of view. Rather the fact, that in each segment there are thousands of families who are either more open to the renovation measures or more in a need of help.

2 Introduction

The study presents the results of an in-person survey with a sample of 2009 households, implemented in autumn 2023 in Budapest. The aim of the survey was to get a closer insight into the attitudes of homeowners with regard to the energy efficient interventions in the family houses, multi-family apartments and multi-family buildings. The survey aimed to provide a foundation for the operation of the newly established Climate Agency of Budapest to identify certain entry points in assisting the home owners to implement energy efficient interventions.

The survey was designed to be representative of the housing stock of Budapest in order that we can understand if there are certain housing segments which represent high potentials for energy efficient interventions or if there are segments that require intense assistance to be able to start the renovation process.

The current study first describes the major technical and social characteristics of the surveyed housing stock and households. Then we analyse where the active property owners can be found, consider those ones active who plan to implement renovations measures or at least consider them necessary. Afterwards we list those interventions that were implemented or desired by the owners to gain knowledge about technical considerations of owners. As a next step we turn to the implementation and think of how the renovation measures can be financed, what is the attitude of owners towards payment and subsidies. We also deal with the multi-faced problem of energy poverty as a social aspect of interventions and we finally conclude in providing insight into what owners would need as information or assistance from any public bodies.

3 Methodology

The in-person survey, asked at the households premises, was implemented between 13 October to 7 of November 2023. It covered 2009 households of Budapest that were all owners of their house or flat. Acknowledging the fact that about 15-20% of households are tenants in Budapest, we might have decided to include tenants to the survey as well, but we decided to focus exclusively on owners as they have the legitimacy to decide on renovation investments in the property. Taking into account that this survey was designed to lay down the foundation of publicly supported energy efficient investment decisions, we had to exclude tenants.

The survey is representative to the housing stock of Budapest, that was secured by three quotas in the process:

- 13 main building types of the Budapest housing stock (4 categories of family houses and 9 categories of the multi-family buildings),
- Age distribution of the adult population of Budapest, according to which the respondents were grouped to three categories (from 18-39, 40-64 and from 65),
- Share of the housing stock of each district compared to the total of Budapest.

The quotas were set according to the Census of 2011 (as the results of the Census from 2022 were not available in autumn 2023).

The surveyors had to follow a standard questioning procedure: start from a randomly appointed public space and then turn to a certain direction and choose every second building. Only one questionnaire could be completed in each multi-family building in order to cover the widest possible variety of buildings.

The survey meant to be representative with regard to the housing stock of Budapest. One way of checking this is the results of the sample compared to the Census (already the one from 2022) with regard to some indicators that were not part of the quota system but can be extracted from both databases. As the figures below show, even if the survey was made on the basis of the Census from 2011, its results are close to the Census of 2022 when we compare simple characteristics like the main ways of heating or the types of walls.

Figure 1. Comparison of the Census of 2022 and the sample based on the heating types

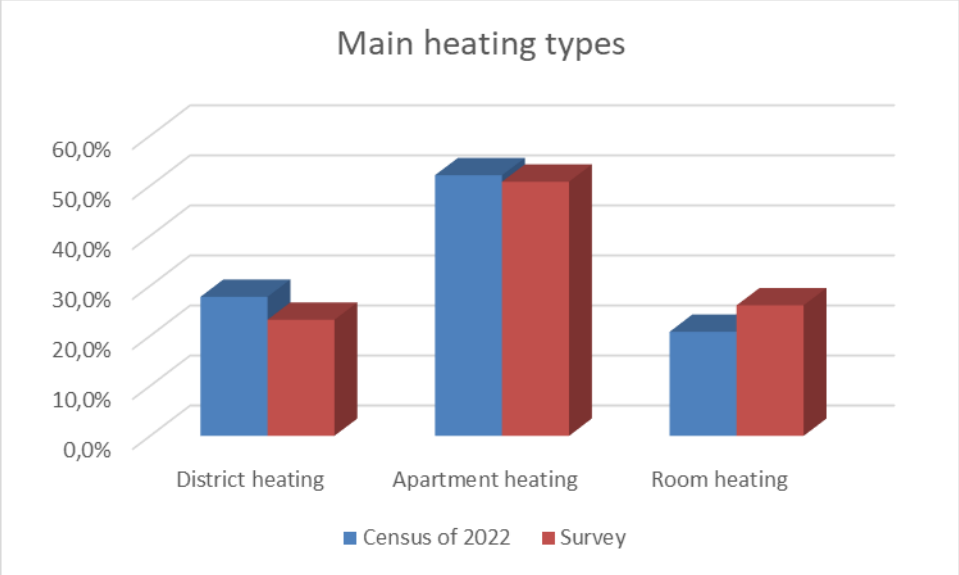
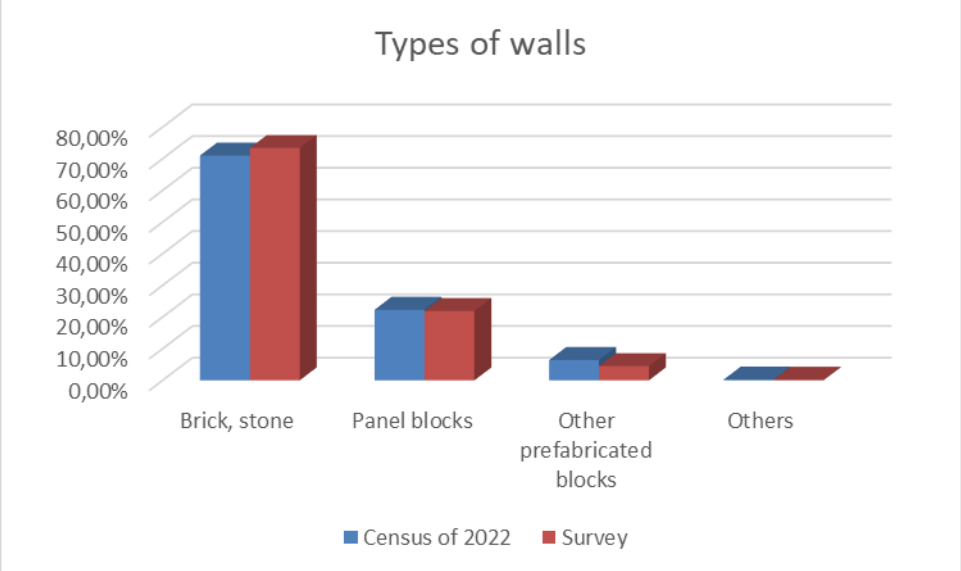
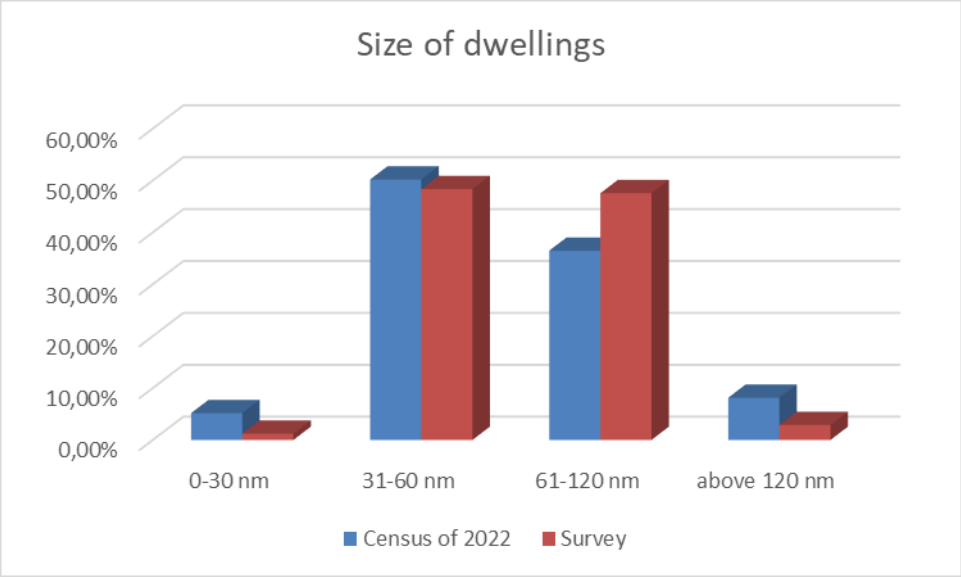


Figure 2. Comparison of the Census of 2022 and the sample based on the types of walls



The figures show that the survey can be considered representative in general, however there might be slight differences with regard to the size of the flats, where the smallest and the largest dwellings are underrepresented in the sample.

Figure 3. Comparison of the Census of 2022 and the sample based on the size of dwellings



One of the causes might be the exclusion of tenants from the survey, who are generally overrepresented in the smallest and in the largest housing stocks. In addition, methodologically it is the most difficult to make a household interview with the most affluent people living in the biggest apartments, which is why the high end sample is usually underrepresented in surveys. Taking into account all these information on representativity there was no need to apply secondary weighting before starting to analyze the results of the survey.

We have to emphasize that the sample can be considered representative for Budapest, and certain segments of the housing stock can be compared by means of it. On the other hand the sample is not representative for individual districts or any smaller area of the city as it would have requested a much bigger sample size.

4 Results

4.1 Main technical characteristics of the surveyed housing stock

4.1.1 General characteristics

Respondents were asked about the main technical characteristics of their house, flat or building concerning the heating system, windows or insulation. We have to note that these statements should be handled with caution, as the respondents were not technicians, thus could easily misinterpret the actual technical conditions of their buildings.

Figure 4. Primary heating source in family houses

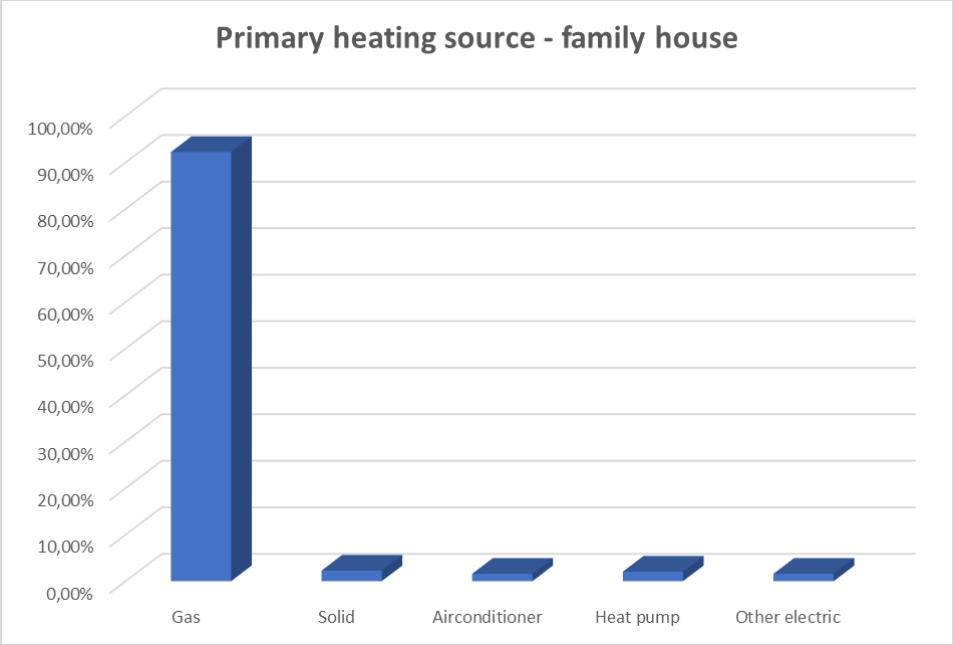
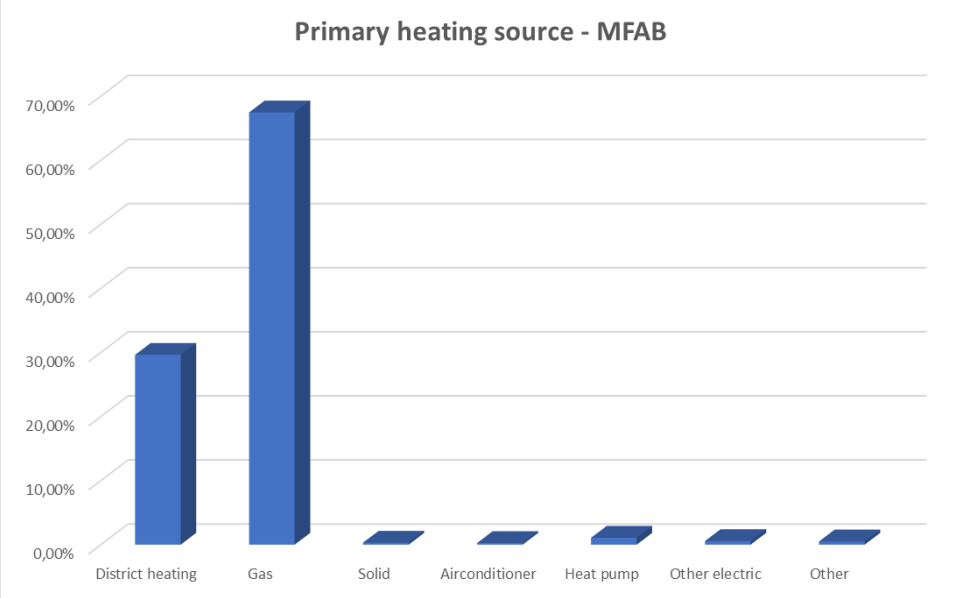


Figure 5. Primary heating source in multi-family apartment buildings (MFABs)



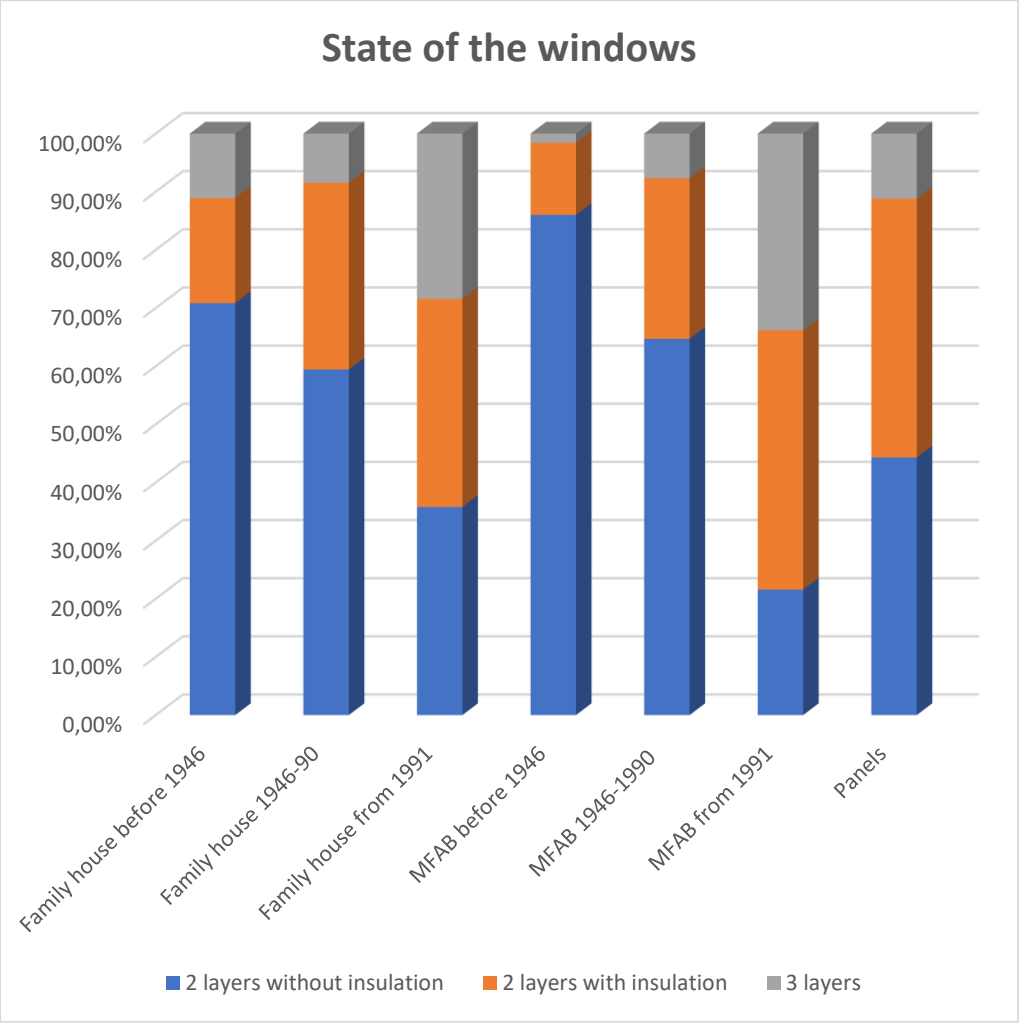
As the survey (and also the national Census) proves, **the primary heating source of the housing stock in Budapest is gas**. It takes 92.24 % in case of family houses, while 67.45% in case of multi-family buildings, where district heating takes the second place with 29.62%. Gas heaters are split between traditional gas boilers, condensation boilers and convectors. According to the survey 41.9% of the gas boilers are condensation boilers in case of multi-family buildings, while 38.8% in family houses. This high rate should be treated with caution, considering that even if only condensation boilers can be installed since January 2016, their application is quite expensive due to the additional costs of installing new chimneys, new pipes and obtaining the needed permits. It is a rather complicated process in case of

multi-family buildings (due to the requirement of special chimneys), which is why households tend to repair their original gas boilers as long as it is possible instead of installing a new one.

The figures also show that solid fuels are extremely rarely applied as primary heating sources (0.3% in case of multi-family buildings, while 2.28% in case of family houses). Still, solid fuel stoves and burning of different solid materials (including garbage) is a problem mainly in the outskirts of Budapest, as few households can cover wide areas with pollution easily.

Air conditioners are only complementary heating sources in the Hungarian climate, while heat pumps are getting to be more and more popular, mainly in newly built residential buildings (taking up 1.3% of the heating source currently).

Figure 6. Structure of windows

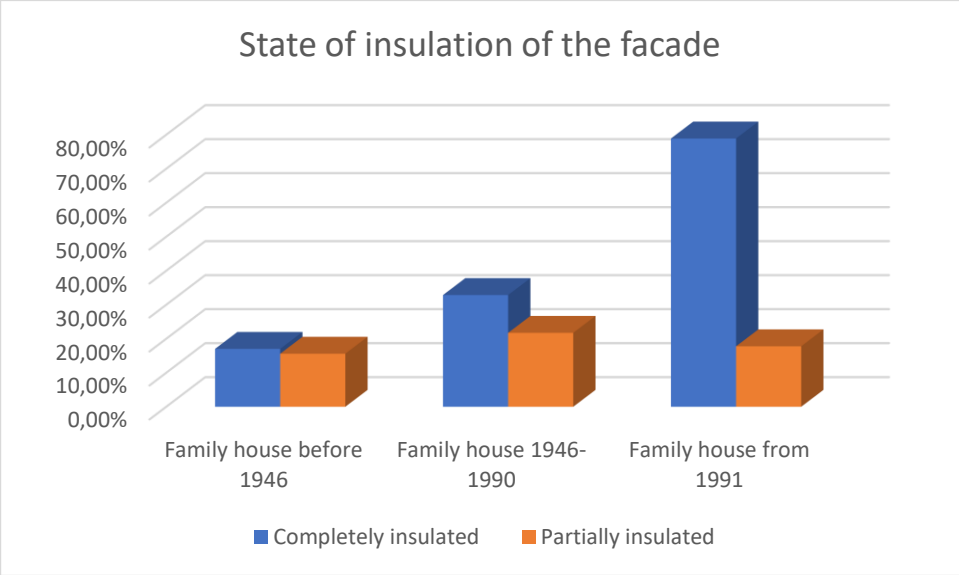


With regard to the state of the windows, their technical characteristics are in line with the age of the building: the outdated, two layered windows without insulation are mostly used in family houses and multi-family buildings built before 1946 (70-86%), while the three layered windows are mostly applied in buildings constructed after 1991 (28-33%).

The state of the buildings with regard to their insulation is an important indicator of the energy efficiency of the building stock. The state of insulation was differently asked in the questionnaire in case of family houses and multi-apartment buildings. In case of family houses the figure nicely shows that nearly all family houses built after 1991 are either completely or partially insulated. This comes from the higher

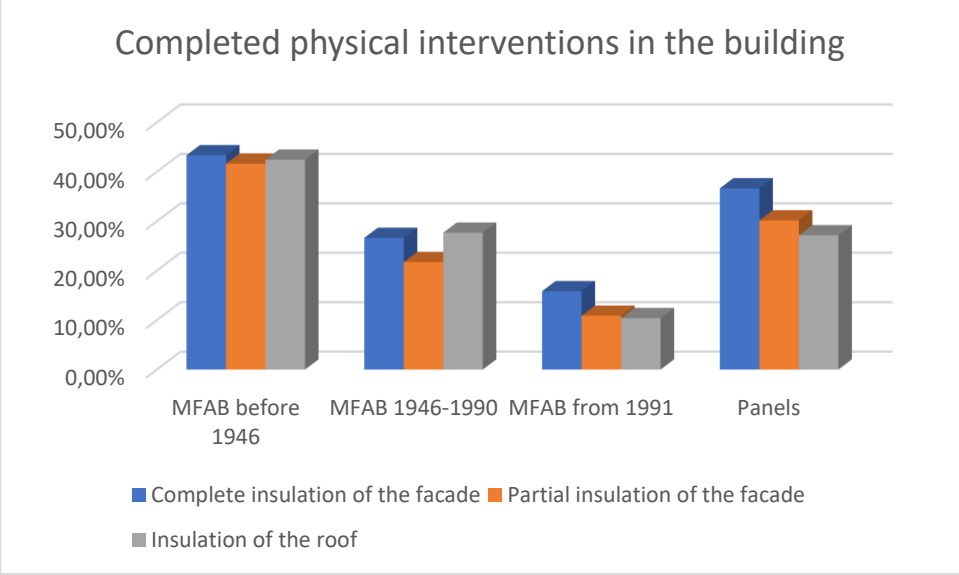
energy standards. One third of the family house segment that takes up the majority of this type (the ones built between 1946-1990) is also completely insulated according to the opinion of the owners. The lowest rate of insulation can be experienced in the case of the oldest family housing segment, built before 1946. More than 80% of these insulations were reported to be implemented more than 10 years ago, thus even if they were realized, they may not need the current technical standards.

Figure 7. State of insulation of the façade – family houses



As regards the multi-family buildings the survey asked if certain interventions were completed either in the last 10 years, or earlier, or any time. As the figure below shows, the newest buildings were insulated the least, as according to their construction standards they may not have needed additional insulation.

Figure 8. State of insulation of the façade – multi-family buildings



MFABs built before 1946 seem to be insulated the most, which statement raises uncertainties, considering the fact that most of these buildings can not easily be insulated from their external part, either due to their protected status or complicated facade layout. We have the suspicion that in this building segment the owners may have mixed the insulation with painting. While in the case of the panel buildings the 36.7% of complete insulation may be a valid statement as these buildings are not painted without insulation, so any visual change in their exterior refers to insulation.

What is important to note however, is that we also asked the owners about the types of interventions that were completed in their building in the last 10 years. Based on the answers it seems that only 17-18% of the complete or partial insulation has happened in the last 10 years, thus most of these interventions were implemented before, just like in case of family houses, which means that the quality of insulation most probably does not meet the current energy efficiency standards.

4.1.2 The worst performing building stock

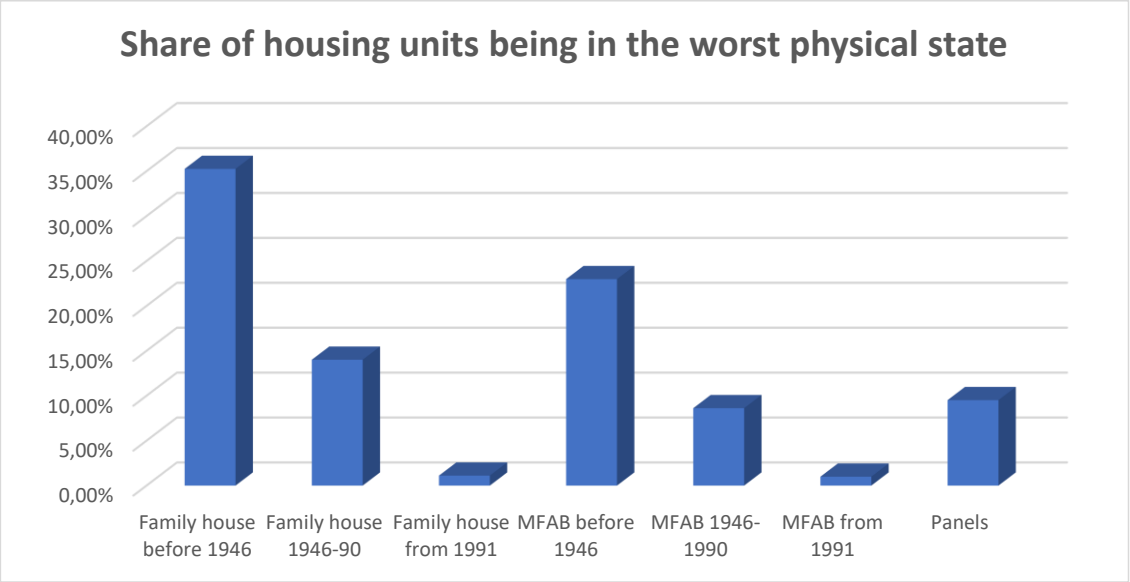
The Energy Performance of Buildings Directive (EPBD), the recast of which was accepted in the spring of 2024 by the European Parliament and the Council, puts special emphasis on the 43% worst performing buildings, which should result in 55% of the primary energy saved by 2030. The survey did not provide a proper foundation to select the worst performing building stock in Budapest based on the answer of the respondents as the owners are generally not experts on energy performance and o**nly 8.4 % of the multi-family apartment owners and 15.13 % of the family house owners indicated to have an energy performance certificate for the property**. Most of these certificates were above DD and only a few of them belonged to low performing buildings.

On the other hand we asked the owners to evaluate the general state of their property, they could choose between four options: 1) the building is in an excellent state, 2) the building is in an acceptable state, 3) the state of the building is strongly deteriorating, 4) the building is practically out of order, the technical problems endanger the everyday operation.

We wanted to understand where the worst performing building segments are, about which the owners stated to be either in the 3th or 4th category. This segment in general takes 14% of the housing stock according to the evaluation of the owners.

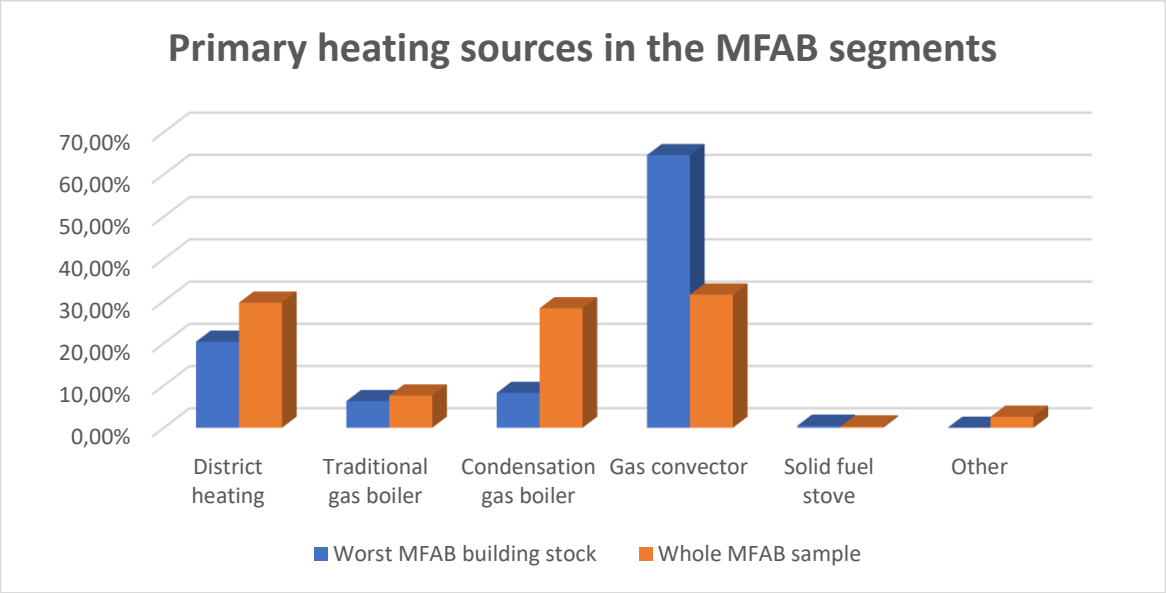
The following figure shows that the share of properties that have the lowest technical performance are in the older building categories both regarding family and multi-family houses, however family houses are proportionally more affected.

Figure 9. Buildings in the worst physical state



Comparing the heating source of the worst building stock to the whole sample it becomes obvious, that the low performing individual heating solutions (gas convectors) are highly overrepresented in the worst performing segment of the sample both in case of multi-family and family houses. This is linked to the age of the buildings and the neglect in modernizing the heating systems inside the apartments.

Figure 10. Comparative analysis of heating sources



There is a common belief by the European decision makers, that the worst performing buildings are inhabited by the less affluent owners thus physical deterioration and social deprivation goes hand in hand. There seems to be a correlation between the two, however the link is not straightforward. The share of households with lower than 400.000 HUF (1 040 EUR) net income/month is about 10 percent point higher among households who reported to live in buildings with the worst technical conditions (55.4% instead of

44% in multi-family buildings and 46.6% instead of 36.87% in case of family houses). The application of a linear regression model reveals that not specifically the low level of income which is decisive in living in the worst rated building segment, rather the perception about the income: **people considering that their income is not enough to make a living are more likely to live in dilapidated buildings**. These people also have a lower level of education (not having maturity), and tend to be older in case of multi-family buildings.

4.2 Main social characteristics of the surveyed households

The social structure of the households in Budapest are presented in various studies. Our aim was not to duplicate these results, rather to link the technical characteristics of the housing stock to the social characteristics of the households in order to specify certain segments as entry points for renovation.

As was already described, the survey was conceptualised to be representative to 13 building types, which were finally merged to seven major types. Acknowledging the varieties inside these seven building categories, the following figures give us the opportunity to draw some generic conclusions.

Figure 11. Share of low educated in the sample

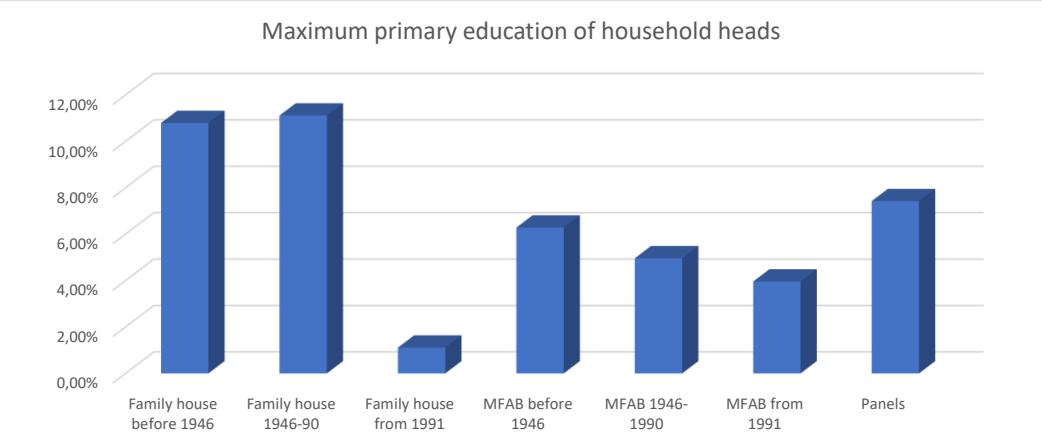


Figure 12. Share of highly educated in the sample

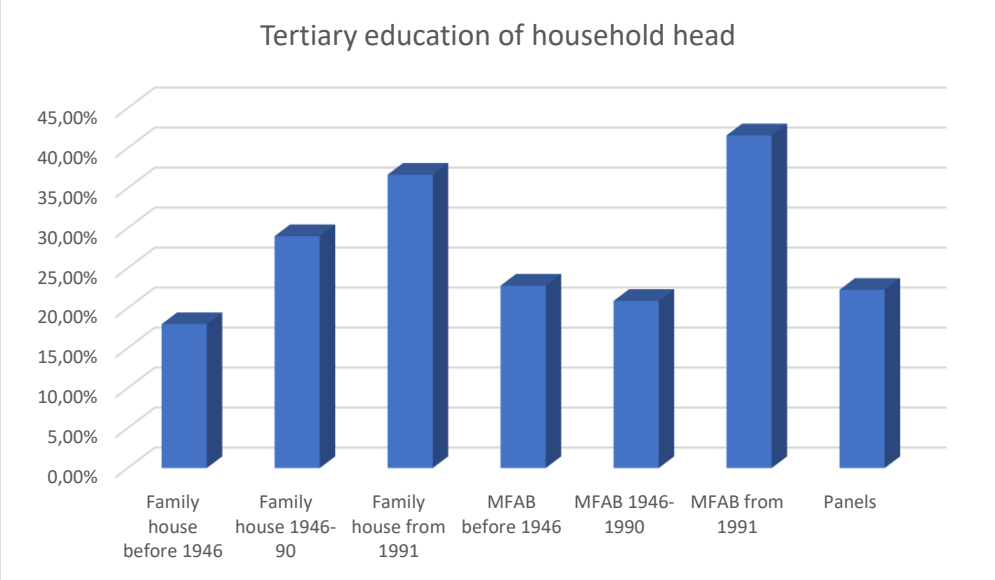
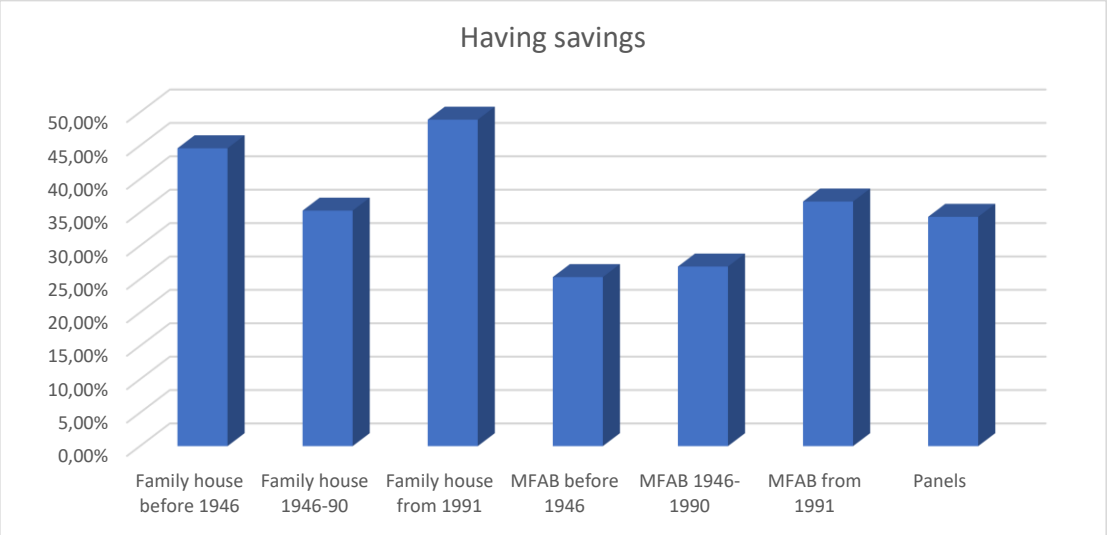


Figure 13. Share of households reported to have financial savings



In combining the results of the three figures above we may formulate some major statements:

- **The social status of residents with regard to the multi-family apartment buildings built by traditional building technology seems to go hand in hand with the age category of the building: the newer the building category is, the higher the social status of the residents are**. It means that there are fewer undereducated (maximum primary education), more highly educated (having tertiary education) and wealthier (having savings) residents in buildings built after 1991 then in buildings built in the former age categories.
- In the case of the family houses, the statements can be more colorful. **It is obvious that the owners of the newest family houses (built after 1991) have the highest social status in the whole sample:** they have nearly the highest rate of highly educated, the lowest rate of undereducated and the highest share of households with savings. On the other hand, family houses built before 1991 seem to be more heterogeneous: while the owners have substantial savings, they have the highest rate of undereducated households, and a modest rate of highly educated, mainly in family houses built before 1946. Comparing it with the age characteristics of household heads it is probable that the oldest family housing stock in Budapest is in strong transition: it still accommodates the oldest and least wealthy households while it also houses more affluent and highly educated people as well.
- The residents of the panel buildings represent the strong average of the total population.

4.3 Who are the active property owners?

The survey was carried out in autumn 2023, and provides a snapshot from a very particular moment: it reflects the concerns of a society in a deep economic crisis. In connection with this, a nonchalance and **negligence can be observed in the sample about the need for retrofits in Budapest.** This attitude can be observed in all housing segments. Thus:

- only 28.8% of the respondents in family houses plan (with concrete financial backing) in the coming 5 years or at least can think of necessary renovation measures if they had money. This ratio is even lower, 20.3% with regard to the renovation of flats in multi-family buildings. **Thus 71-80% of the respondents were not considering any type of interventions** (be it energy

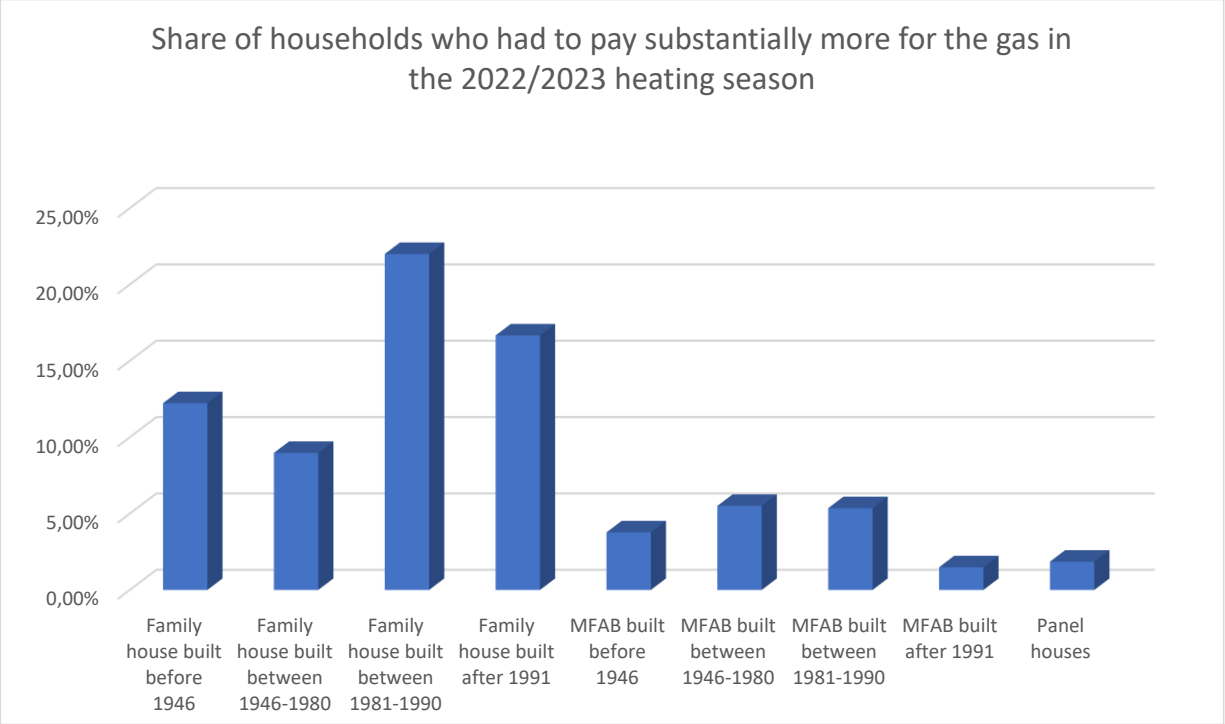
related or not).

- With regard to the renovation of the common spaces of multi-family buildings, there seems to be a higher interest: 39.3% of the respondents identified some renovation measures that should have already been implemented in the building. This ratio also highlights that **most of the respondents could not even formulate a critique about the building**.

This relatively low visibility of renovation needs can partly be explained by the assumption of the owners, that their property is in a relatively good shape: 81% of family house owners considered that their property is in excellent or acceptable physical condition, while it was 87% with regard to the state of the multi-family buildings.

Contrary to expectations, changes in the energy price structure at the end of 2022 seems to have had a low impact on renovation assumptions. The explanation lies in the way the new price structure was implemented. As it is visible from the figure below, family houses have been much more affected by the gas price increase (most probably due to their larger floor area - which is the largest in family houses after 1981 - and large external envelope). Most of the housing stock however (about 80%) in Budapest consist of multi-family apartment buildings (MFABs), the residents of which did not experience substantial change in their costs for gas in the 2022/2023 heating season. As a result, they were not encouraged to implement energy efficient interventions to reduce costs.

Figure 14. One of the results of the reduction of gas price subsidies



When analyzing the attributes of those households who plan or at least 'dream about' renovation measures (from now on we call them '*Active*' households) we can observe significant differences between family house and apartment owners.

- For family house owners this attitude is strongly linked to the physical needs of the buildings. Active households live in physically worse buildings - according to their own judgment - while their social status is not higher than that of the 'Passive' owners. (They do not have higher

household income, they do not have less arrears in housing costs, they do not have higher or very specific vocational education). When asked about the reason behind the planned interventions, the most frequent answer was: “the need for urgent repair”. **Thus the ‘activism’ of family house owners is based more on the need for intervention into their buildings and less about their financial capacity.**

- For **apartments in multi-family buildings** the trend seems quite the contrary: interventions are more motivated by individual desires and financial capacity. Even if the rate of Actives is higher in older and physically worse buildings, the main motivation for intervention is more about increasing the comfort level of the flat and not to make urgent repairs. This is also reflected in the fact that bigger financial possibilities (having higher income and more savings) lead to higher activity level in this segment: **thus people with a bigger financial capacity implement interventions primarily to increase their comfort level.**

The ‘activism’ with regard to the interventions in the common spaces of multi-family buildings can not be measured by the same indicators (as the owners do not act alone, but as part of a community). One way to define active residents is to look at those, who can name at least one renovation intervention that would be necessary for the building. Another option is to evaluate those respondents, who are willing to pay to improve the physical condition of the building (this later topic is analysed in section 4.5.2 in detail)

The fact, that someone mentioned at least one measure that should be implemented in the common space of a building can be interpreted in two ways: 1) on the one hand it can indicate those respondents who care about their building, have the needed information and realize if something should be fixed, 2) on the other hand it can indicate that these buildings are in the worst condition and should be renovated first. Both interpretations can be true simultaneously, but the data supports the second approach more.

The survey results show that those respondents articulated more renovation needs, who live in buildings in worse physical conditions, based on their own judgment. The other results of the survey also strengthens the hypothesis that **listing at least one physical measure to fix at the building roots from the technical difficulties and not from being better informed.** Those respondents who were more active in the operation of the building (were part of the supervising committee, attended the general assemblies, or have information about the financial flows of the buildings) listed fewer interventions, than the less active ones. Those respondents however, who consider that their building community is not managed properly, and they do not participate personally in the operation of the building (e.g.: the property manager does not represent the interest of the owners and the needed actions are not taken promptly, the respondent do not attend general assemblies and can not follow the financial flow of the building) named much more physical interventions that should be implemented. (However it is fair to say, that even if the passive owners tend to complain more about the state of the building, 60-64% of the owners stated to be active: attend general assemblies and follow the financial matters of it, and even if they complain less, the majority of people being critical about the renovation needs are from the later group.).

4.4 Renovation needs

As was mentioned before, the vast majority of the respondents could not mention any renovation interventions that should be implemented in their building or flat. Still, it is important to analyze the type of interventions that were 1) most commonly implemented in the last 10 years 2) most commonly planned - meaning that there was available financing, 3) most frequently desired - beyond the financing possibilities.

4.4.1 Family houses

The most common interventions implemented in the last 10 years were:

1 Painting of the walls (105 mentions)
2 Changing of doors and windows (94 mentions)
3 Renovation of the kitchen or bathroom (84 mentions)
4 Improvement of coverage (63 mentions)
5 Partial or full insulation of external walls (47 mentions)
6 Installation of air conditioners (46 mentions)

The preference list is the same in each age category of the family houses, which means that most of the interventions aimed to increase the visual quality of living rather than increasing energy efficiency.

The most common interventions planned in the coming 5 years (with the necessary financing available) were:

1 Change of windows and doors (10 mentions)
2 Renovation of the kitchen or bathroom (7 mentions)
3 Partial or full insulation of the external envelope (6 mentions)
4 Changing the heating boilers/convectors (5 mentions)

While the most desired energy efficient interventions above the planned ones (or even in case nothing is planned) were:

1 Change of windows and doors (46 mentions)
2 Partial or full insulation of external walls (36 mentions)
3 Changing the heating boilers/convectors (31 mentions)
4 Insulation of the roof slabs (28 mentions)
5 Installing solar panels (28 mentions)

As regards the energy efficient interventions that the owners would consider necessary, there is a clear age distinction experienced: while **insulation and window change is the most important need articulated in case of family houses built before 1991, the installation of solar panels and heat pumps are in the center of attention in case of the more modern buildings**, which is understandable taking into account the higher energy standards of the modern building envelopes.

As the lists show, the measures that were implemented in the last 10 years in family houses were primarily of 'beautification' nature. At the same time the planned measures (where the availability of budget was considered) focus more on energy efficiency. When considering the desired energy efficiency interventions (without budgetary constraints) **the "energy efficiency first" principle seems to be acknowledged by the respondents**, according to which the energy consumption should be considered first, before the energy source is installed. The survey findings thus show that this primary message about energy efficiency has reached public consciousness (at least in that specific segment, which prioritizes renovation and energy efficiency).

4.4.2 Apartments

The most common interventions implemented in the last 10 years were:

1. Painting of the walls (613 mentions)
2. Renovation of the kitchen or bathroom (382 mentions)
3. Changing of doors and windows (328 mentions)
4. Installation of air conditioners (153 mentions)

The same interventions were implemented in all four major categories of multi-family apartment buildings, which means that the preference of owners to increase the visual quality of the flat was the same, no matter when the flat was constructed.

The most common interventions planned in the coming 5 years (with the necessary financing available) were:

1. Painting of the walls (41 mentions)
2. Changing of doors and windows (35 mentions)
3. Renovation of the kitchen or bathroom (32 mentions)
4. Installation of air conditioners (23 mentions)
5. Changing the heating boilers/convectors (14 mentions)

While the most desired energy efficient interventions above the planned ones (or even in case nothing is planned) were:

1. Changing of doors and windows (136 mentions)
2. Insulating the internal walls (62 mentions)
3. Installation of air conditioners (60 mentions)
4. Changing the heating boilers/convectors (34 mentions)

Owners living in flats constructed after 1991 practically do not feel the need to implement energy efficient interventions, while people in older buildings (before 1946) prefer the change of windows and the internal insulation of the flat the most, while people living in buildings built between 1946-1990 go for the change of windows and the installation of air conditioning the most.

4.4.3 Multi-family buildings

The most common interventions that were completed either in the last 10 years or earlier:

1. Painting of the staircases (723 mentions)
2. Complete insulation of the walls (533 mentions)
3. Insulation of the roof (480 mentions)

4 Partial insulation of the walls (466 mentions)

5 Upgrading the engineering system - e.g. elevators, ventilation (434 mentions)

6 Insulation of the basement (431 mentions)

7 Changing of windows in a coordinated way (419 mentions)

The most active category of buildings, where proportionally the most interventions happened were the ones built before 1946, where the most common project was the painting of staircases and the external walls and also the external insulation of walls. Buildings built between 1946 and 1990 applied painting of staircases as well, but the insulation of external walls and the roof was also an important issue. In the case of the panel buildings painting of staircases and external insulation of walls were the most commonly applied interventions, but the coordinated change of windows in multiple apartments were also frequently implemented. In the modern buildings built after 1991 much fewer interventions happened and they also aimed at the painting of staircases the most.

The most common interventions that should have been done but were not:

1 Complete insulation of the walls (337 mentions)

2 Partial insulation of the walls (266 mentions)

3 Modernisation of the heating system (262 mentions)

4 Installation of solar panels (243 mentions)

5 Changing of windows in a coordinated way (242 mentions)

6 Change of pipes (229 mentions)

In buildings built after 1991 the need for energy efficient interventions occurred very rarely - only 3% of the owners could mention any, mainly aiming at the installation of solar panels. The order of preference of energy efficient interventions are differing in the three remaining building categories: while the major issue is the coordinated change of windows and the upgrade of the heating system in the oldest buildings (built before 1946), external insulation is the biggest topic in panel buildings and buildings built between 1946-1990. The installation of solar panels is a preference in the youngest category, while making the heating system measurable is an articulated need in case of the panel buildings.

4.5 Financial scope of interventions

Assessing the cost scope of interventions is difficult to judge since very few respondents were able to provide approximate interventions costs. In case of **family houses**, the few - 18 - respondents, who plan to make renovation in the coming 5 years (and already have the budget for that) estimated the amount around **5 million HUF on average** (ranging between 500,000 and 20 million HUF), which covers energy efficiency and other types of renovation works as well. The ones, who do not plan any interventions but 'dream about' energy efficient measures and could only guess the price (109 respondents) mostly estimated the expenses up to 5 million HUF.

In case of **apartments** in multi-family buildings, the ones that plan any kind of renovation measures in the coming 5 years (72 respondents) estimate the costs to be about 3 million as an average (ranging between 60,000-40 million HUF). The ones that only 'dream about' energy efficiency interventions in their flats (255 respondents) estimate the costs **mostly up to 1 million HUF**.

4.5.1 Willingness to pay for the renovation of family houses and flats

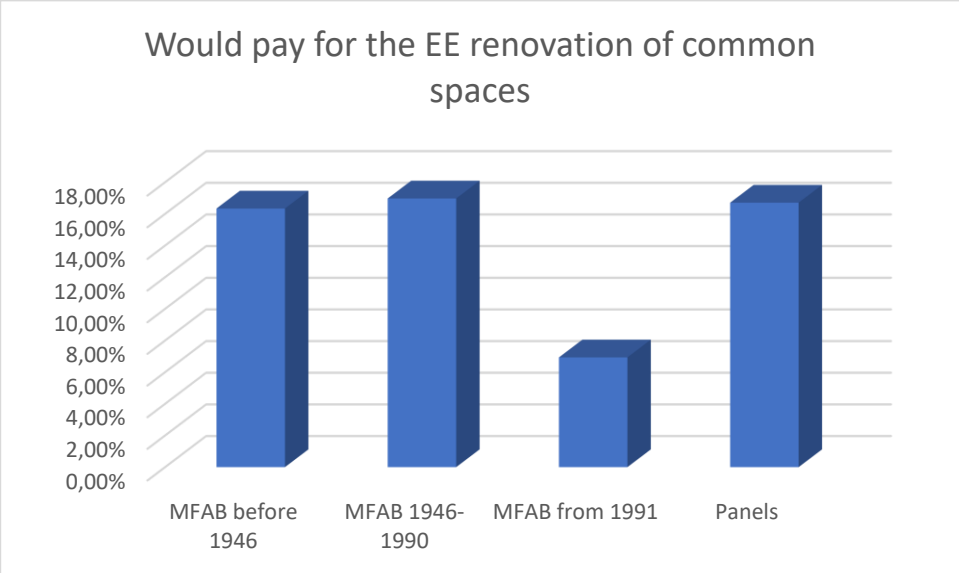
Households were asked to list those energy efficient interventions that they would consider necessary (no matter if they have funds or not). This was already covered in chapter 4.4 They also estimated the potential costs of these interventions. The respondents had the opportunity to evaluate if they would start the interventions in case 30% subsidy could be obtained. 30% of them would start the process in case they obtain a 30% subsidy. Additional 18% would start the process in case of a 40% subsidy. **Which means that 48% of the owners who desire to implement energy efficient interventions could be incentivised by a 40% subsidy**. Transferring this conclusion to the total number of **family house owners** in Budapest it may mean about **20-28.000 households**.

As regards the flats in multi-family buildings, 18,75% of the owners plan to implement energy efficient interventions or feel that it would be necessary to do so. 57% of the owners, who feel the need for interventions would start it in case 30% subsidy would be available. While an additional 19.4% would initiate an energy efficient renovation in case 40% subsidy would be available. Scaling up these rates to the owners of multi-family buildings, **100-120.000 families would start energy efficient renovation in their apartments in case they could get 30-40% public subsidy**.

4.5.2 Willingness to pay for the energy efficient renovation of common spaces

In case of the energy efficient renovation of the common parts of multi-family buildings, **only 15.4% of the respondents who live in these buildings stated that they would be willing to pay for improving the energy efficiency of the building.** As the following figure shows, this rate is quite universal across the four main segments of multi-family apartment buildings, except for the most modern ones (built after 1991), where the owners do not see the cause of paying as they consider it unnecessary to implement energy efficient interventions.

Figure 15. Share of respondents who are willing to pay for energy efficient interventions in MFABs



The structure of respondents with regard to their willingness to pay for the interventions is as follows:

- 15.4% would contribute to the renovation costs
- 27.4% would not pay as they consider that their buildings meets the recent energy standards
- 10.5% do not know whether to pay for the renovation or not
- 9.2% would contribute to the renovation in case a subsidy would be available
- and 37.5% would not change his/her mind on not contributing no matter how much subsidy would be available

Let's analyze these subgroups one by one.

The willingness to pay for the energy efficient renovation (whether someone belongs to the 15.4% group or not) does not seem to depend on the physical state of the building, on who the property manager is (whether any of the owners, or a cooperative or a professional company), or on the level of arrears in the building. The willingness also does not correspond to the number of units in the building (smaller communities are as much reluctant as bigger ones). Analyzing whether the more mobile (moved in recently and/or plan to move away soon) or the less mobile have a higher willingness to contribute to the renovation costs, also does not result in significant statements: they are equally not eager to pay for the interventions.

However one aspect seems to be very important: the operation of the building. **The rate of respondents who are willing to pay for the energy efficient renovation works is substantially higher in those buildings where most of the owners attend the general assemblies, where the owners trust the property manager. Importantly, more active respondents tend to be more willing to invest into the improvement of the common property**, whereby being active is defined to be part of the supervising committee or to attend the general assemblies in person, and to follow the financial flow at the community. Another important attribute seems to be the accumulation of reserves for the building and having a renovation fund: if funds are already available people are more willing to contribute to the renovation. Financial circumstances of the respondents also play an important role: **owners with a higher household income and more savings are more likely to pay for renovation works.** (E.g. 35.8% of the respondents, who are willing to pay for the renovation have savings, while only 6.8% of the non-willing respondents stated to have financial reserves.)

27.4% of the respondents living in multi-family apartment buildings do not want to contribute to the energy efficient renovation of the common parts of the building as they **consider that their building meets the most recent energy standards**. In case we analyze where these respondents live, we might have the assumption that they do not properly evaluate the technical status of their buildings. This consideration is strongly linked to the age of the building, thus respondents living in more modern buildings tend to state that their building meets the most recent standard (e.g. 75.86% of the buildings built after 2018 while 8.11% of the ones built before 1919). On the other hand we can be sure that a building built between 1991-2005 is not able to meet the most recent energy standards even if 50% of the respondents living in those buildings considers so and 22% of these buildings are completely insulated according to the observation of the owners.

Respondents, who stated that they would change their mind about not contributing to the renovation costs in case a subsidy would be available, mostly asked for a subsidy over 70% (62.9%) or a 50% subsidy (18.5%).

The last 37.5% of the owners of multi-family apartments, who stated not to contribute to the energy efficient interventions in the building, no matter if there is a subsidy or not, covers a colorful group. Very few of them consider that energy efficiency is not important (10% of them), they rather think, that their

building technically do not need any energy efficient interventions (not meeting the most recent standards, but good enough - 32% of them), and the vast majority thinks, that they simply can not afford the interventions even with any kind of public subsidy (58% of them). These people, who stated not to contribute, even if a 100% subsidy is available, as they can not afford the payment, indeed represent a substantially lower income level than that of the average multi-family sample. They are less educated than the sample on average, however 53% of them have at least a maturity in a secondary grammar school. They are less interested in getting any information or advice on the renovation of their flats than the sample average, however they are not completely reluctant as 62% of them would appreciate any advice.

All these results show us that according to the recent consideration of the owners, energy efficient interventions in the common spaces of the multi-family buildings would require a substantial public subsidy, and the vast majority of owners have uncertainties, knowledge gaps and bad feelings about the renovation process that should be addressed by intense public interventions.

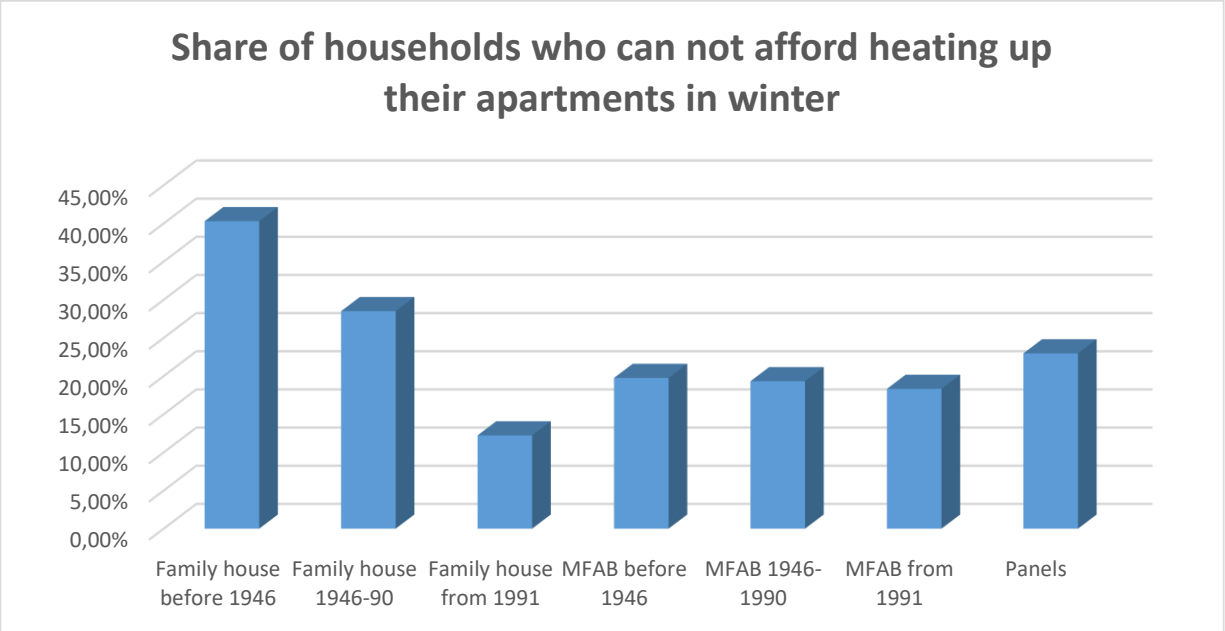
4.6 Energy poverty

According to the Directive on Energy Efficiency (2023/1791) "energy poverty means a household's lack of access to essential energy services, where such services provide basic levels and decent standards of living and health, including adequate heating, hot water, cooling, lighting, and energy to power appliances, in the relevant national context, existing national social policy and other relevant national policies, caused by a combination of factors, including at least non-affordability, insufficient disposable income, high energy expenditure and poor energy efficiency of homes". The phenomenon can be measured by different indicators, some of which were captured by our survey.

4.6.1 Not able to keep home adequately warm

The most common subjective indicator of energy poverty is the share of households, who are not able to keep their home adequately warm. This indicator is measured in the EU by the SILC (EU Statistics on Income and Living Conditions) survey, thus there are comparable datasets for each member state. According to the latest SILC data (2023) 7.2% of the Hungarian respondents reported that they were unable to keep their home adequately warm in wintertime. **In our survey 22.2% of the respondents stated that they cannot afford to keep their homes properly warm in wintertime**. While this question is subjectively interpreted and the methodology behind the questions may not be the same completely, the nearly 22% in the wealthiest city of the country, where the effect of the ban on capped energy prices had a moderate effect as opposed to the countryside, is a very high amount. Besides the methodological discrepancies, this high share may be connected to the general financial difficulties of the Hungarian households due to the high inflation in 2022/2023, which narrows down their concept on what they can afford and what they can not. The fear from increasing prices also resulted in the decrease in temperature (thus not reaching the adequately warm level) in 6.7% of the responding households. The energy poverty level according to this indicator is higher in family houses (28.7%) than in multi-family buildings (20.1%) in Budapest. This could be the result of the higher floor area and bigger building envelope of family houses.

Figure 16. Energy poverty - can not afford heating up



Applying some linear regression models we can identify which factors contribute the most to the state of not being able to warm up the apartment/house in wintertime. The model states that social indicators contribute less to the probability of not being able to warm up the apartment. Age, education, family status seems not to be decisive. Income is also not a dominant factor, more precisely middle income families tend to be more in energy poverty in this respect, probably not because of not having enough funds, rather deciding to reduce heating if needed.

The energy poverty status is rather explained by the state of the building. In general, the older the building is, the higher the prevalence of energy poverty is. This is also true to the self-evaluated physical state of the buildings: the more deteriorated it is considered, the greater the incidence of energy poverty, mainly in case of multi-family buildings. Another important factor is the area the building is located: in case of multi-family buildings energy poor households can rather be found in cheaper real estate areas (assessed by the surveyors) while less energy poor households are in high prestige areas. In case of family houses, the highest probability to find energy poor households is among the buildings built before 1946.

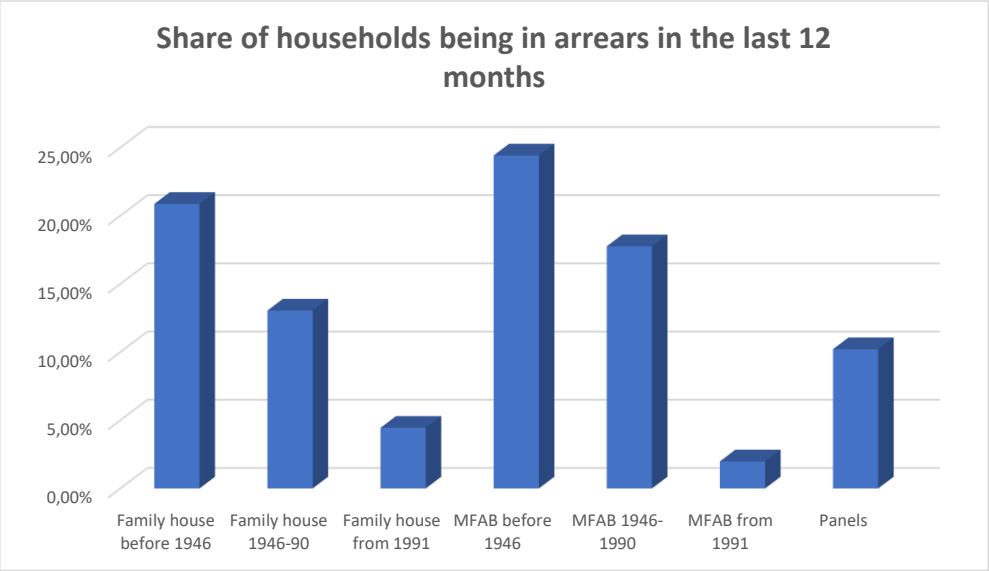
It is essential to highlight the numerous surveys and researches on energy poverty that consistently identify low income level as one of the most important factors of energy poverty. At the same time we have to emphasize that this relation does not hold uniformly across all indicators of energy poverty. This underscores the complexity of the phenomena that covers income and technical aspects at the same time, and where specifically the **“inability to keep warm” indicator seems to be more sensitive to the technical factors than to the financial or social ones**.

Transferring the potentials and rates into pure numbers, we might state that the most households that suffer from energy poverty due to not affording to warm up their homes in wintertime can be found in multi-family buildings built before 1946 (approx. 44,000 families) and in the panel housing estates (approx. 40,000 families).

4.6.2 Having arrears

The survey contained a question about whether the household had occasionally, or frequently any arrears with regard to any types of utility costs and whether they were excluded from the service in the last 12 months. In general 15.43% reported any arrears in utility costs this period (October 2022-October 2023). 70% of these respondents were only in rare delays in payment due to financial reasons, and 30% were rather seriously indebted.

Figure 17. Energy poverty – being in arrears



As the figure above shows, **the share of households being in arrears in the last 12 months for financial reasons is higher in the older building segments, but - as opposed to the indicator of "inability to keep warm" - it is higher in case of multi-family buildings than in family houses in spite of the fact that family houses were more affected by the increase in gas prices than households living in MFABs.**

Applying again some linear regression models it becomes more clear that **generating arrears because of financial reasons** (and not because of forgetting to pay a check) **is caused by a combination of social and physical factors.** Income (and mainly the subjective judgment whether someone has financial difficulties or not) becomes an important factor behind getting in arrears. Mainly those households experience financial difficulties, who are undereducated (not having secondary grammar school maturity at least) or have children.

As was the case with the indicator of energy poverty on "inability to keep warm" the self-evaluated physical state of the building, the estimated value of it and its age is strongly linked to the probability of accumulating arrears pointing to the fact that buildings in a bad shape generate higher utility costs.

With regard to the amount of households that can be in arrears in utility costs, the most endangered segment again is the one that contains multi-family buildings built before 1946 (approx. 54,000 families).

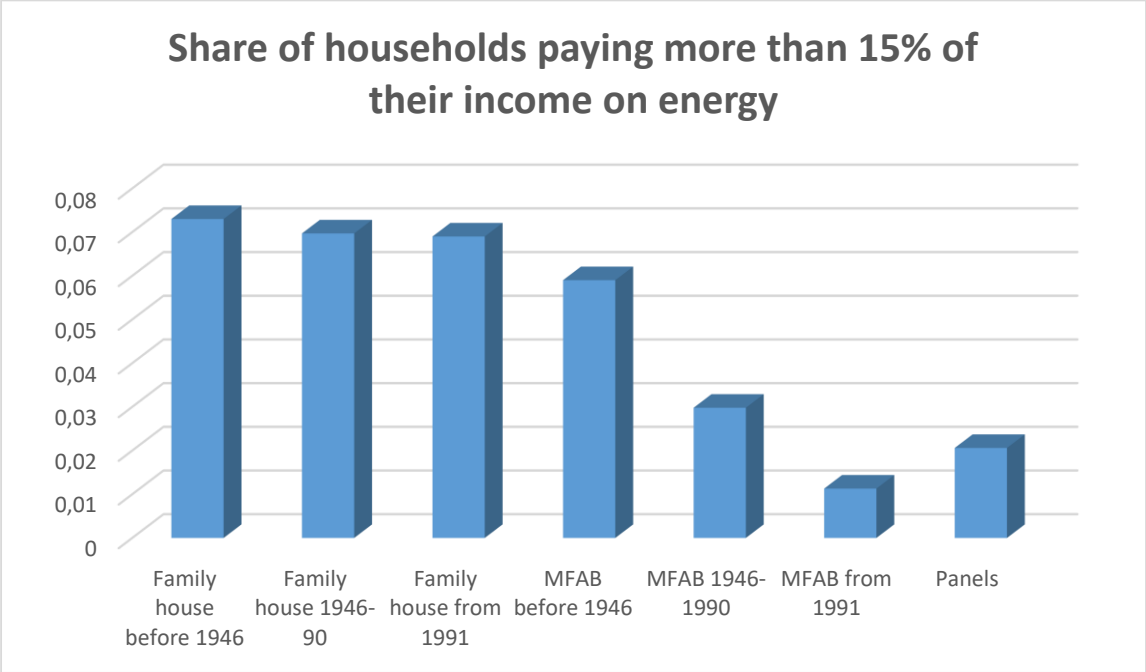
4.6.3 Having high rate of energy costs

This indicator of energy poverty is the most complicated to measure. Not only due to the fact, that people tend not to report on their exact income (that is why choosing categories of income and applying regression models to set income is a generally applied method and we also applied it), but also as energy costs of apartments may not be properly set in case they are paid as part of the common costs. Taking

all these methodological limitations into account it is still possible to create some interesting hypotheses on who is suffering the most from this type of energy poverty.

As the figure below shows, not only the older buildings are the ones that are affected the most. In the case of family houses another aspect becomes important, which is the size of the building. Family houses are in general bigger, and have a higher surface of envelope which is why their proportionate heating and cooling costs are higher. This is nicely reflected in the fact that these buildings felt the effect of gas price increase the most, and it might have had an impact on utility costs. What might be a bit surprising is that family houses built after 1991 accumulate the most affluent owners as was presented in chapter 4.3, still, their share of energy costs compared to income is among the highest. This can be explained by two major factors: these family houses are the biggest, and the reduction in gas price subsidies can be experienced among them. Another important aspect is that luxury type of consumption has more space in case of family houses, which can create additional energy costs.

Figure 18. Energy poverty – high energy costs



With regard to the results of the linear regression models we found that **having a high rate of energy cost is strongly linked to income and education factors** (much more than being in arrears). While in case of family houses the probability of having low income concentrates more in low real estate value areas, and in older households (over 65), in case of multi-family buildings the low income status is spatially more dispersed and endangers single households more. Technical characteristics of the buildings seem to be less important in case of this indicator, except for the size of the building.

The housing sector, in which most of these people, who have an energy cost overburden, can be found is the one of multi-family buildings built before 1946, in which about 13,000 families are affected.

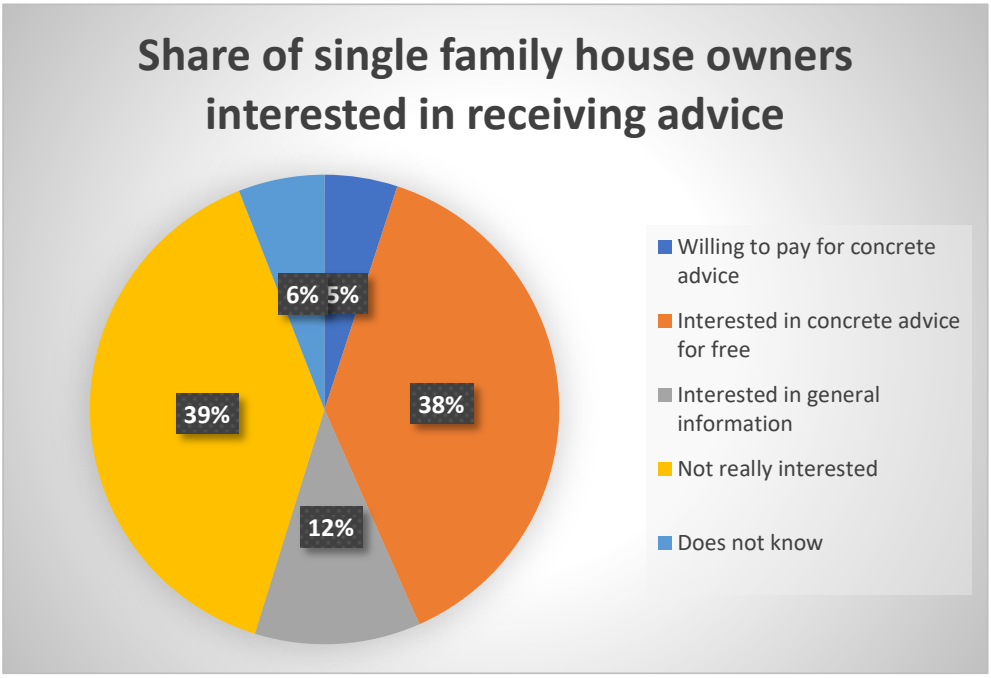
4.7 Roles of the Climate Agency

The possible roles of the Climate Agency have been tested by gauging homeowners' interests in various directions: namely what type of information they are looking for and where. A few underlying findings can be stated:

- overall, there seems to be a notable lack of interest both among single family and multi-unit building owners;
- especially, when it comes to paying for advice, strikingly few have expressed their willingness to pay (although what 'concrete advice' really means was not defined in the questionnaire). This might indicate a very restricted market segment for SMEs and the need for public involvement;
- openness to advice about energy efficiency interventions strongly correlates with the fact if a household is planning/vaguely considering an intervention or not. In the previous case they seem to be notably more open to information;
- owners - regardless if they live in a single family home or in a multi-family building - tend to trust sources they have personal connection to and the internet the most.

Regarding the details, we can see that owners of single family houses only 5% of the respondents would be willing to pay for concrete advice, and 55% are interested in receiving some kind of advice about energy efficient interventions. That leaves 45% of the respondents completely disinterested.

Figure 19. Interest for receiving advice – family houses

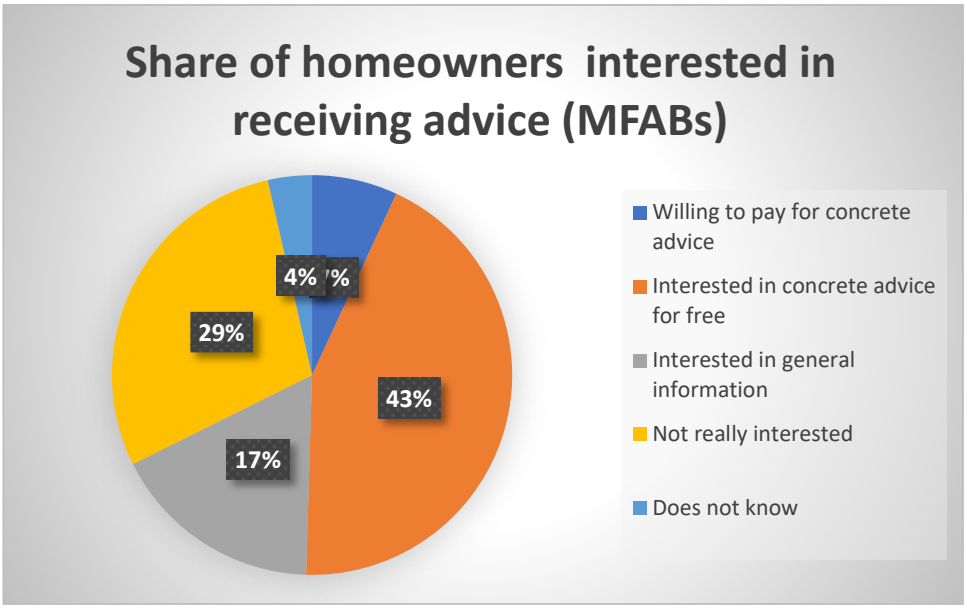


Two variables seem to influence a household's attitude toward receiving energy advice: income level and planning an intervention or not. Regarding the first one, a growth in income indicates a growth in openness. (E.g. with an income level below 400.000 HUF 57% were disinterested, while for households

with an income between 400.000 and 800.000 HUF this has decreased to 37%.) Regarding the second one, in case of planning or dreaming about an intervention, 80% said they were open to receiving advice about increasing the energy efficiency of their homes.

The picture is more or less the same in case of multi-unit buildings, however particularly the interest for energy efficiency related advice seems a bit increased. (Here respondents were asked about interventions into their own apartments and not into the building itself.) As the figure below shows, 67% of the respondents were open to receiving information, and 7% were willing to pay for it in case it was specifically for their apartment.

Figure 20. Interest for receiving advice – multi-family buildings



In multi-apartment buildings we found that what really mattered was if the owners were planning or considering an intervention. Everyone else was completely disinterested. And unlike in single family homes, income level does not seem to matter: households of various income levels roughly show the same interest for specific advice focused on their own apartment (between 45-56%), and general information about energy efficiency (between 19-20%).

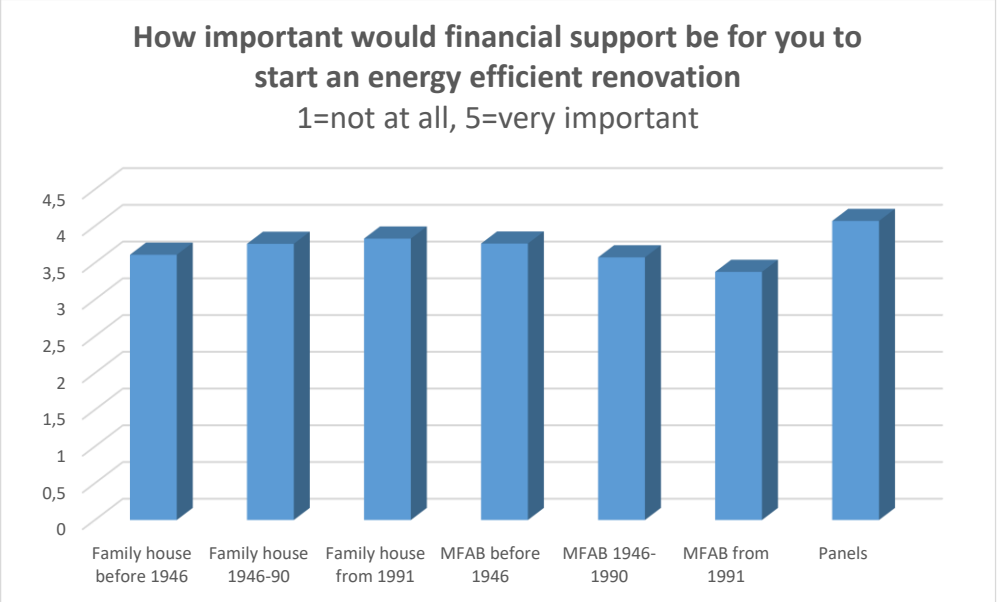
But what type of help is really needed?

Regarding the source of information, personal contacts seem to matter: neighbors and acquaintances who have done similar investments as well as craftsmen seem to be the overwhelming choice of people for advice about energy savings. (If added together it was the choice of 41% for single family owners and 33% for apartment owners.) For owners in multi-apartment buildings, housing managers also play an important role, with 13% of the respondents turning to them for advice. Finally, the other most trusted source is the internet, with 15 and 17% respectively turning to it. **All this information points in the direction that the Climate Agency should set up a detailed and well-functioning webpage, but also provide in-person counseling.**

More detailed analysis clearly shows certain areas, where support will be needed for residents in single-family homes and multi-family buildings alike. These are financial support, and targeted assistance activities. The latter includes help in technical matters, in choosing the appropriate (and reliable) contractors and help in securing loans. While the level of interest varies between the subjects - it is highest for getting financial support - assistance in itself - unlike simply receiving information - seems to be more welcome from the residents. Respondents had to choose on a scale between 1 to 5 - where 1 signified

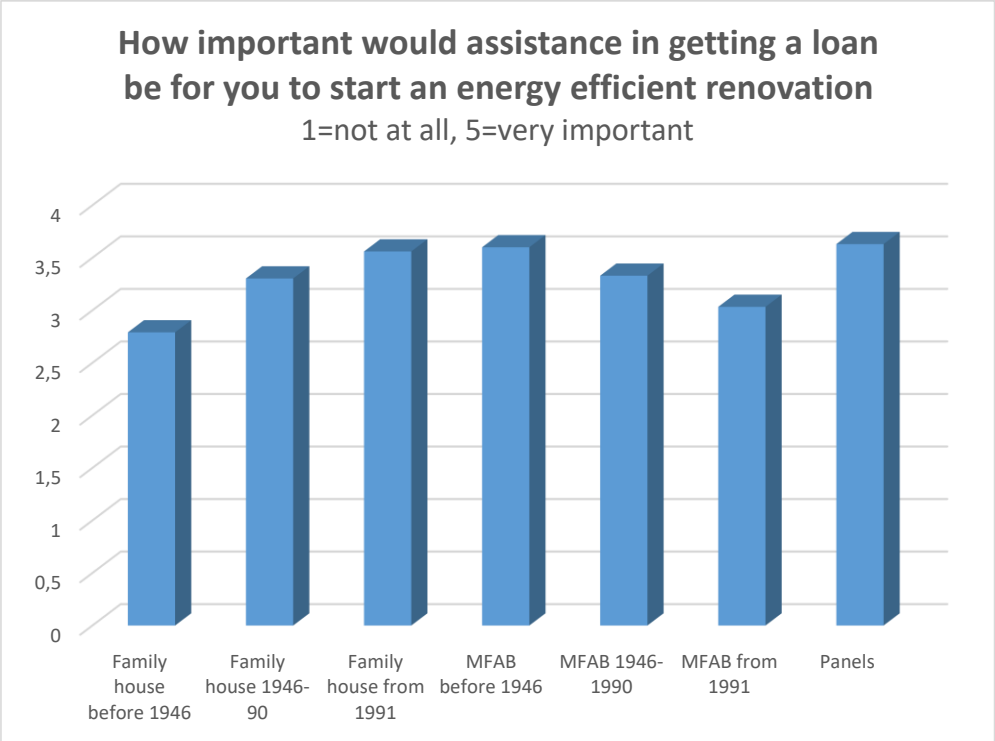
the lowest importance and 5 the highest - and for the vast majority of cases we can see that the answers are above 3 on average, indicating a general interest in the topic.

Figure 21. Interest for getting assistance – financial support



There were of course differences. Regarding finances, the interest was here the highest, reaching between 3 and 4, and almost 4 on average by residents of panel buildings. The lowest interest was in multi-unit buildings built after 1991 is reasonable, since they have the least investment needs and their energy standards are the highest.

Figure 22. Interest for getting assistance – obtaining a loan



Regarding assistance in getting a loan, respondents remained below 3,5 on the same scale for every type of building, and disinterest was the highest in single-family homes built before 1946. This correlates with the other findings of the research, showing that in this mixed-income housing segment a lot of poor and elderly owners live.

Figure 23. Interest for getting assistance – technical advice

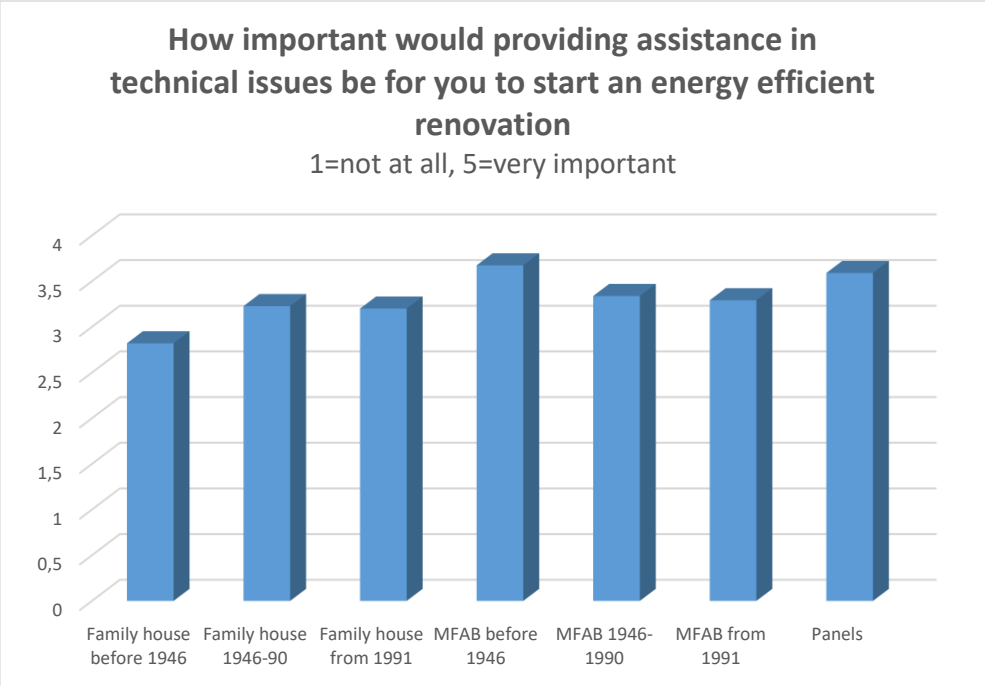
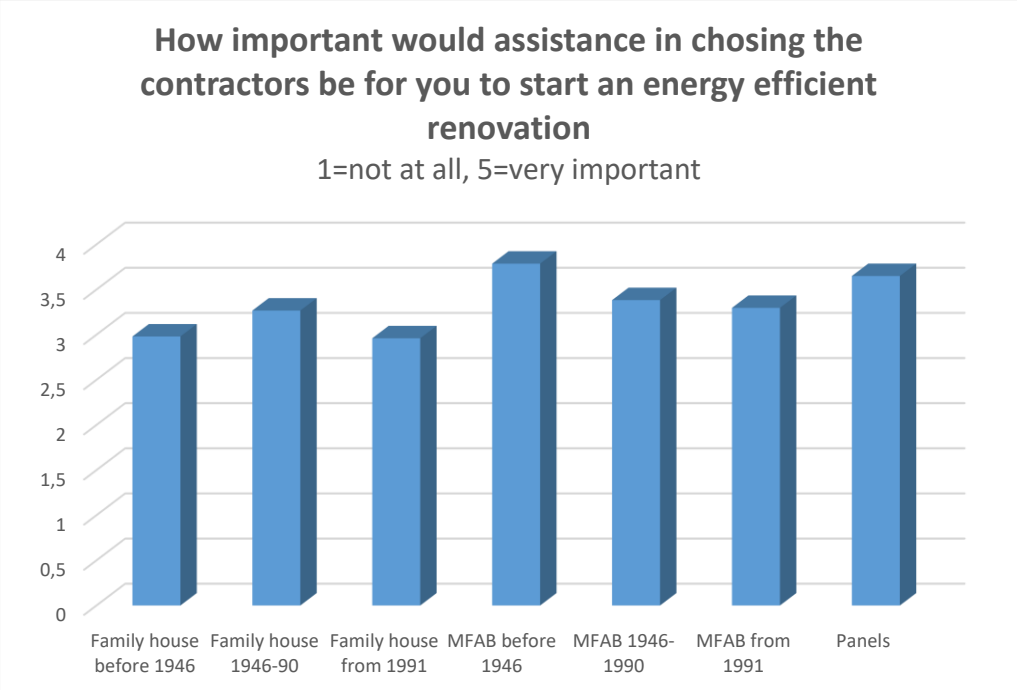


Figure 24. Interest for getting assistance – selecting contractors



Finally, assistance in technical matters seems to have sparked similar interest as assistance in getting a loan, but choosing a contractor is even a bit less important. This might be related to the fact that despite its seminal importance, this is typically not raised as a crucial issue.

While there are certain differences in how owners in different building types have answered the various questions about assistance, it is clear that there is little variation between the answers. However, two patterns stand out slightly:

- owners in single-family homes built before 1946 seem to be the least interested in any kind of assistance;
- owners in panel buildings and in multi-family buildings constructed before 1946 seem to be the most open to assistance.