

March 2014

# Quantitative Report on Energy Efficiency Study Among Population

## **REELIH Project**

*(Residential Energy Efficiency for Low-Income Families)*

To: Habitat for Humanity Armenia Foundation

From: **imr** Armenia

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## DESCRIPTION

### *BRIEF DESCRIPTION OF THE PROJECT*

Residential heating accounts for more than 30 percent of energy use in most countries of our region, as previous construction and heating methods did not focus on energy efficiency. As a result, highly inefficient energy use intensifies the impact of rising energy prices on low-income households.

It is important to address the problems of residential energy efficiency because it can help our country move forward on the road to energy reform and can limit energy waste.

The majority of Armenia's housing stock, especially in urban areas, consists of pre-fabricated multi-story apartment buildings that are generally of poor construction, poorly insulated, and, as a result, provide a low level of energy efficiency and living comfort. Usually, residential buildings that are constructed based on Soviet standards GOST and SNIP (State Standard and Sanitary Norms and Rules) are behind the corresponding European and international standards.

The REELIH project seeks to demonstrate that integrated efforts in this sector—both at the regional and national levels—address in market will bring significant improvements to the living conditions of low-income families in the region, reduce energy costs, reduce carbon emissions, and overall, contribute to tangible experiences in the ongoing dialogue and reform process in Europe and Central Asia.

REELIH intends to demonstrate various financial models that will facilitate the process of renovating residential building heating insulation in a way that reduces cost increases while maintaining a social safety net for low-income families. This is done in conjunction with the condominiums, city halls, residents, and other interested organizations. The approach incorporates research, knowledge platform development, and peer learning opportunities. A wide range of sector actors will be engaged through the project including specialized companies working on energy efficiency, residential multi-family builders, financial institutions, State organizations, and tenants' associations among others.

Energy efficiency has many benefits including:

- Reduce the burden on households as energy prices rise
- Increase energy security
- Increase the investment needed for energy supply
- Reduce air pollution and climate change emissions
- Expand employment in unskilled and skilled labor
- Reduce demands on national and municipal budgets

### *RESEARCH GOAL*

Until June 2015, the project aims to show the improvement mechanisms of living standards in multi-unit apartment buildings in the region. It will focus on developing a regional effort, resources, and networks to address the impact of rising energy prices on collective housing. First, the project will develop viable and sustainable models for selecting multi-unit buildings in Armenia.

The purpose of this baseline survey is to measure qualitatively:

- Awareness of energy efficiency;
- The current state of the target groups' attitudes towards collective decision making as it relates to energy efficiency related housing renovations; and
- How a lack of energy efficient housing structures affects the target group's financial state, physical and emotional health, and overall comfort in their homes.

This survey will be used during the evaluation phase of the Residential Energy Efficiency for Low-Income Households: in Europe and Eurasia program. Based on survey findings, a financial model will be developed.

### RESEARCH OBJECTIVES

This survey has four primary objectives. The questions are written with the intent of meeting each objective.

1. To determine the target groups' awareness of energy efficiency
2. To gauge the current energy usage of the target groups.
3. Determine how current energy efficiency affects the health and quality of life of the target households
4. To determine the target groups' experience with collective decision making as it relates to homeowners' associations.

### RESEARCH METHOD AND INSTRUMENT

Based on the above-mentioned objectives, the quantitative method has been selected as the primary research method. A standardized questionnaire has been the primary research instrument. The questionnaire had 5 main sections. These are:

- a. **Section 1.** Awareness of energy efficiency
- b. **Section 2.** The current usage of energy by target groups
- c. **Section 3.** Impact of energy efficiency on target families health and life quality
- d. **Section 4.** The experience of target groups concerning collective decisions with condominiums
- e. **Section 5.** Demography

In general, the questionnaire included 10 open questions and the average duration of the interview was 20 minutes.

### RESEARCH SAMPLING

The survey was carried out in 100 private houses and 400 multi-apartment buildings of Yerevan city (overall 500 interviews). The **multistage random sampling** method was used for respondents' selections.

Yerevan city communities were selected on the *first stage* of sampling. The proportion of residential houses/buildings in the sampling has been determined based on the 2011 census results ([www.armstat.am](http://www.armstat.am)). The overall picture of the houses/ multi-apartment buildings is shown below:

Community	PRIVATE HOUSE (quantity)	Apartment (quantity)	TOTAL (quantity)	PROPORTION (percent)
Avan	5	20	25	5%
Arabkir	11	44	55	11%
Adjapnyak	10	40	50	10%
Davtashen	4	16	20	4%
Erebuni	11	44	55	11%
Kentron	12	48	60	12%

Malatia-Sebastia	13	52	65	13%
Norq-Marash	1	4	5	1%
Nor Norq	12	48	60	12%
Nubarashen	1	4	5	1%
Shengavit	13	52	65	13%
Qanaqer-Zejtun	7	28	35	7%
<b>Total</b>	<b>100</b>	<b>400</b>	<b>500</b>	<b>100%</b>

On the *second stage of* sampling, streets were randomly selected; on *stage three*, the PSU was selected (i.e. building, house).

On the *fourth stage*, the interviewers selected the apartments in which they would be conducting interviews on the first floor, last floor, and medium floors in each building. No more than 5 interviews were conducted in each building. In buildings with more than 2 entrances or stairwells—not more than 3 interviews.

On the last and *fifth stage*, the project selected the respondents who were the main decision makers on utility payment issues.

### **FIELDWORK IMPLEMENTATION**

Fieldwork was carried out since between March 13, 2014 and March 24, 2014.

Fifteen interviewers were involved in the fieldwork. They were trained by the project manager in sampling techniques and proper questionnaire administration. After the training, before the fieldwork starts, all the interviewers conducted pilot interviews with the aim of getting acquainted with the questionnaire.

The completed questionnaire was checked in by quality control specialists in the following methods:

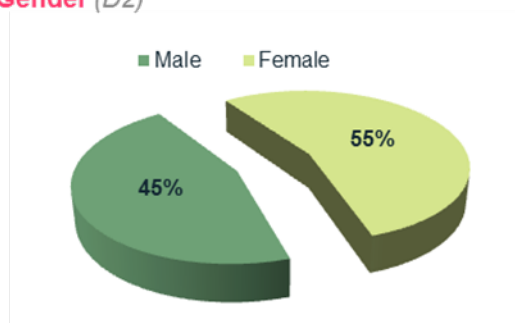
- 100% logic control
- 30% control through phone calls
- In the case that significant errors were detected in a questionnaire, this questionnaire would be replaced and completed again through telephone interviews
- Control visits in suspicious cases (wrong telephone number, wrong address, etc).

## SECTION 1. RESPONDENTS SOCIAL-DEMOGRAPHICAL CHARACTERISTICS

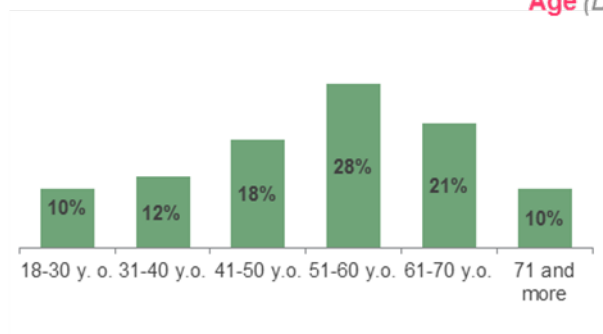
A social-demographical image of the respondents who were involved in the survey is shown below. As seen in Picture 1.1, **55% of the research participants are women and 45%- men.** Half of the respondents (46%) are between 41-60 years of age:

Base: N=500

Gender (D2)

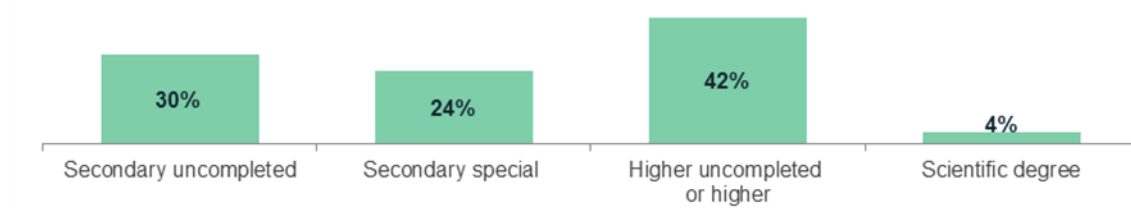


Age (D1)



Education (D7)

Base: N=500

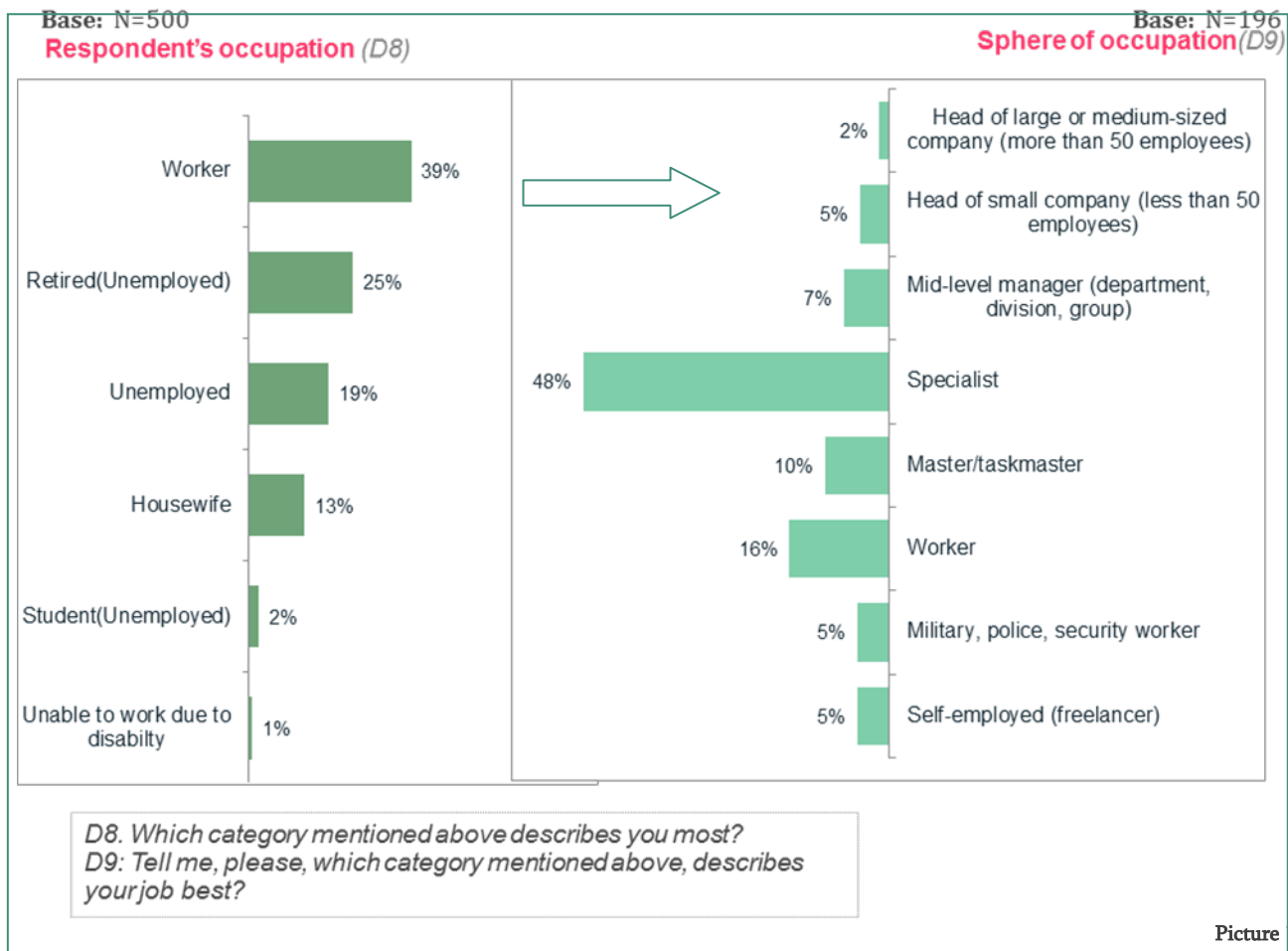


D1 How old are you?  
 D2. Respondent's gender  
 D7. Tell me please your education level

Picture 1.1



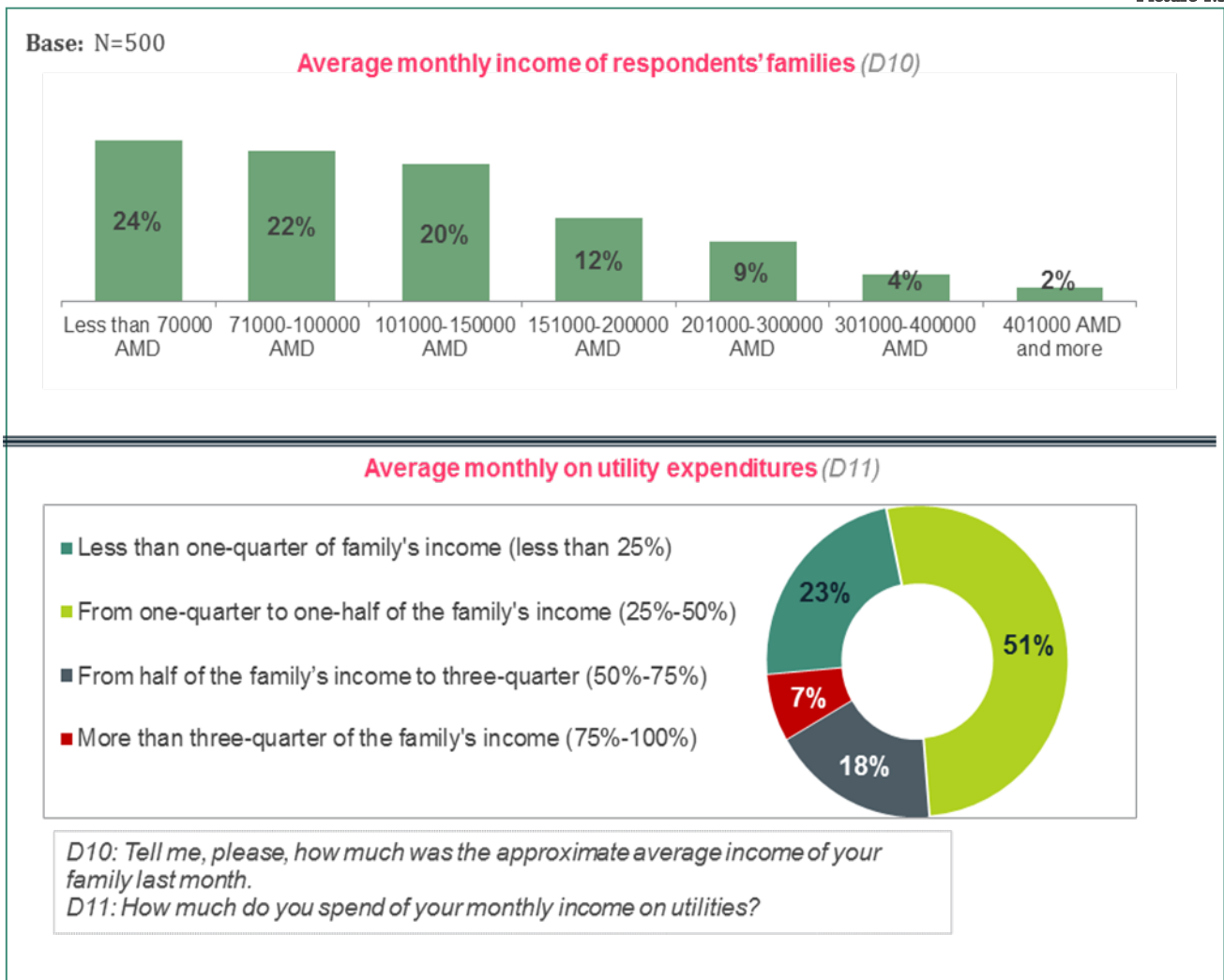
Picture 1.2 displays the occupation sphere of respondents. **39% of participants are employed**, which means they have a definite monthly income. Almost half of the respondents (**48%**) are **degreed specialists (lawyer, doctor, teacher etc)**.



Picture 1.2

Picture 1.3 displays the average monthly income of the majority of the respondents. **66% of respondents earn less than 150, 000 AMD**, and in **51% of cases 25-50% of family income is spent on utilities**. (Picture 1.3)

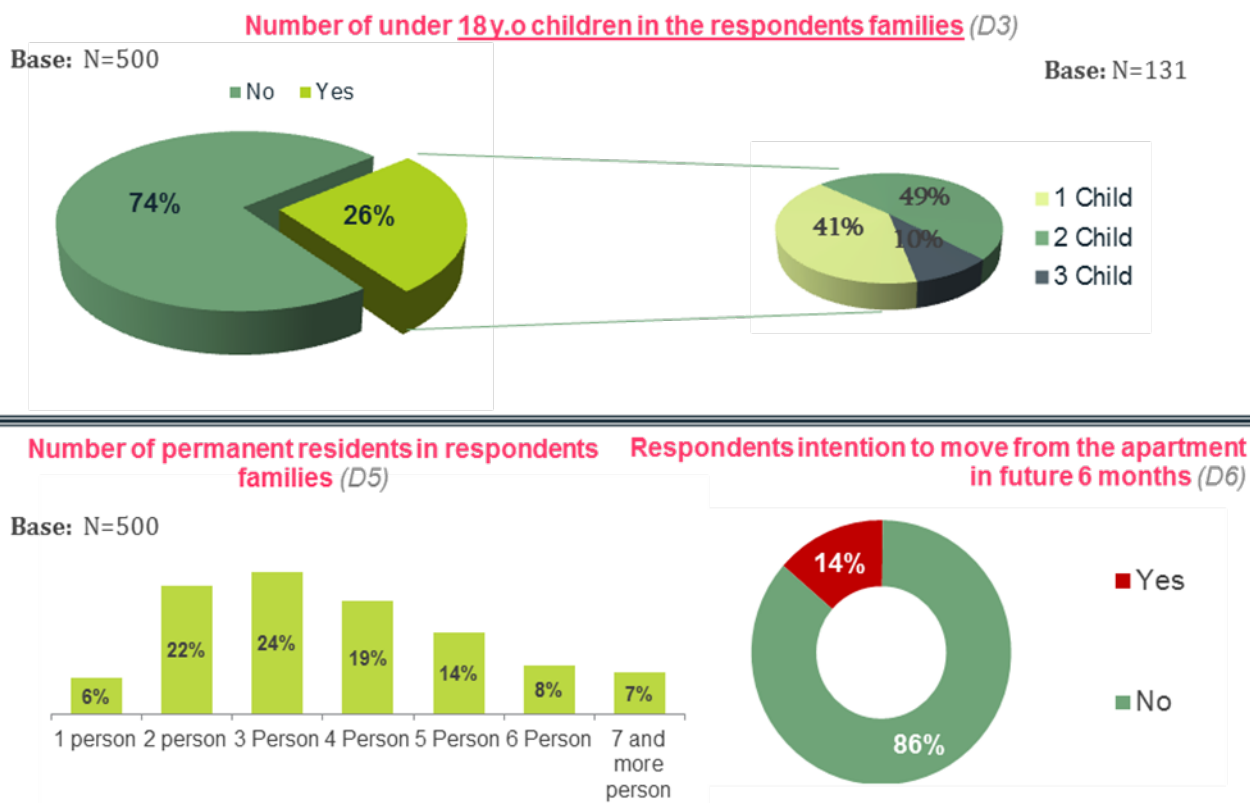
Picture 1.3





26% of the surveyed households reported having children under 18. The average number of people living in their families is 3.7 (Picture 1.4).

Picture 1.4



D3. Do you have children under 18? IF yes, how many children do you have? (D4)  
 D5. How many persons live at your house permanently?  
 D6. Are you planning to sell or leave your apartment in the nearest 6 months?

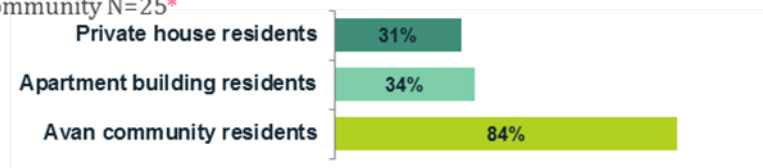
## SECTION 2. AWARENESS OF ENERGY EFFICIENCY METHODS

Generally it can be stated that the awareness of energy efficiency renovations among the people is very low. Only 36% of the total respondents are aware of these methods. The **residents of Avan administrative district** have a **high level of awareness (84%)**. There, energy efficiency measures were carried out in the past. It is interesting that these residents didn't single out any disadvantage concerning energy efficiency renovations.

Picture 2.1

### Awareness of energy efficiency (Q1)

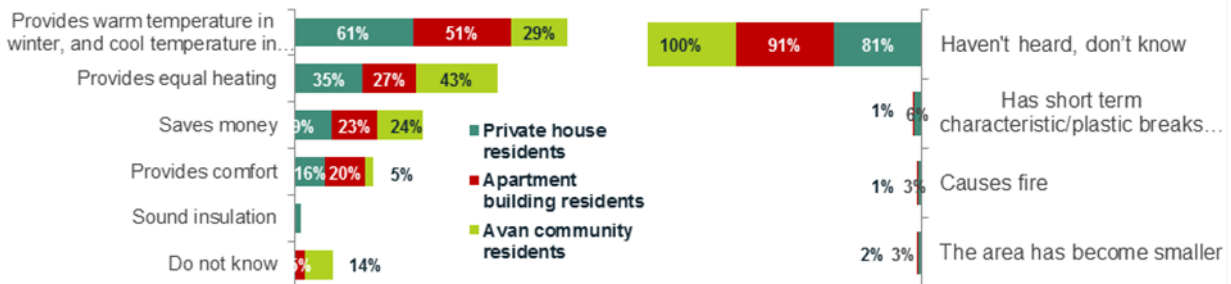
Base: Private house residents N=100  
 Apartment building residents N=375  
 Residents of Avan community N=25\*



### Advantages of energy efficiency according respondents (Q1a)

### Disadvantages of energy efficiency according respondents (Q1b)

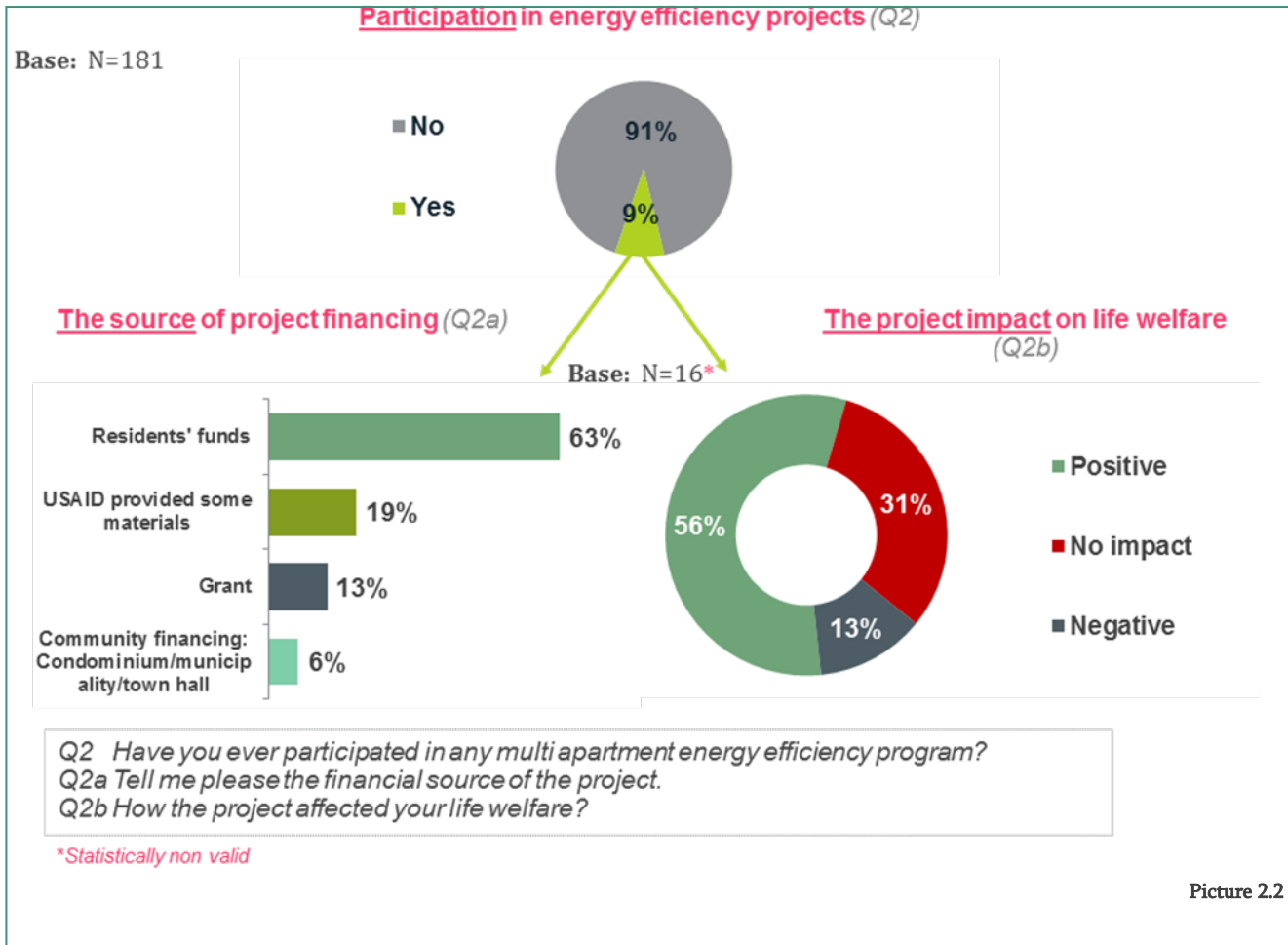
Base: Private house residents N=31  
 Apartment building residents N=129  
 Residents of Avan community N=21\*



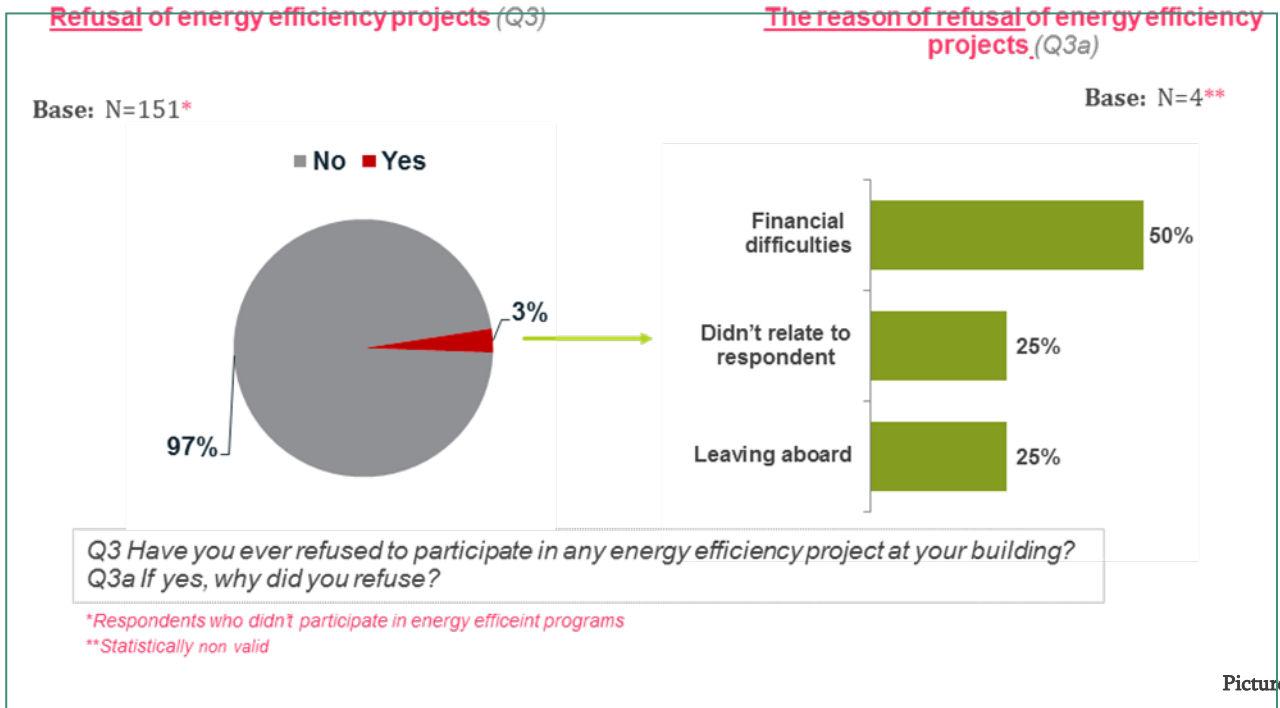
Q1 Have you heard about multi apartment building's energy efficiency repairs?  
 Q1a. What kind of advantages have you heard of?  
 Q1.b What kind of disadvantages have you heard of?

\*Statistically non valid

The participation rate in energy efficiency programs is also very low: Only 9% of respondents reported being involved in an energy efficiency program. Of these 9%, 63% reported that the program they are involved in was paid for by residents' funds, and 19% by USAID financing. 56% of residents who carried out energy efficiency activities assess it positively, and 31% of them doesn't see any changes.

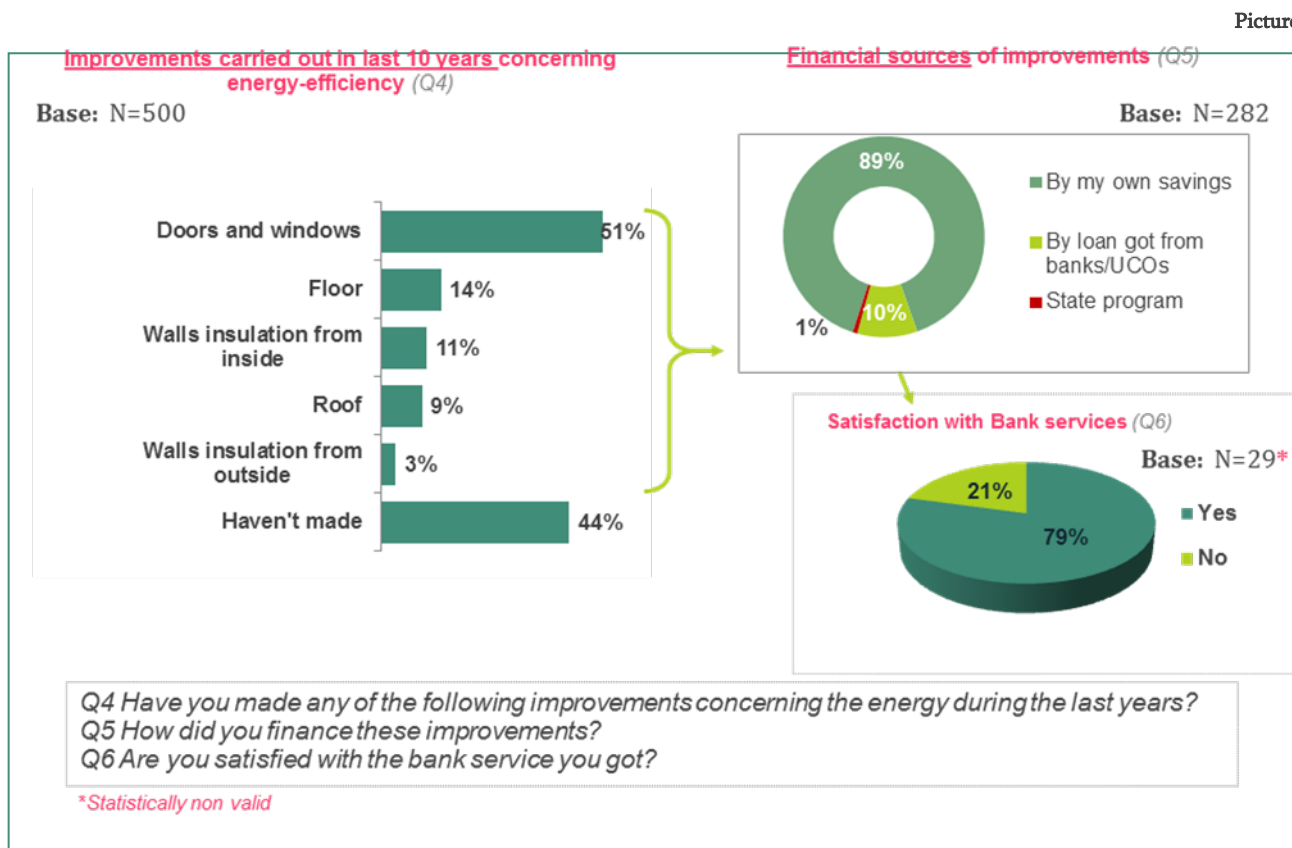


The refusal from energy efficiency projects among respondents is quite low (3%), which can be caused by the fact that most of them haven't been offered it before. The primary cause of these refusals is because they lack financial resources.



Picture 2.3

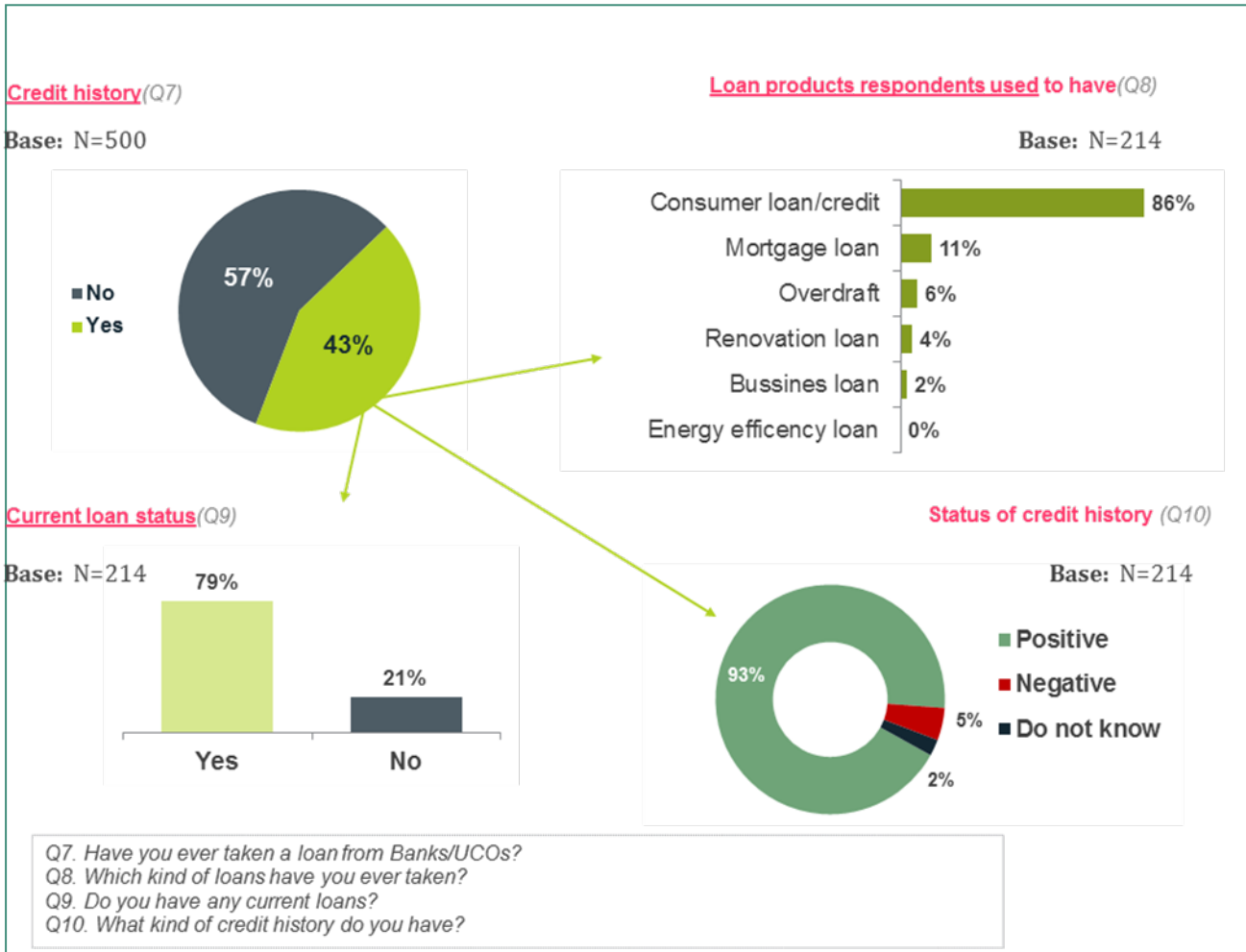
In the last 10 years, 44% of the respondents haven't made any renovations concerning energy efficiency. The main measures they have taken is renovating the windows and doors. In 89% of cases, the homeowners have financed their renovations with their own money.



Picture 2.4

43% of the respondents have a credit history and 79% have current loans. **No one who reported having a credit history have ever taken a loan for energy efficiency renovations. 93% have a positive credit history.**

Picture 2.5



Picture 2.6 shows that **replacing/insulation doors and windows is the most important energy efficient renovation** for the respondents (correspondingly 56%, 81%, 72%), Replacing the roof is the third most important renovation (69%, 27%, 16%).

Picture 2.6

**Base:** Private house residents N=100  
 Apartment building residents N=375  
 Residents of Avan community N=25\*

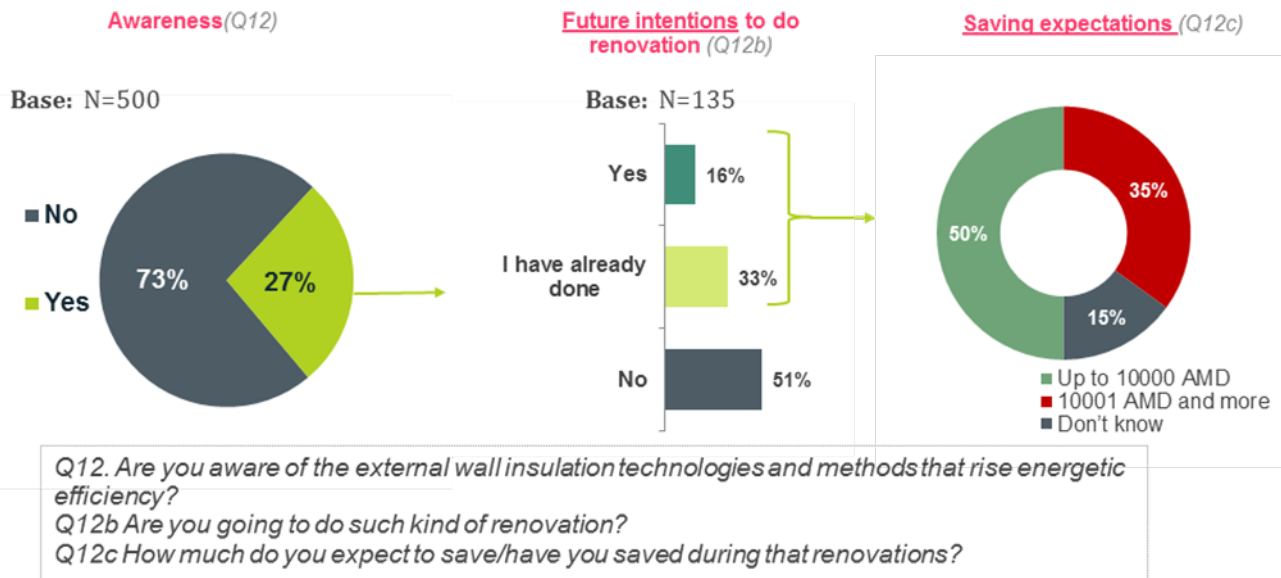
		Important	Partly important	Not important
Doors and windows	Private house	56%	9%	35%
	Apartment building	81%	11%	7%
	Avan community	72%	20%	8%
Walls insulation from outside	Private house	36%	23%	41%
	Apartment building	33%	29%	38%
	Avan community	56%	16%	28%
Walls insulation from inside	Private house	16%	23%	61%
	Apartment building	30%	30%	39%
	Avan community	28%	44%	28%
Floor	Private house	23%	30%	47%
	Apartment building	29%	21%	50%
	Avan community	28%	12%	60%
Roof	Private house	69%	15%	16%
	Apartment building	27%	7%	65%
	Avan community	16%	8%	76%

Q11 Please rate the following energetic efficiency renovation types according to their importance.

\*Statistically non valid

27% of respondents report being aware of what types of energy efficient technologies improve thermal insulation in walls.

Only 16% of the informed respondents have any intention to do these kinds of renovations in the future. 33% have already done it. 50% of respondents who intend to increase the energy efficiency of their homes through improved insulation in the walls predict that they will be able to save up to 10,000 AMD per heating

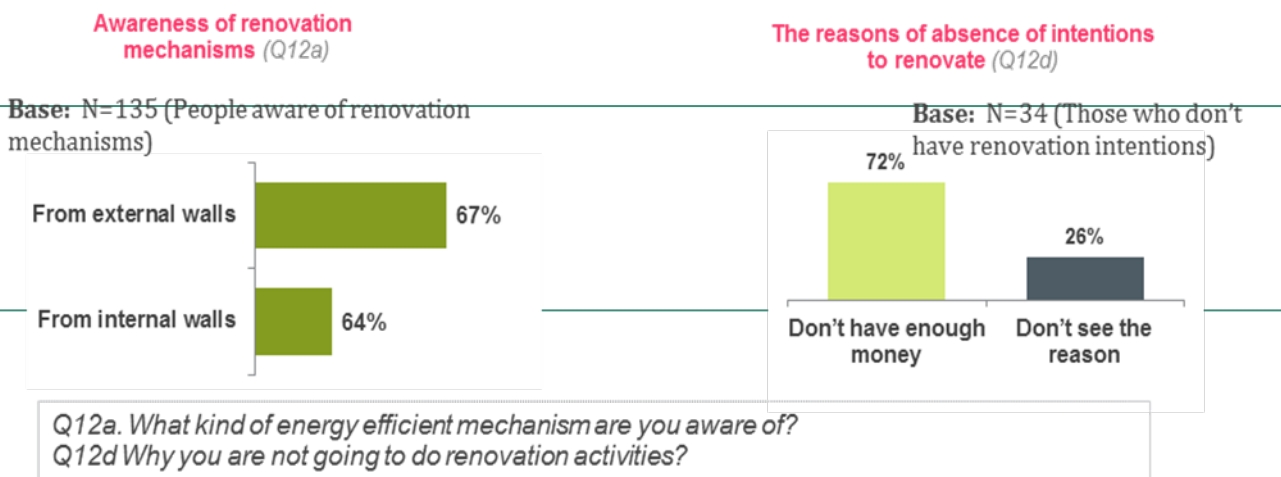


month, 35% predict that they will save 10,000AMD per heating month or more.

Picture 2.7

The knowledge base of respondents is almost equally divided. 67% of respondents are aware of external wall renovations. 64% report being aware of internal wall renovations.

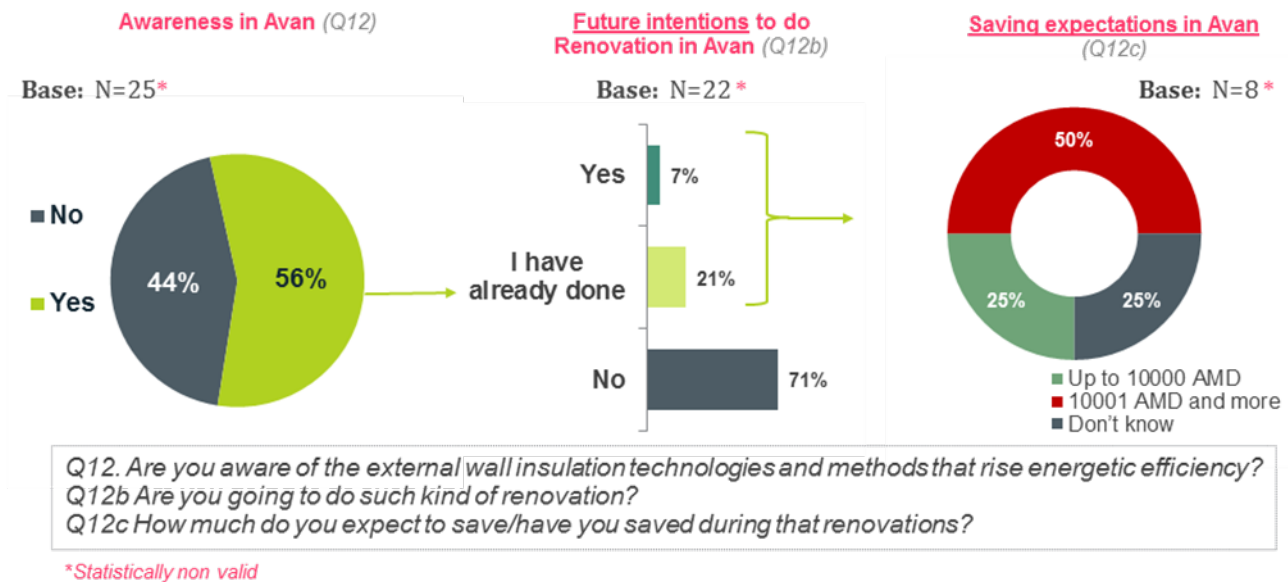
72% of the respondents who reported having no intention of making any improvements explain that they lack sufficient funds to make renovations, Only 26% report not knowing the benefits of energy efficiency renovations.



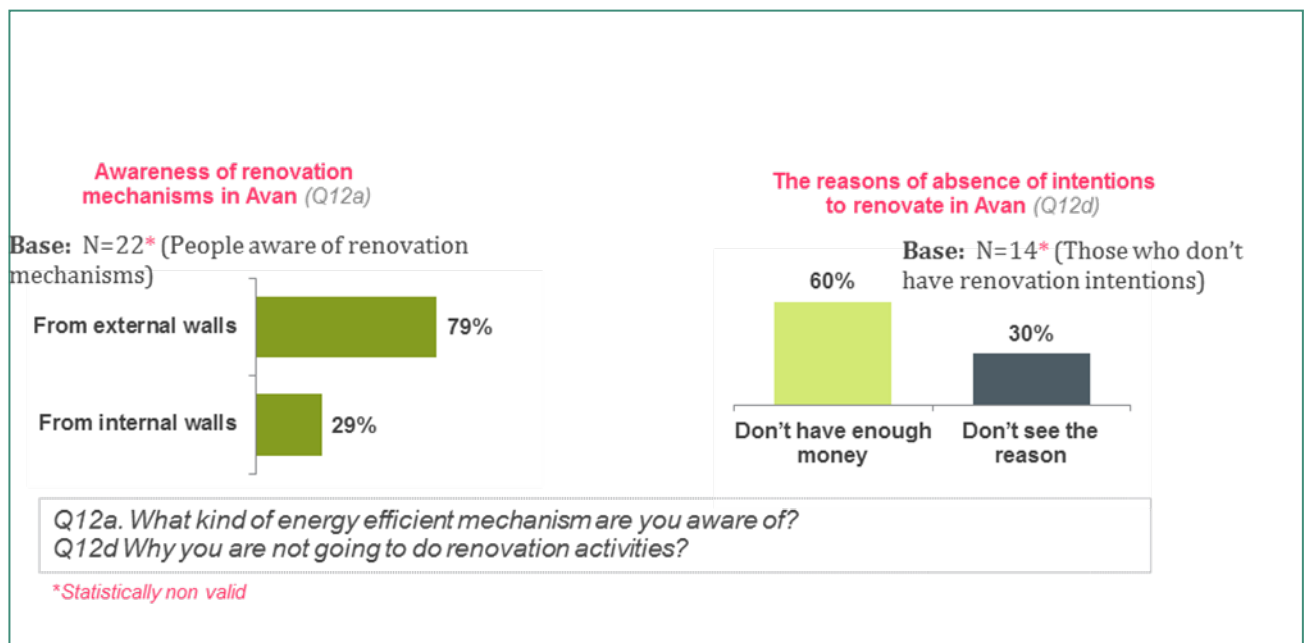
\*Statistically non valid

Picture 2.8

In the Picture 2.9 are shown the awareness and future intentions to do energy efficiency renovations of Avan community residents. In Picture 2.10 types of energy efficiency renovation, as well as the reasons of absence of intention to renovate are presented.



Picture 2.9



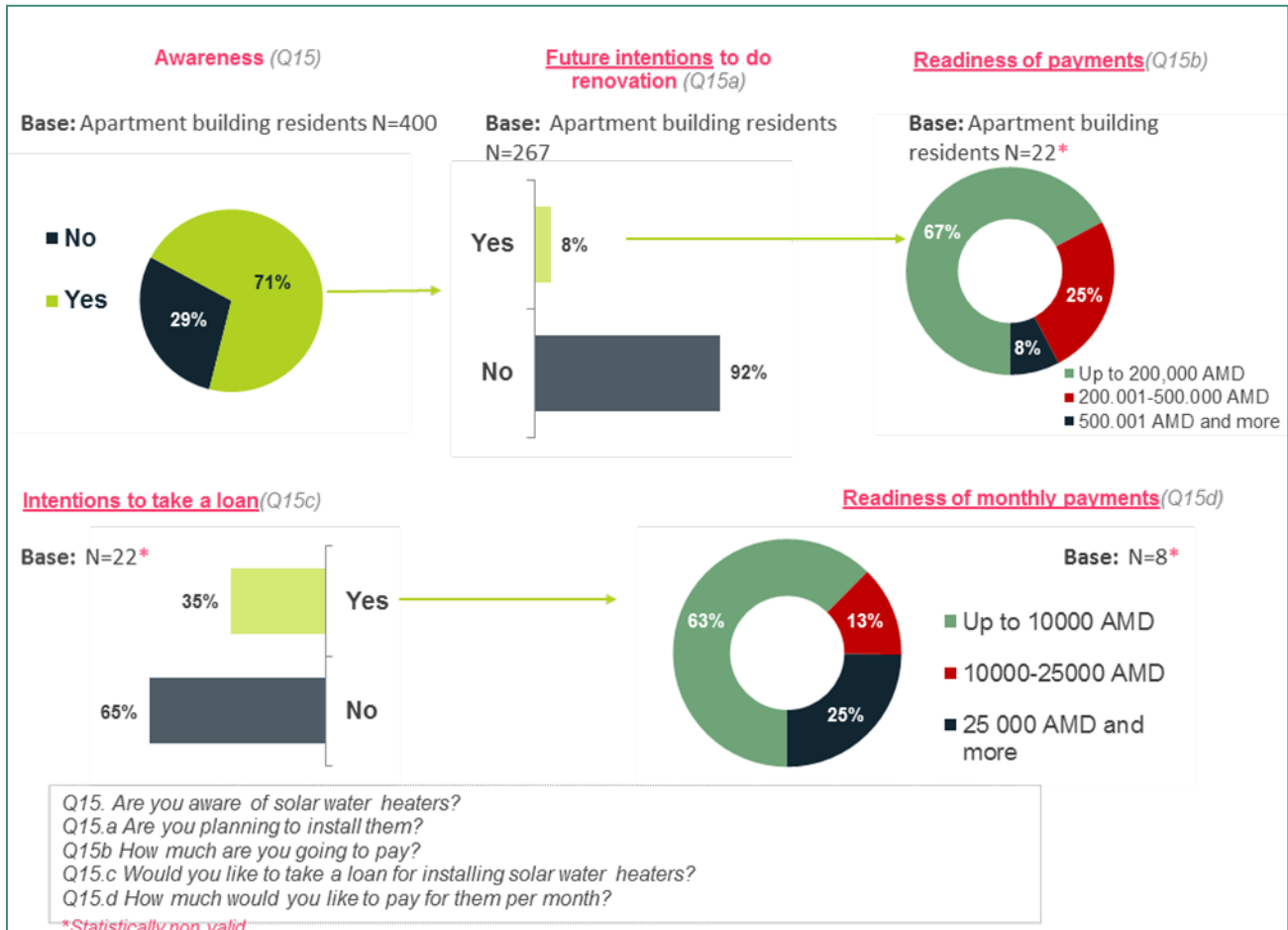
Picture 2.10



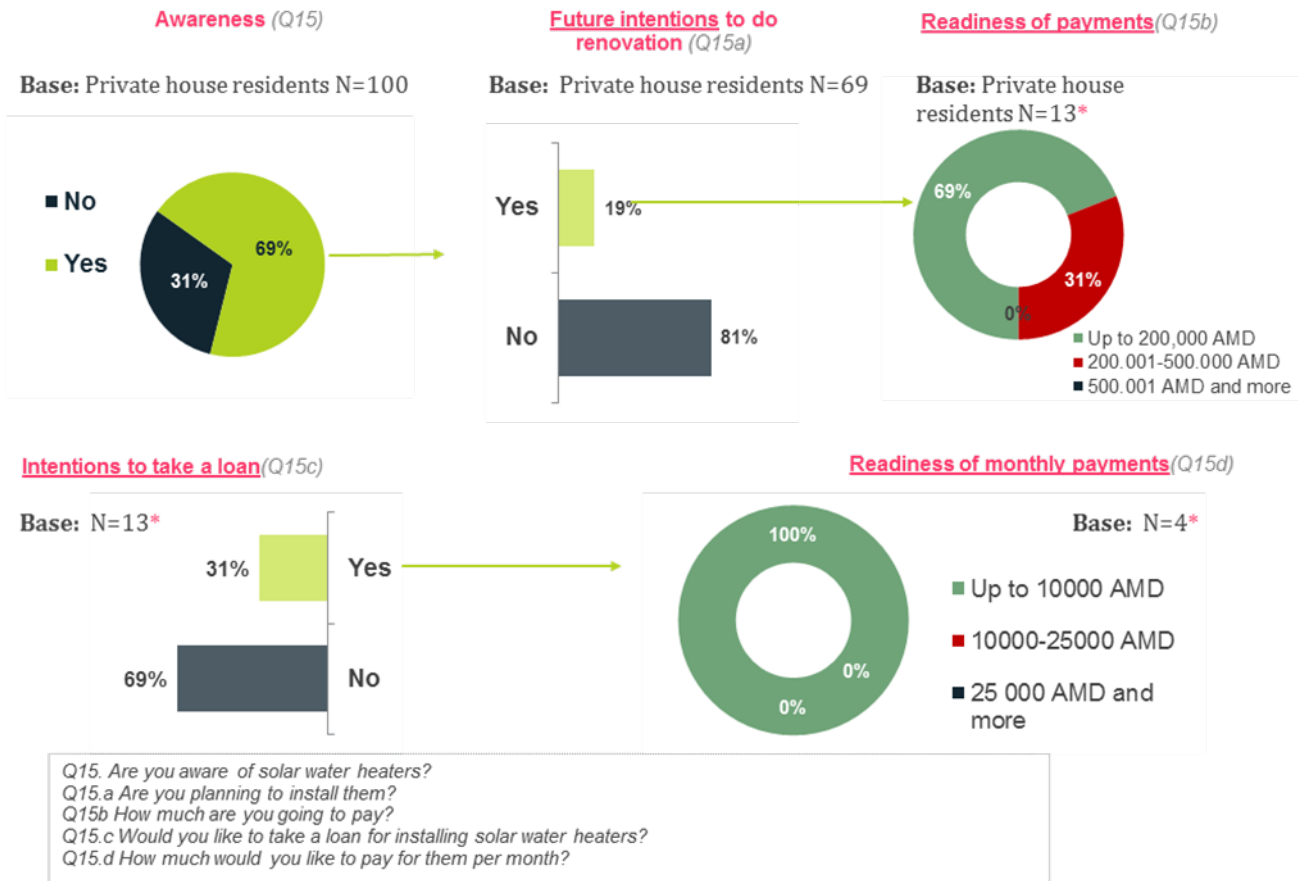
More than half of the respondents (71%) are aware of solar water heaters. 8% of respondents report that they intend to invest in them in the future. 67% of respondents are ready to pay up to 200,000 AMD for solar water heaters.

35% of respondents think it is possible to take a loan for the installation of a sun water heating. 63% of these individuals agree to pay up to 10,000 AMD.

Picture 2.11



Within private houses, awareness of solar heating awareness is 69% which is 2% lower than the awareness level among apartment building residents. Despite the seemingly low level of knowledge among private home owners, 19% of private house residents intend to install solar heating sometime in the future and 69% of them are eager to pay up to 200,000 AMD. No respondent showed interest in paying 500,000 AMD or more (0%) for a solar heating system.



Picture 2.12

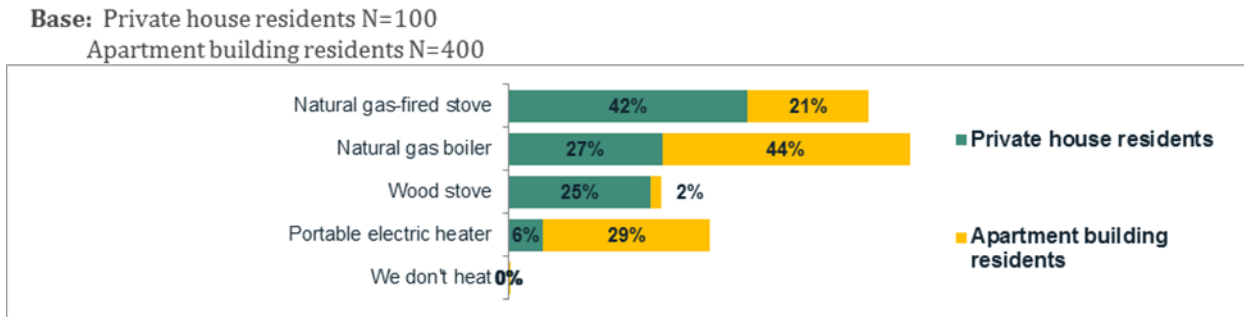
### SECTION 3. VOLUME OF THE CURRENT USAGE OF ENERGY BY TARGET GROUPS

The following pictures illustrate the methods that residents currently use to heat their homes.

The results show that in private houses, gas stoves are the most popular heating method with 42% of respondents reporting using them. Wood stoves are the second most popular method with 25% of respondents using this method. In multi-apartment buildings, natural gas boilers and heaters that work with electricity are the most popular (29%).

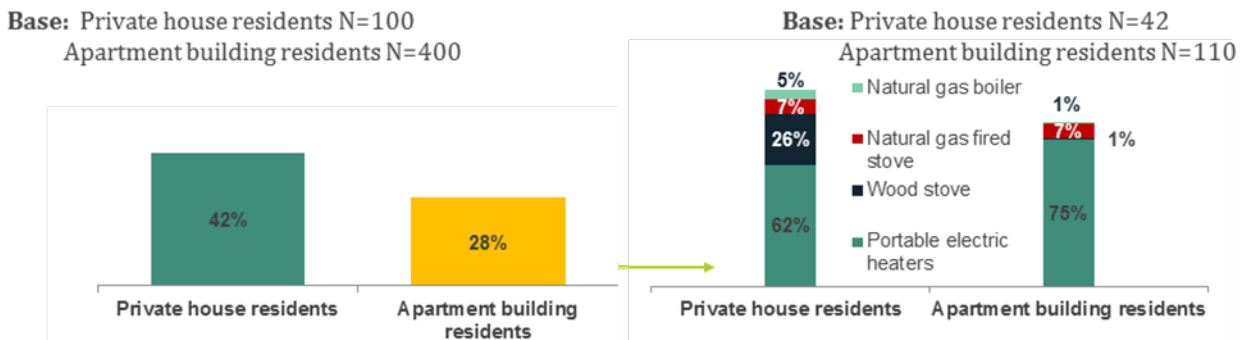
Secondary heating methods are mostly used in private houses with 42% of homes using a secondary heating method. Electrical heaters are the most popular secondary heating method in both multi-apartment buildings and private houses.

**Main methods of apartment heating (Q16)**



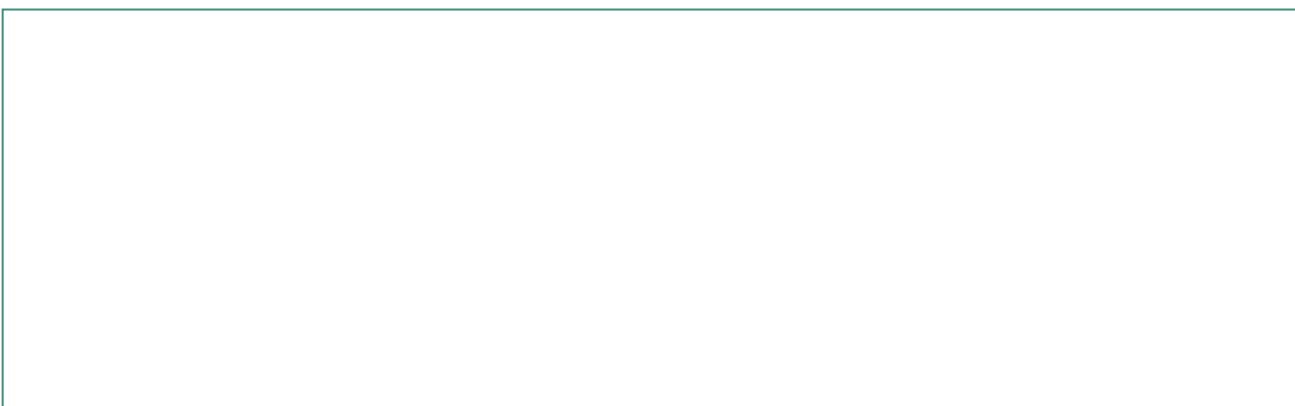
**Usage of second choice methods of apartment heating**

**Second choice methods of apartment heating (Q18)**



Q16: How do you heat your apartment in general?  
 Q17: Do you have second choice heating system?  
 Q18: What kind of second choice heating systems do you use?

Picture 3.1



Respondents who heat their apartments using a stove (gas or wood) ventilate their houses by opening a window (89% of private house residents, and 79% of multi-apartment building residents).

63 % of people who heat their apartments using a stove mentioned they noticed dark residue on the roof.

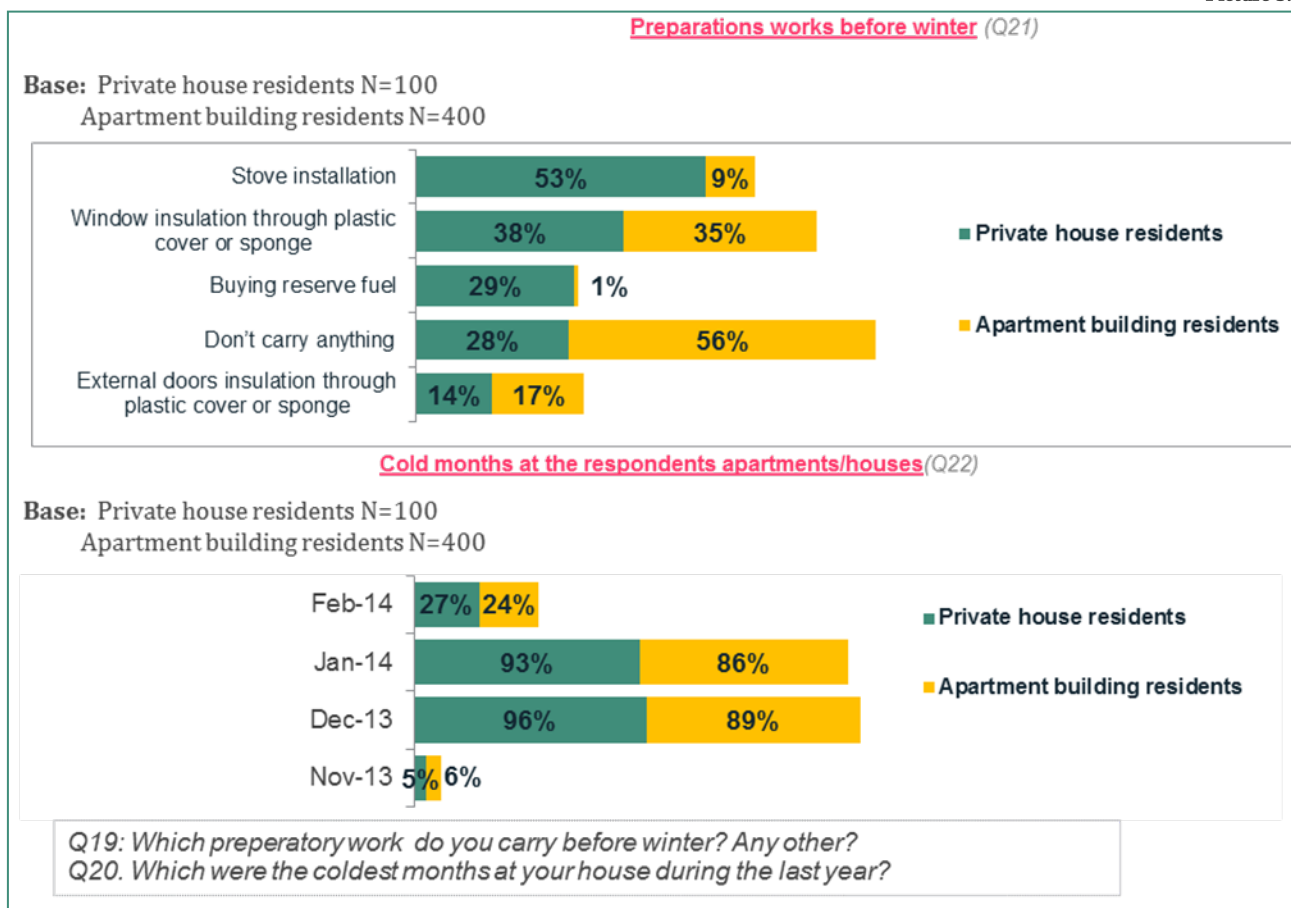


Picture 3.2

As seen in Picture 3.3, **the residents of private houses mostly make preparations before winter.** Thus, 53% install a stove, 38% install thermal window insulation, and 29% buy fuel reserves. Meanwhile 56% of multi-apartment buildings do nothing to prepare for cold weather. Of those who do, multi-apartment residents mostly install thermal insulation on the windows before winter- 36%:

During the last year **the coldest months at the respondents' apartments were December 2013 and January 2014.**

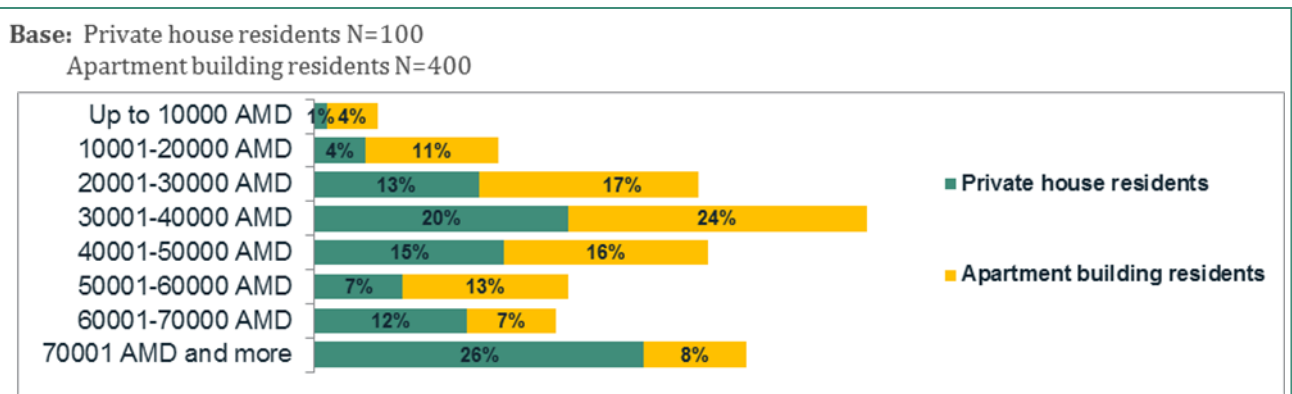
Picture 3.3



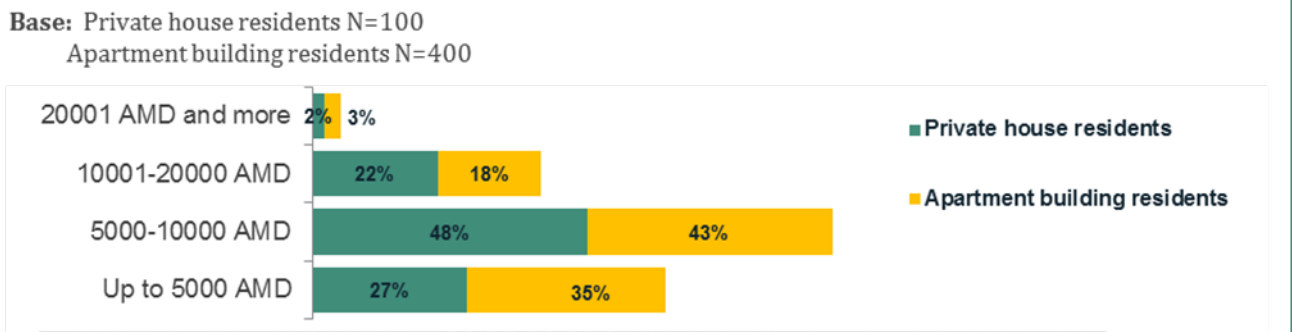
During the cold winter months, 38% of the private houses spent 60,000AMD or more on heating. 41% of multi-apartment owners reported spending between 20 000-40 000 AMD.

There is no reported difference between the cost of water heating during the cold and hot months. 44% of respondents reported spending 5 000 – 10000 AMD.

**Average monthly costs of heating during cold months (Q21)**



**The cost of water heating during the warm months (Q22)**

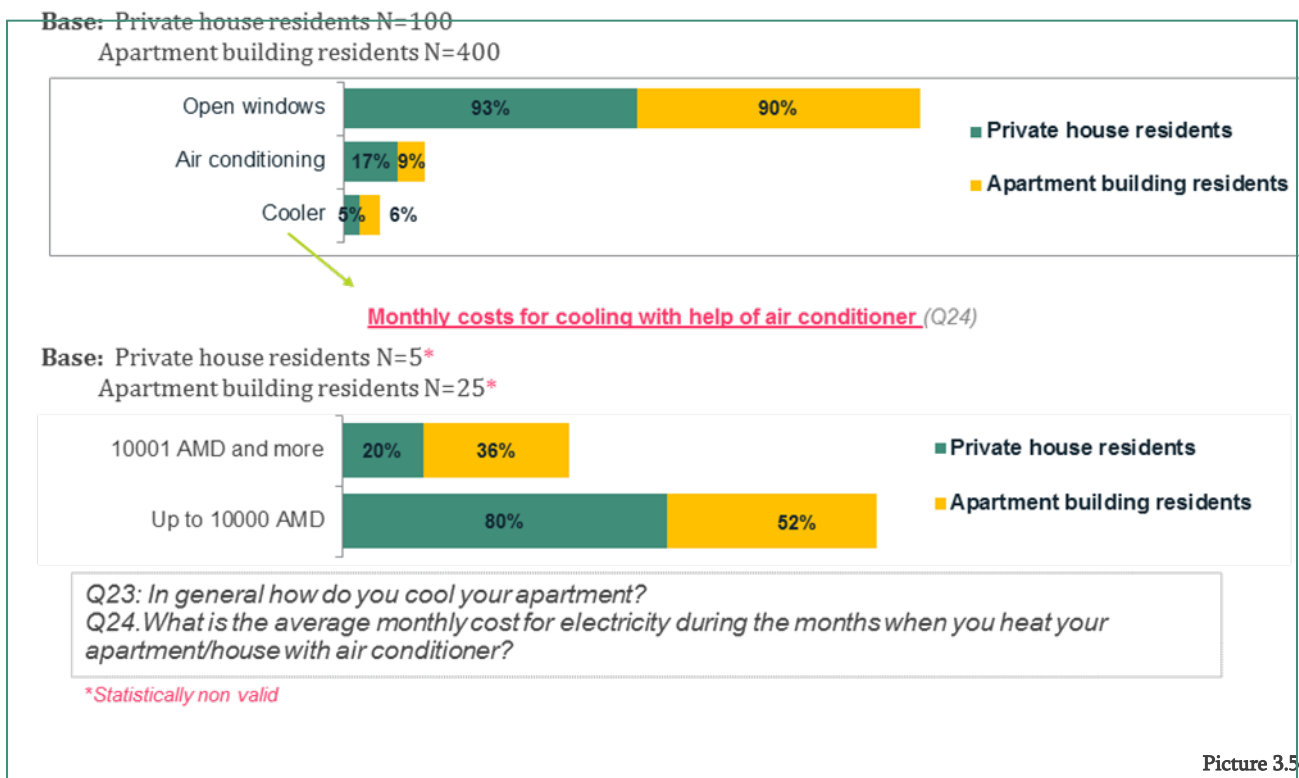


Q21. What is the average monthly cost for ONLY to Heat your house/apartment during that cold months?  
Q22. Can you rate your monthly costs on water heating during the warm months?

Picture 3.4

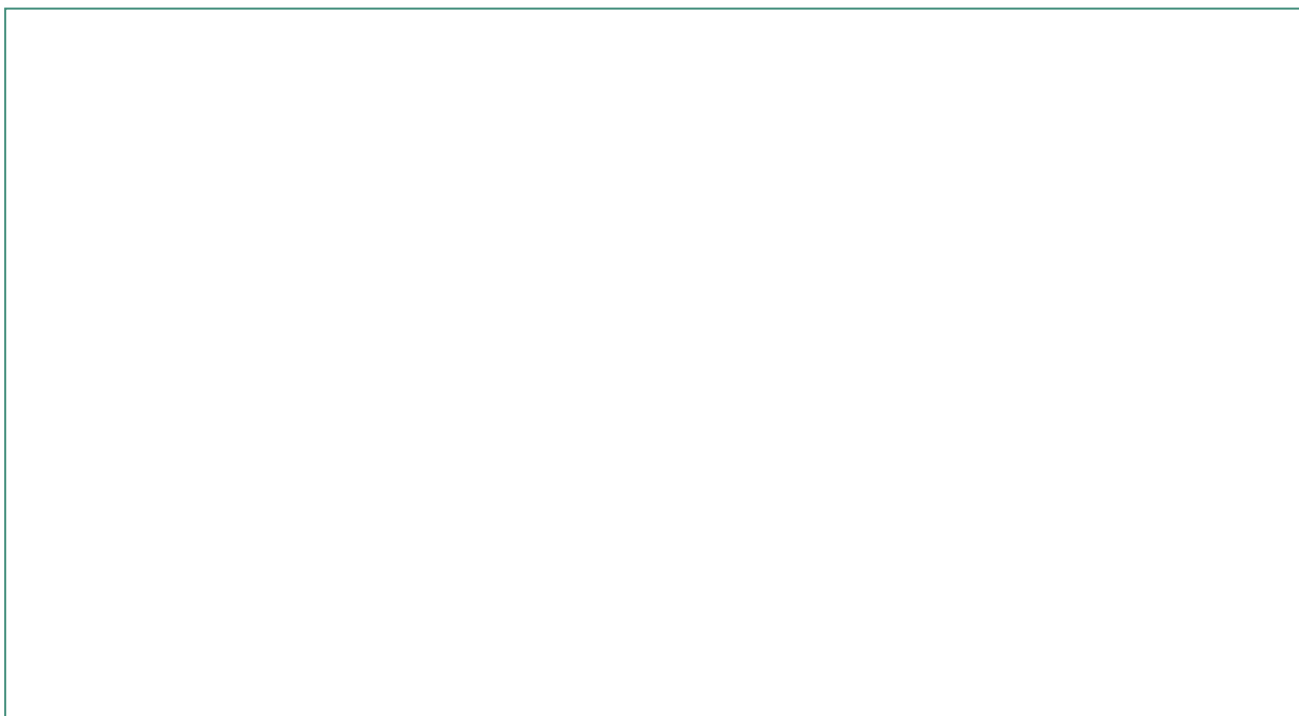
Respondents cool their apartments by opening their windows. Only 6% of respondents report that they use air conditioning. Of those that do, 80% of private houses and 52% of multi-apartment buildings reported spending an average of 10000 AMD on cooling.

**Methods of apartment cooling (Q23)**



Picture 3.6 shows the number of windows, doors, and rooms in the respondents' apartments.

Picture 3.6



**Base:** Private house residents N=100  
 Apartment building residents N=400

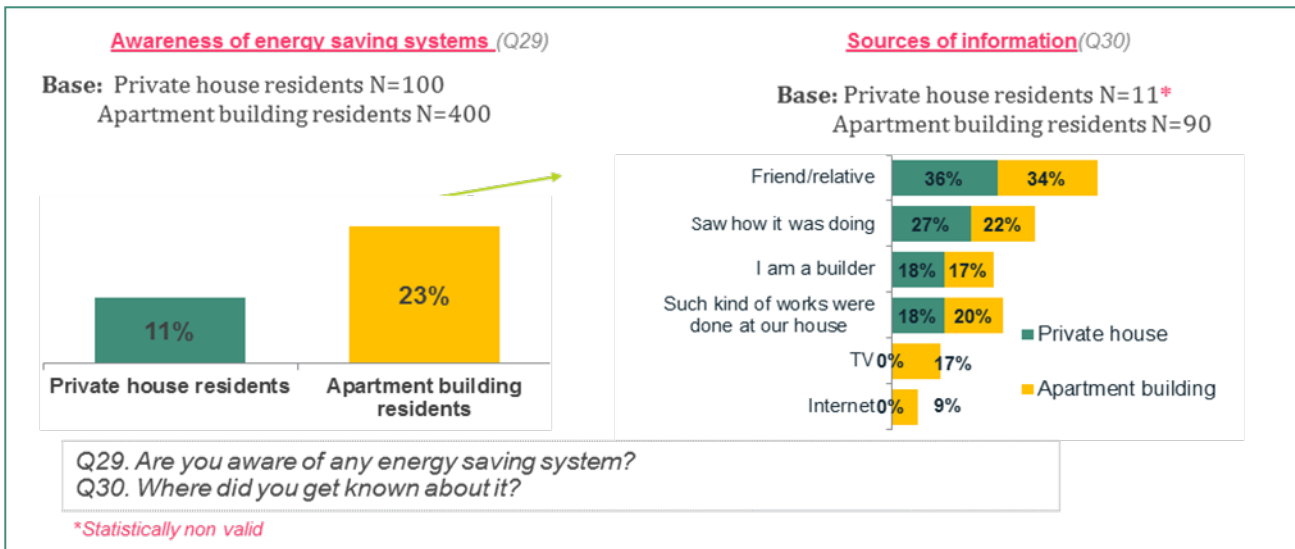
		Private house	Apartment building
<b>Number of windows</b>	1-2 window	12%	11%
	3-4 window	21%	45%
	5-6 window	36%	31%
	7-8 window	17%	12%
	9 and more window	14%	1%
<b>Number of doors</b>	1 door	65%	53%
	2 door	28%	36%
	3 door	4%	10%
	4 and more door	3%	2%
<b>Number of rooms</b>	1 room	3%	15%
	2 room	16%	32%
	3 room	30%	43%
	4 room	36%	9%
	5 and more room	15%	1%

Q25. How many windows are there in your apartment?  
 Q26. How many external doors(including the ones going to balcony) are there in your apartment?  
 Q27. How many rooms are there in your apartment/house?



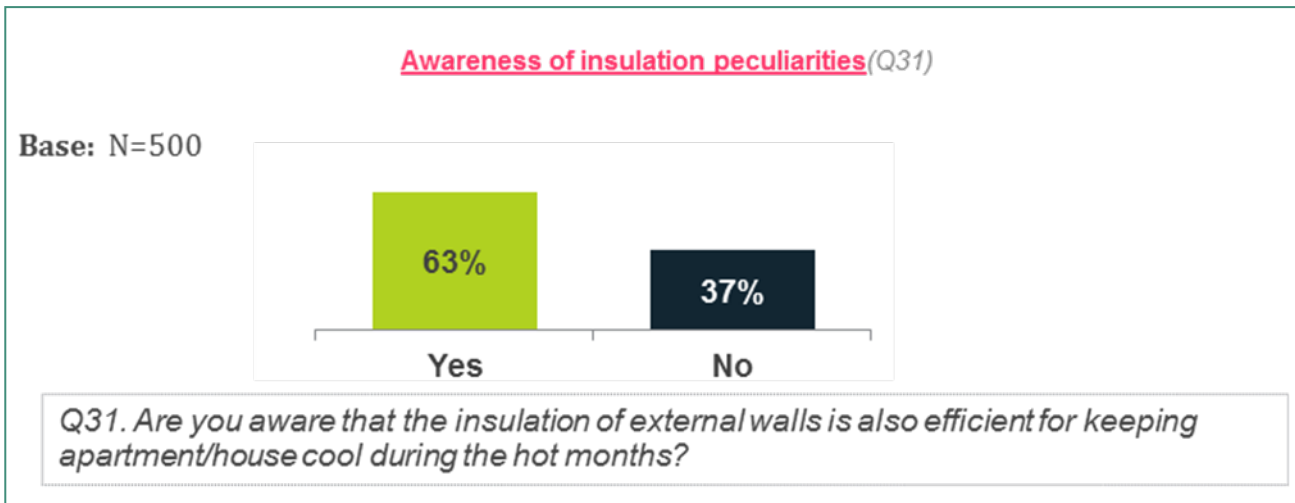
The awareness of techniques that promote energy efficiency is quite low. In comparison, multi-apartment residents are more aware (23%), than the residents of private houses (11%). Friends are the main source of information (35%). Relatives and personal experience are the second most common source of information (23%).

Picture 3.7



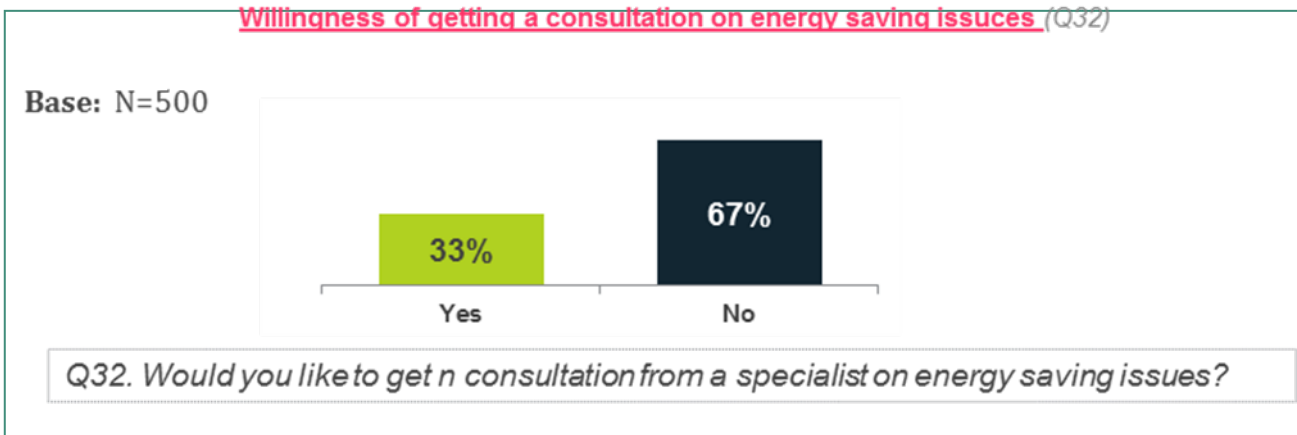
63% of respondents are aware that heating insulation helps apartments stay cool during the warmer months.

Picture 3.8



It is interesting that, though the awareness of energy efficiency issues is quite low, there is little interest among the respondents in acquiring additional knowledge or advice. **67% don't want to get a consultation.**

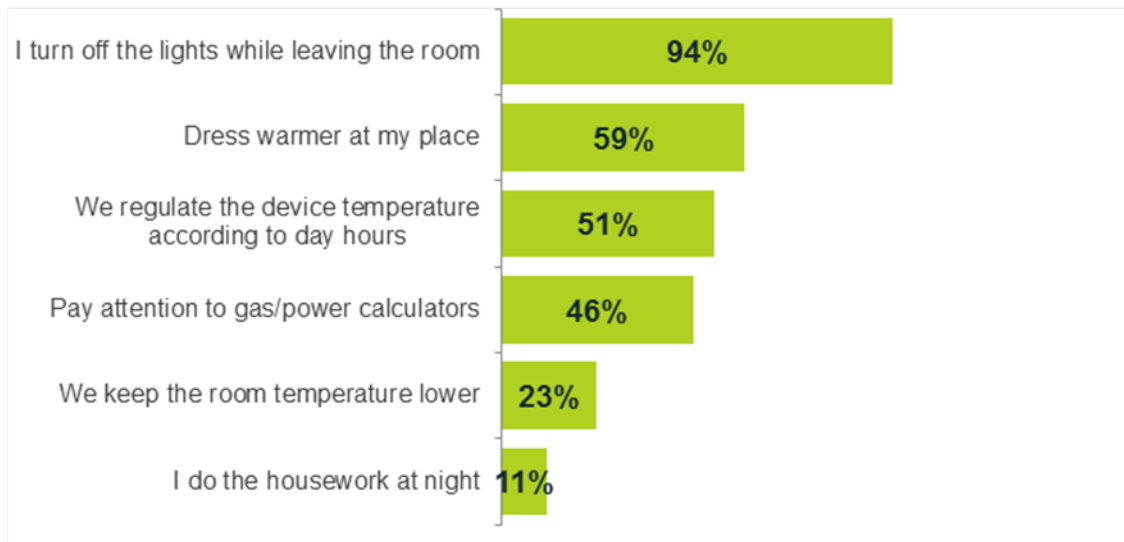
Picture 3.9



The most common energy saving behaviors shown among the residents are turning off the light while leaving the room (94%), wearing warmer clothes at home (59%), and regulating the device temperature during the day (51%).

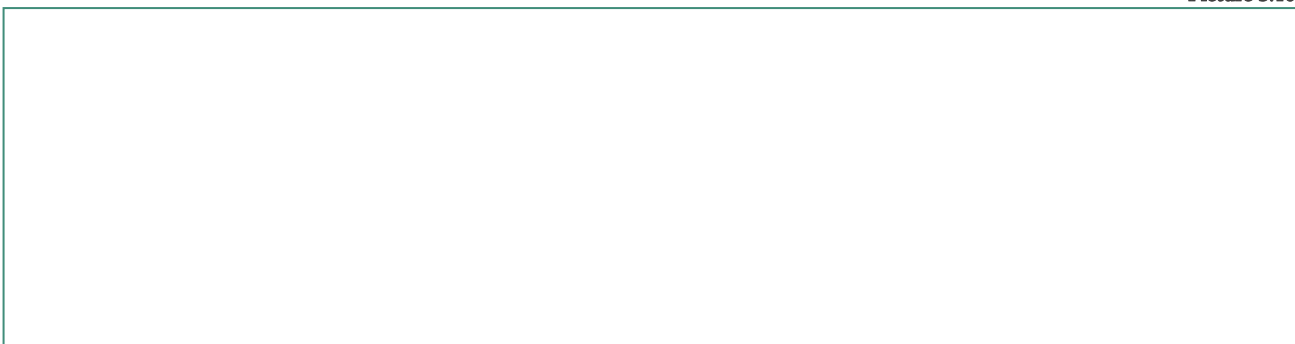
Energy efficiency behavior (Q30)

Base: N=500



Q33 What kind of energy efficiency behaviour do you have now?

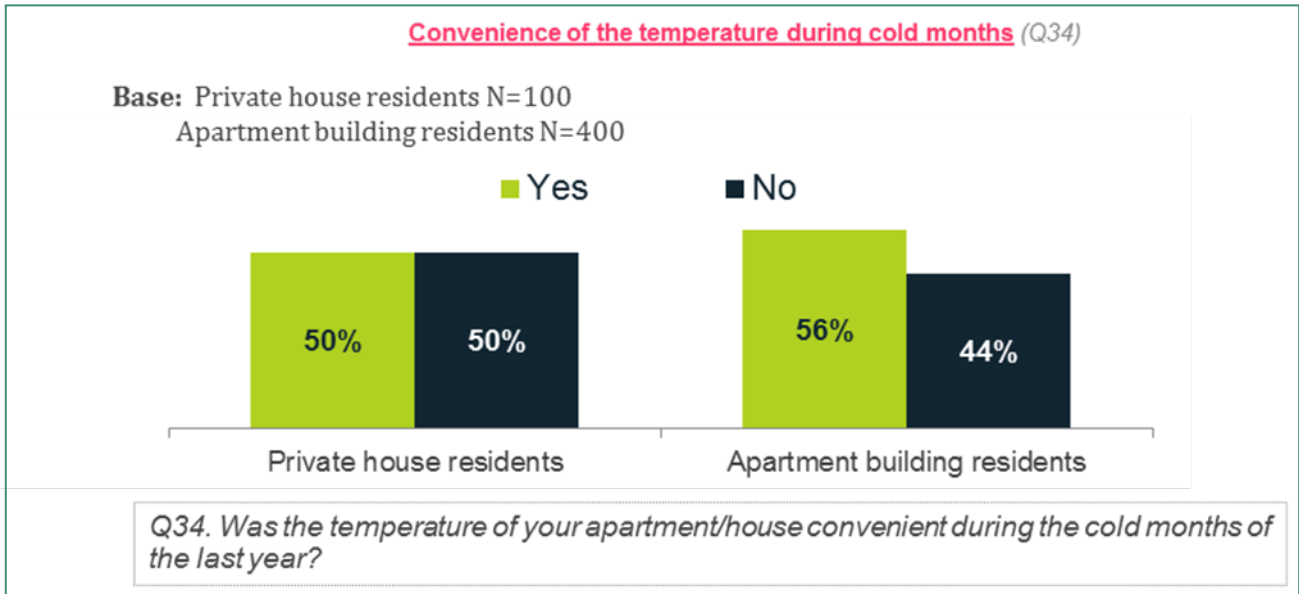
Picture 3.10



## SECTION 4. IMPACT OF ENERGY EFFICIENCY ON TARGET FAMILIES' HEALTH AND LIFE QUALITY

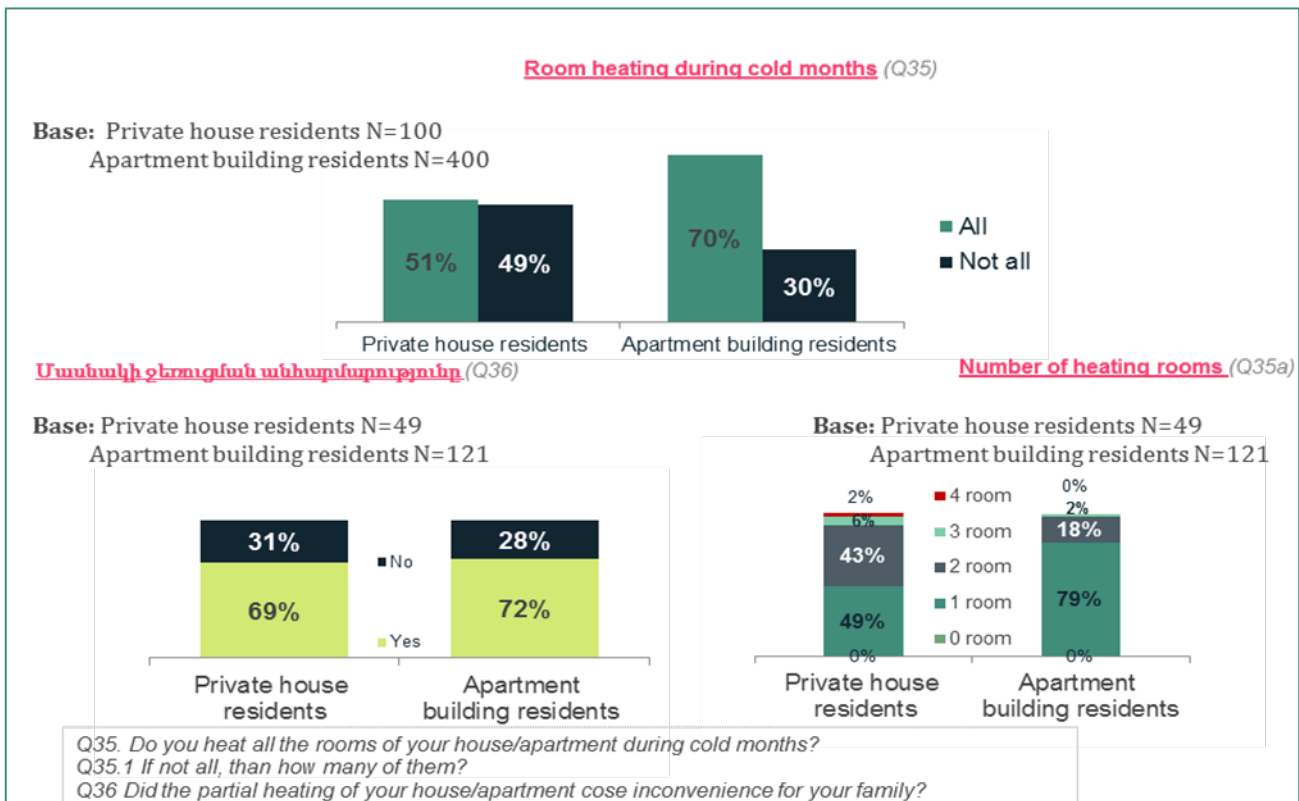
As seen in Picture 4.1, temperature comfort is significantly higher for multi-apartment building residents (56%).

Picture 4.1



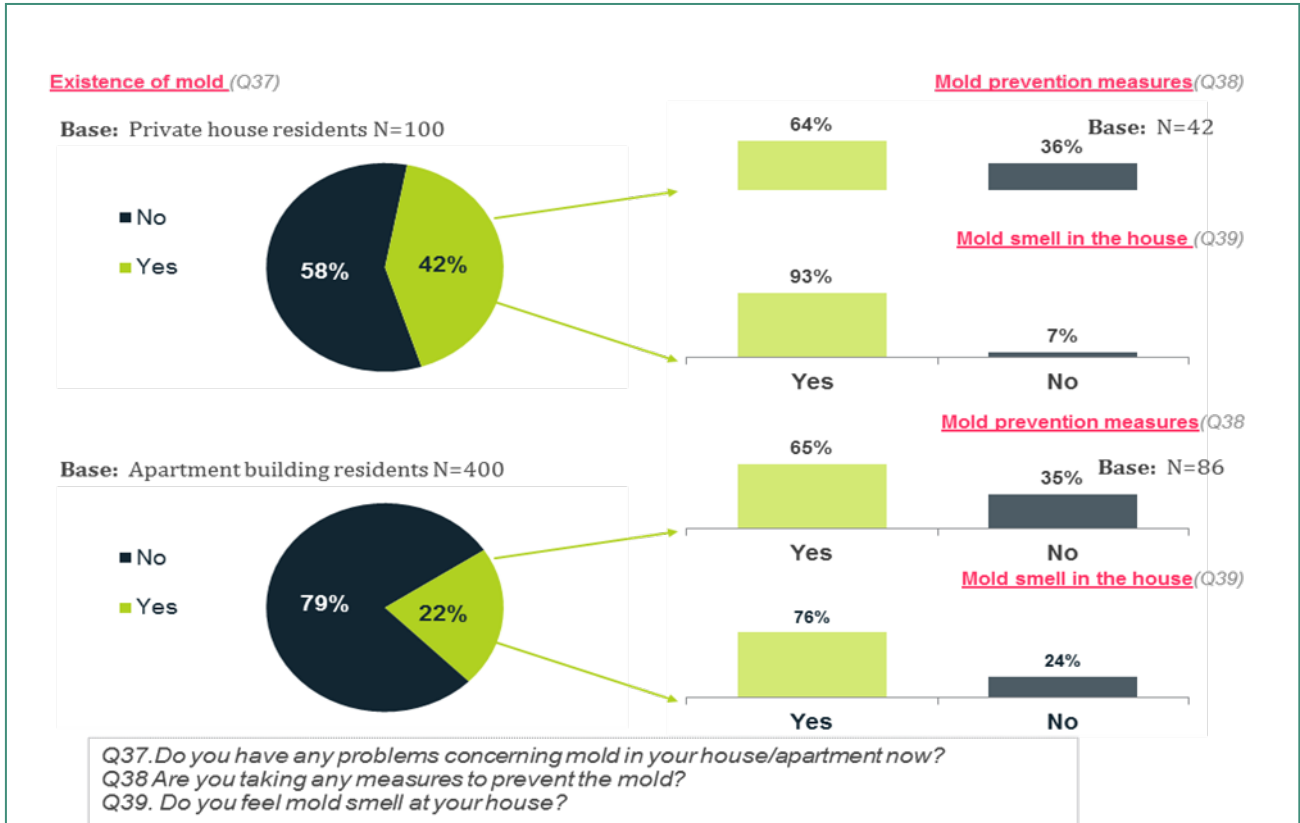
As shown in Picture 4.2, it is obvious that 70% of multi-apartment building residents heat the whole apartment in the cold months of winter. Whereas only half of private house residents (56%) implement total heating. Moreover, **49% of families who implement partial heating, heat only one room.**

Picture 4.2



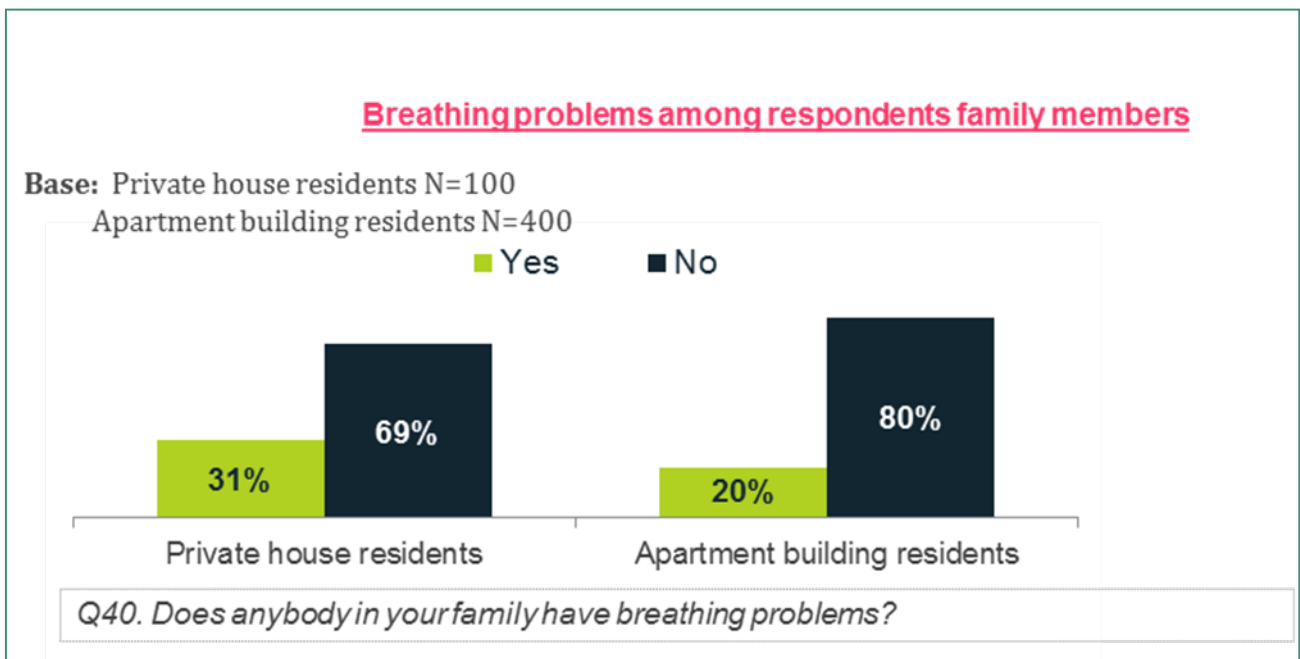
**Mold** problems were mostly reported by respondents residing in private houses (42%). In multi-apartment buildings, only 22% of residents mentioned that they had problems with mold. Both private house and multi-apartment building residents (35-36%) haven't done anything to solve their mold problems.

Picture 4.3



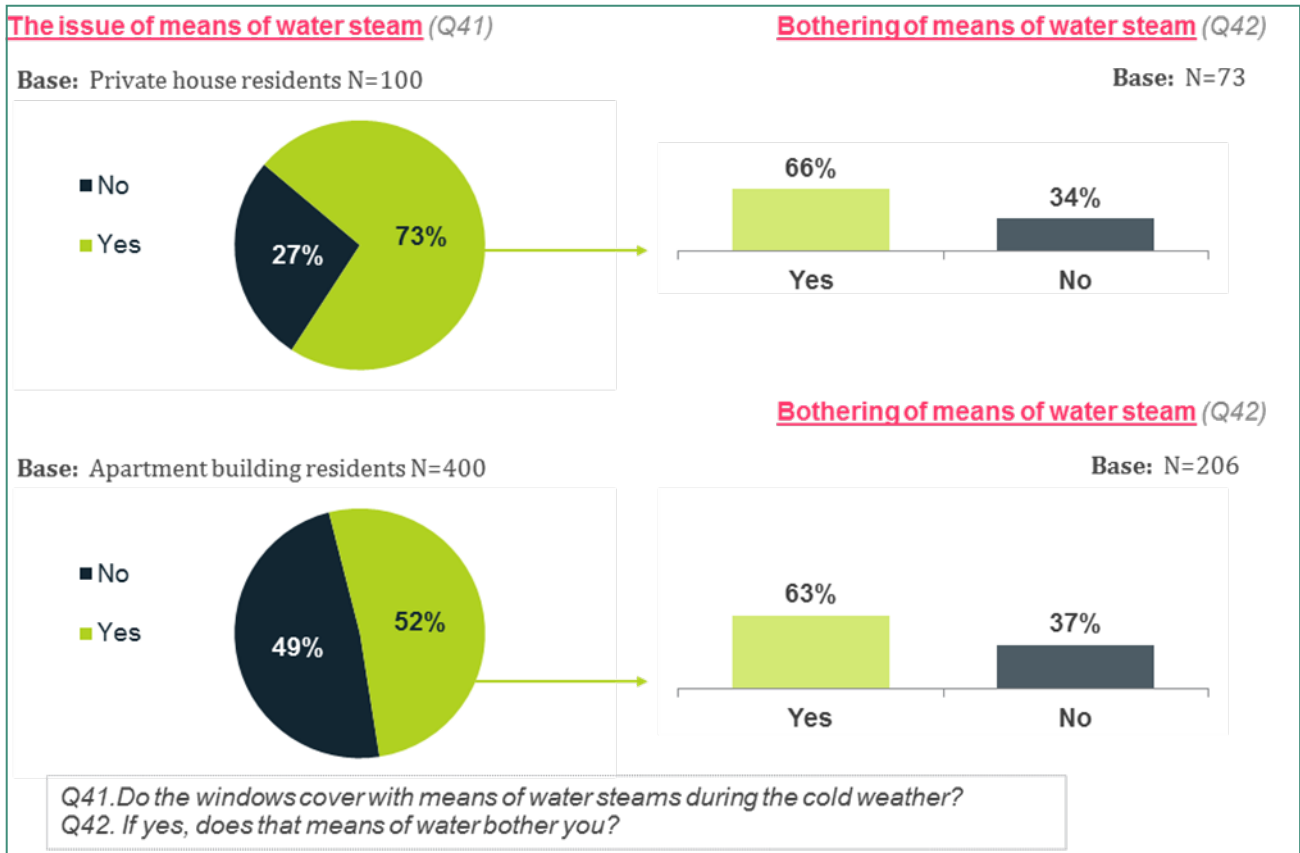
23% of all the respondents' families report that they suffer with **breathing problems**.

Picture 4.4



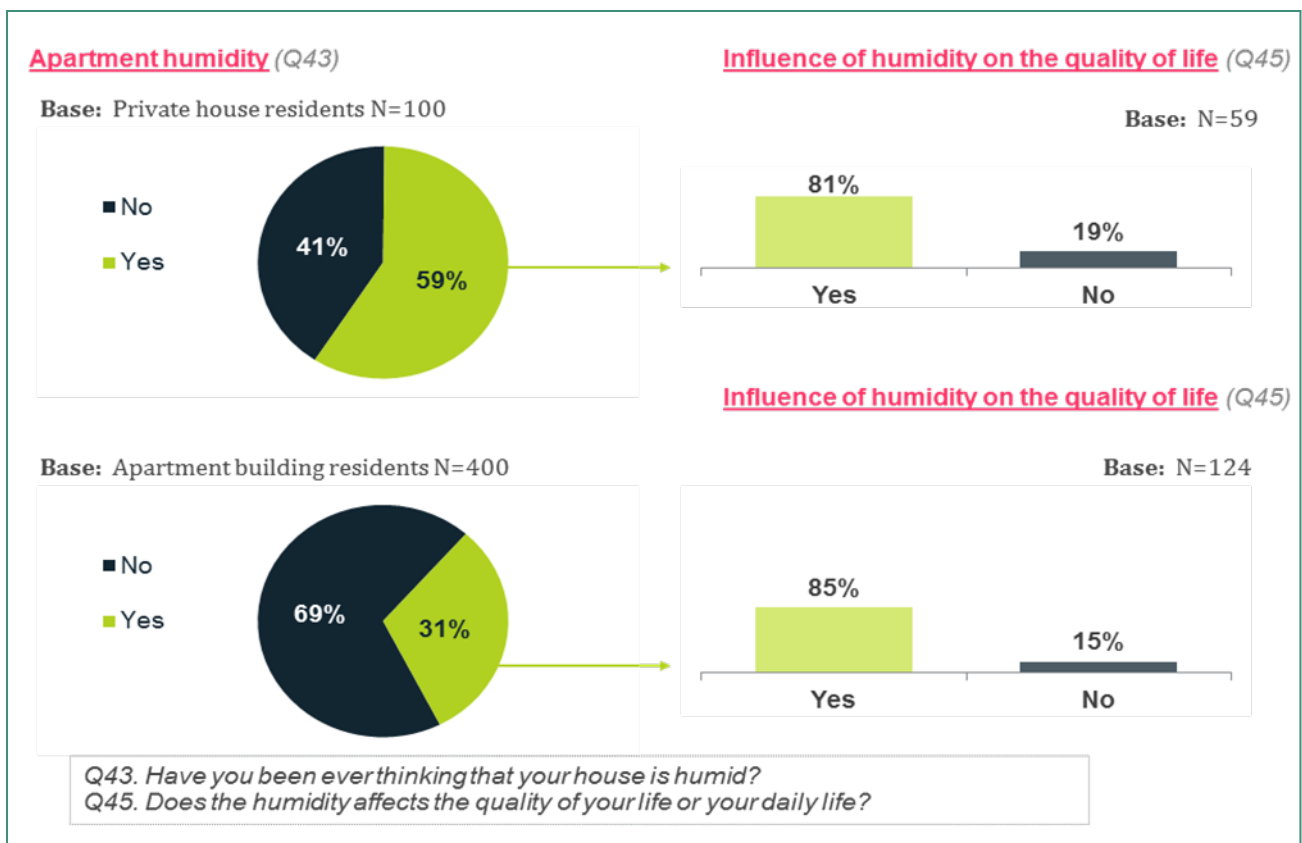
**Steam germinating problems** are more commonly seen in private houses (73%), although they are also rather common in multi-apartment buildings and were reported by 52% of families.

Picture 4.5



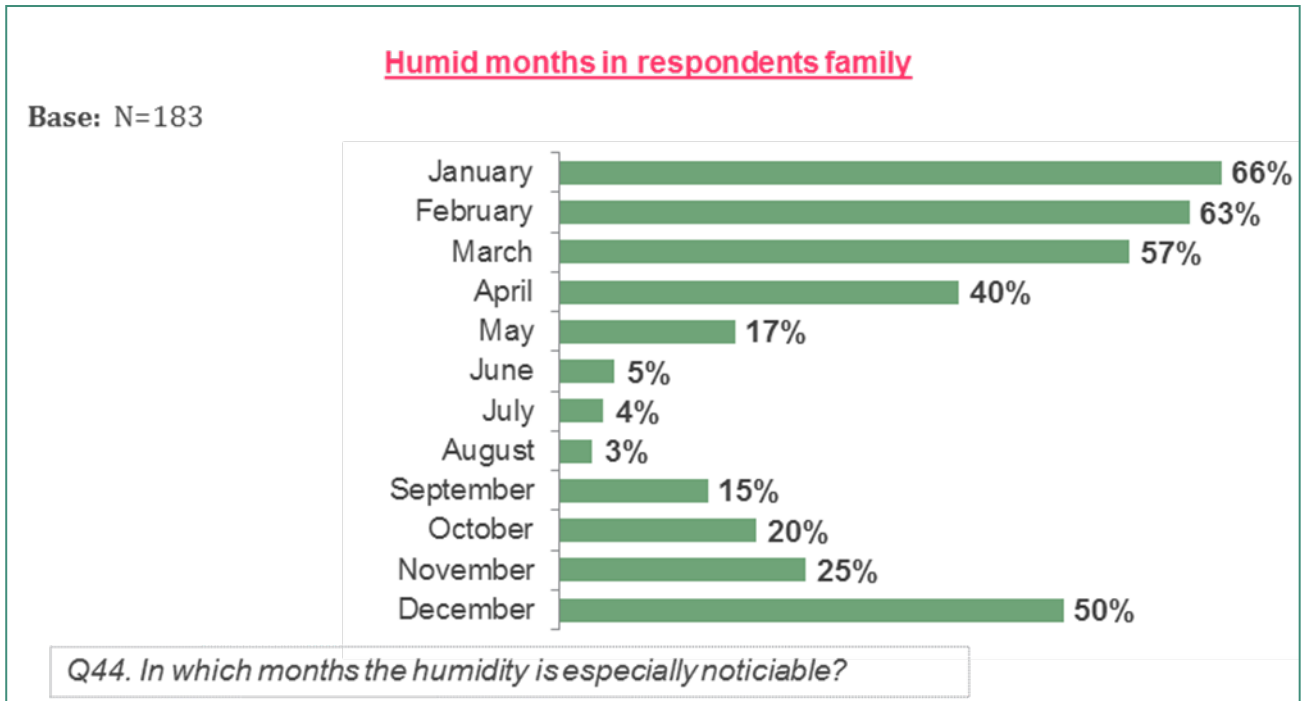
**Humidity** problems were only reported by 31% of respondents. 85% of which state that it affects the quality of their daily lives.

Picture 4.6



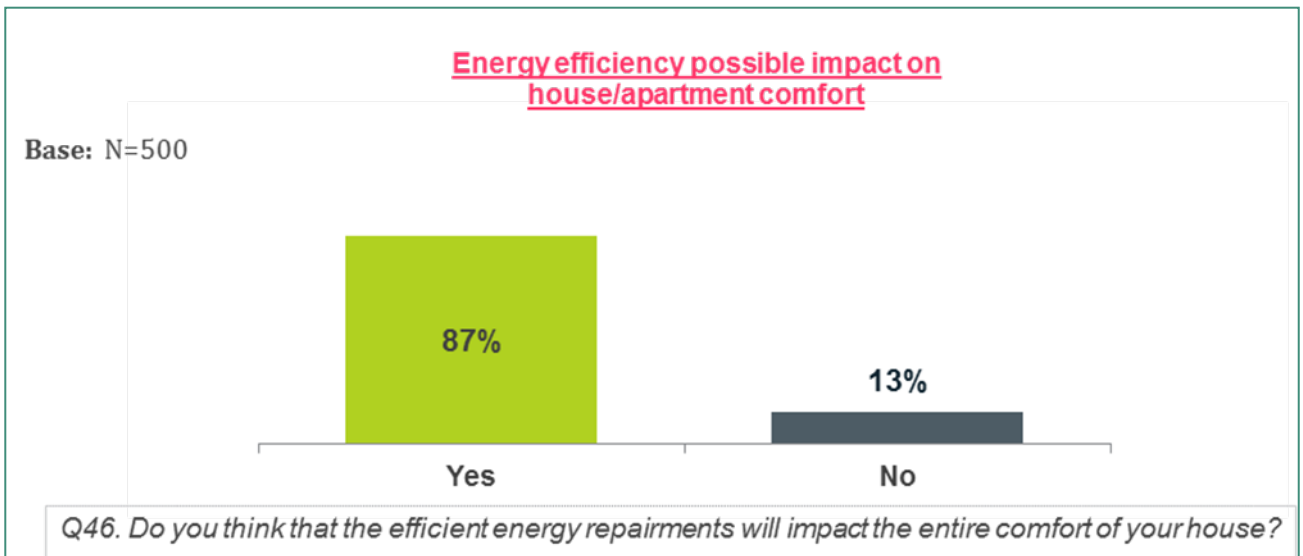
As seen in the picture below, the most humid months in the respondents' apartments are from December-March.

Picture 4.7



87% of respondents feel that implementing energy efficient renovations will have an impact on the comfort of their apartments.

Picture 4.8



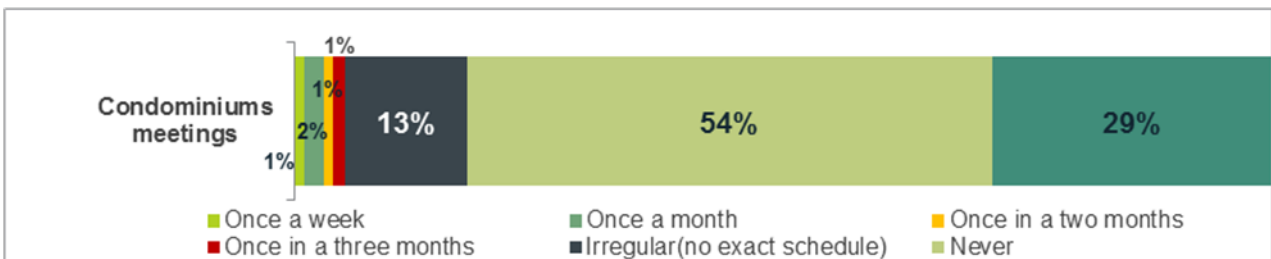
## SECTION 5. RESPONDENTS RELATIONS WITH CONDOMINIUMS

The following section includes data that relates only to multi-apartment buildings, as only the latter concerns condominiums.

As seen in the following picture, 54% of respondents think that their condominiums don't ever organize meetings and 13% of respondents report that the condominium meetings are irregular.

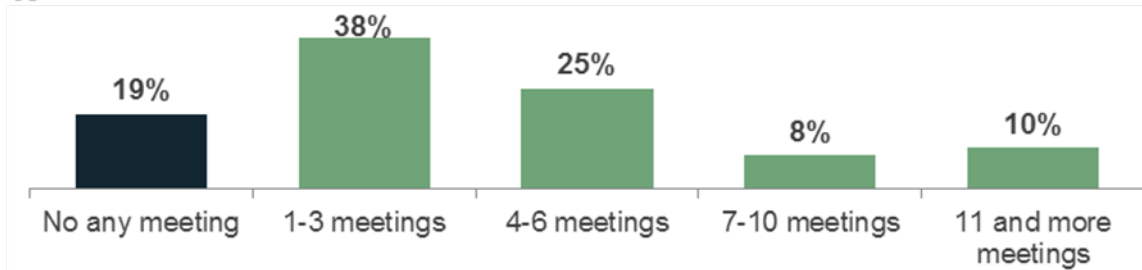
38% of residents reported having attended 1-3 meetings in the last year, and 19% of respondents reported having no interest in attending a condominium meeting.

**Base:** Apartment building residents N=400



### Family members participation in condominium meetings during last 12 months (Q49)

**Base:** N=48



Q47 How often does your condominium organize meetings?

Q49. Have you or one of your family members participated in a condominium meeting during the last 12 months?

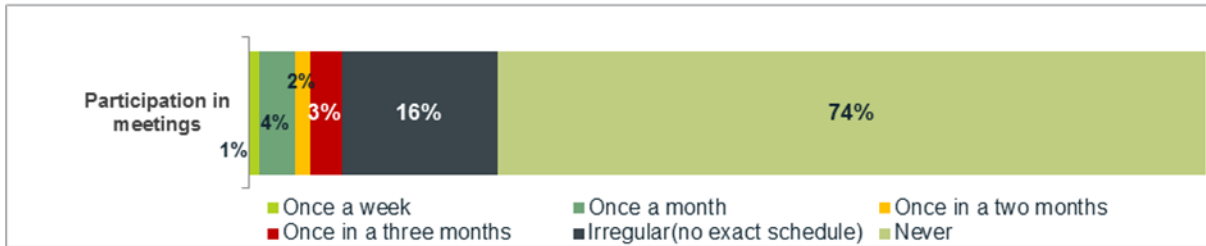
Picture 5.1

It is worth mentioning that the respondents' attendance at meetings organized by the condominium is quite low (74% never attend) and 16% of the respondents attend irregularly only.

It is interesting, that the contact rate with condominium representatives is higher and more frequent (29%

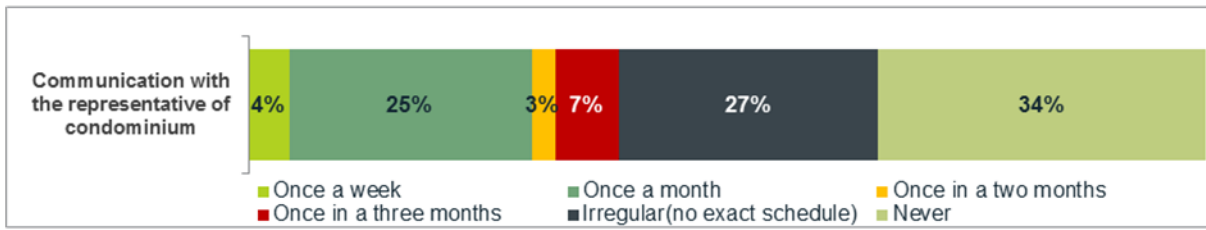
Base: N=185

**Frequency of participation in condominium meetings (Q48)**



**Frequency of communication with the representative of condominium (Q52)**

Base: N=400



Q48 How often do you or one of your family members participate in the condominium meetings?  
 Q52 How often do you communicate with the representative of your condominium?

of respondents deal with them at least once a month), which can be the result of having to deal with specific paperwork related to tax payments, references for banks or other government organisations etc. .

Picture 5.2

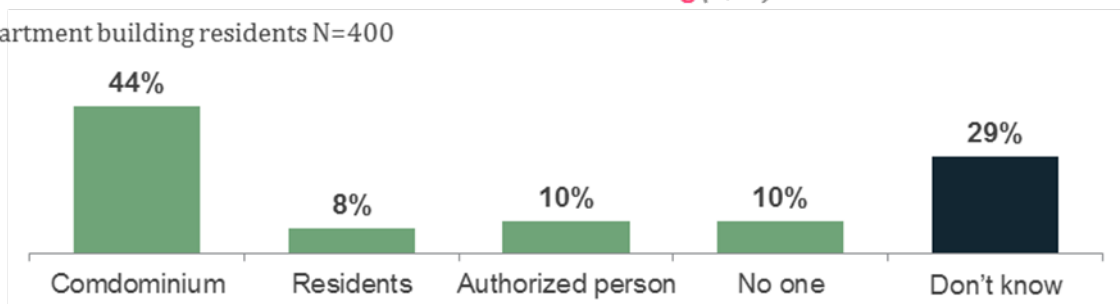
In 29% of cases, respondents don't know who is responsible for the preservation of the common areas in the building. 44% of respondents reported thinking that the condominium is responsible.

Picture 5.3



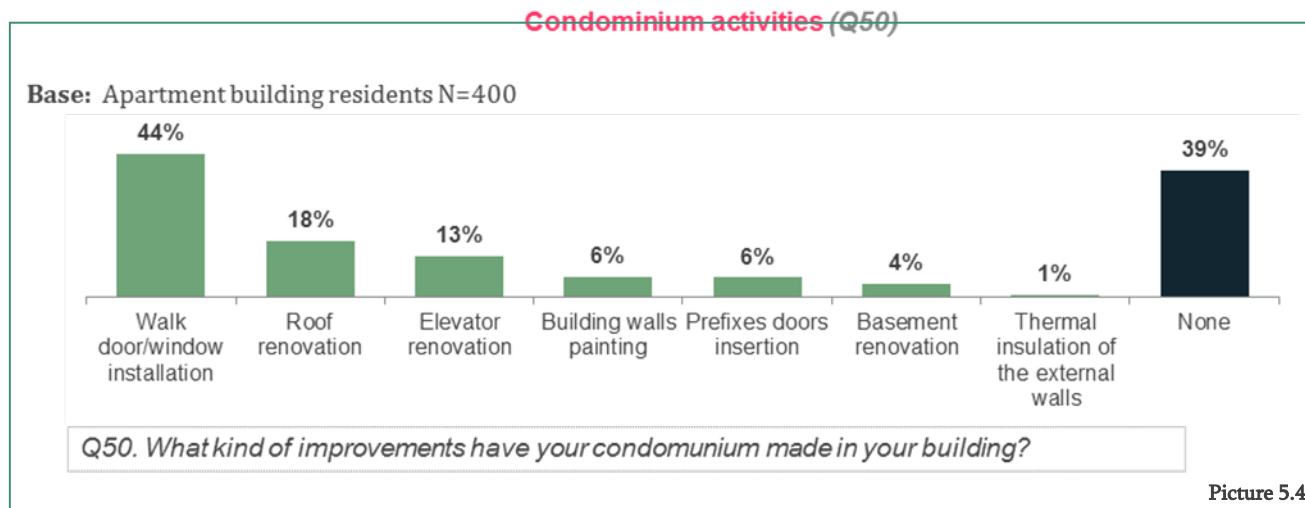
**Responsible person for the protection of the total areas in the building (Q53)**

Base: Apartment building residents N=400



Q53. Who is responsible for the protection of the total areas in your building (walk doors, elevators, exterior)?

In respondents' buildings, the most common renovation has been to implement walk door/window installation (44%). In **39% of buildings, no renovations have been implemented.**



As it is seen in Picture 6.5, the majority of the renovations have taken place after 2011.

**Condominium activities period**

**Base: Apartment building residents N=400**

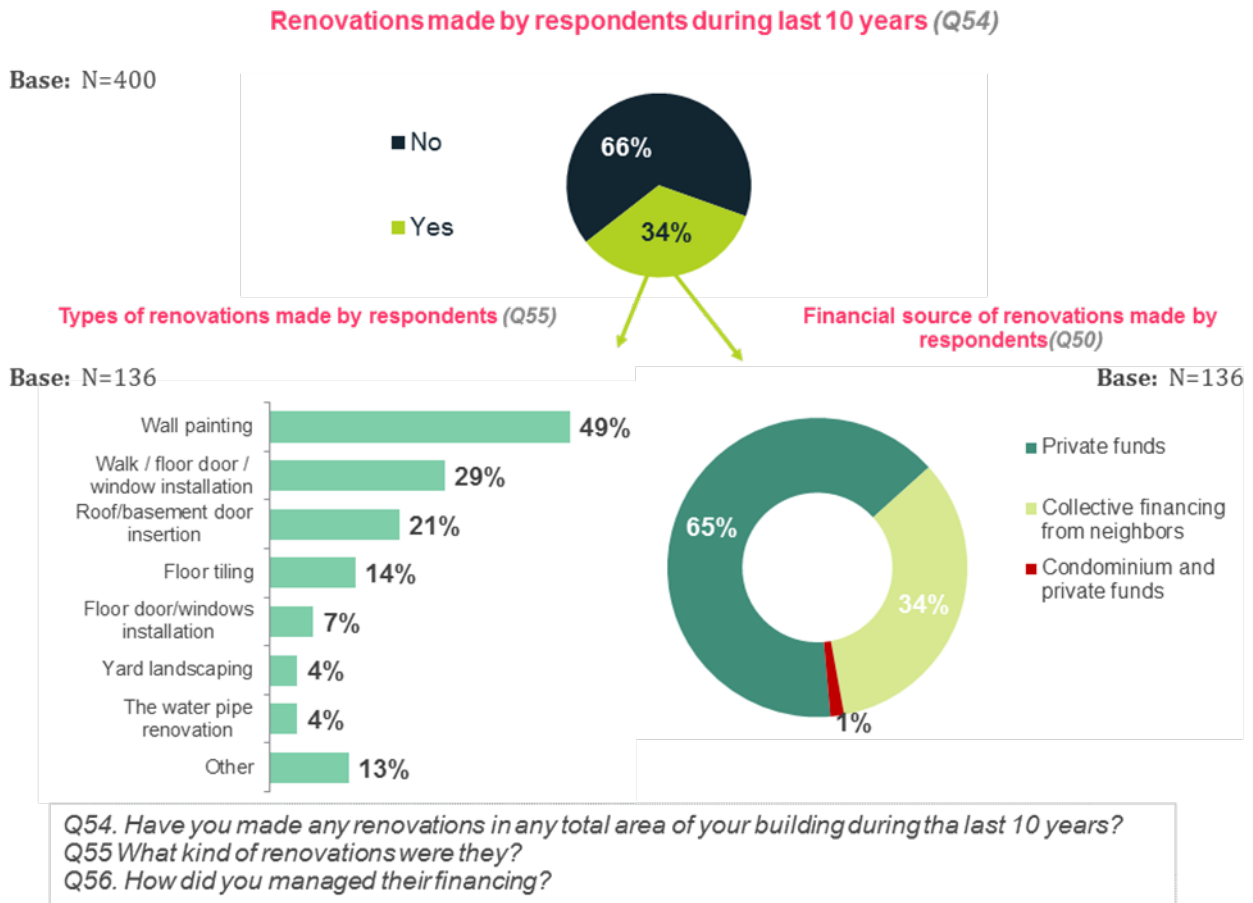
	Condominium activities N=	Up to 2007	2008-2010	2011-2012	2013-2014
Walk door/window installation	177	8%	23%	34%	28%
Roof renovation	70	16%	21%	31%	23%
Elevator renovation	50	4%	10%	12%	60%
Prefixes doors insertion	24	8%	8%	50%	21%
Basement renovation	17	18%	6%	6%	65%
Thermal insulation of the external walls	3*	33%	33%	33%	0%
None	157				

Q50. What kind of improvements have your condomunium made in your building?  
Q51.1 Please, tell me the approximate month/year

\*Statistically non valid

Picture 5.5

Only 34% of respondents have done any kind of renovation work in their buildings. 49% of these renovations were related to wall painting and 29% were related to installation/repairs of walk doors and windows.



The vast majority (65%) have paid for these improvements out of pocket. These improvements have been made collectively in only 34% of cases.

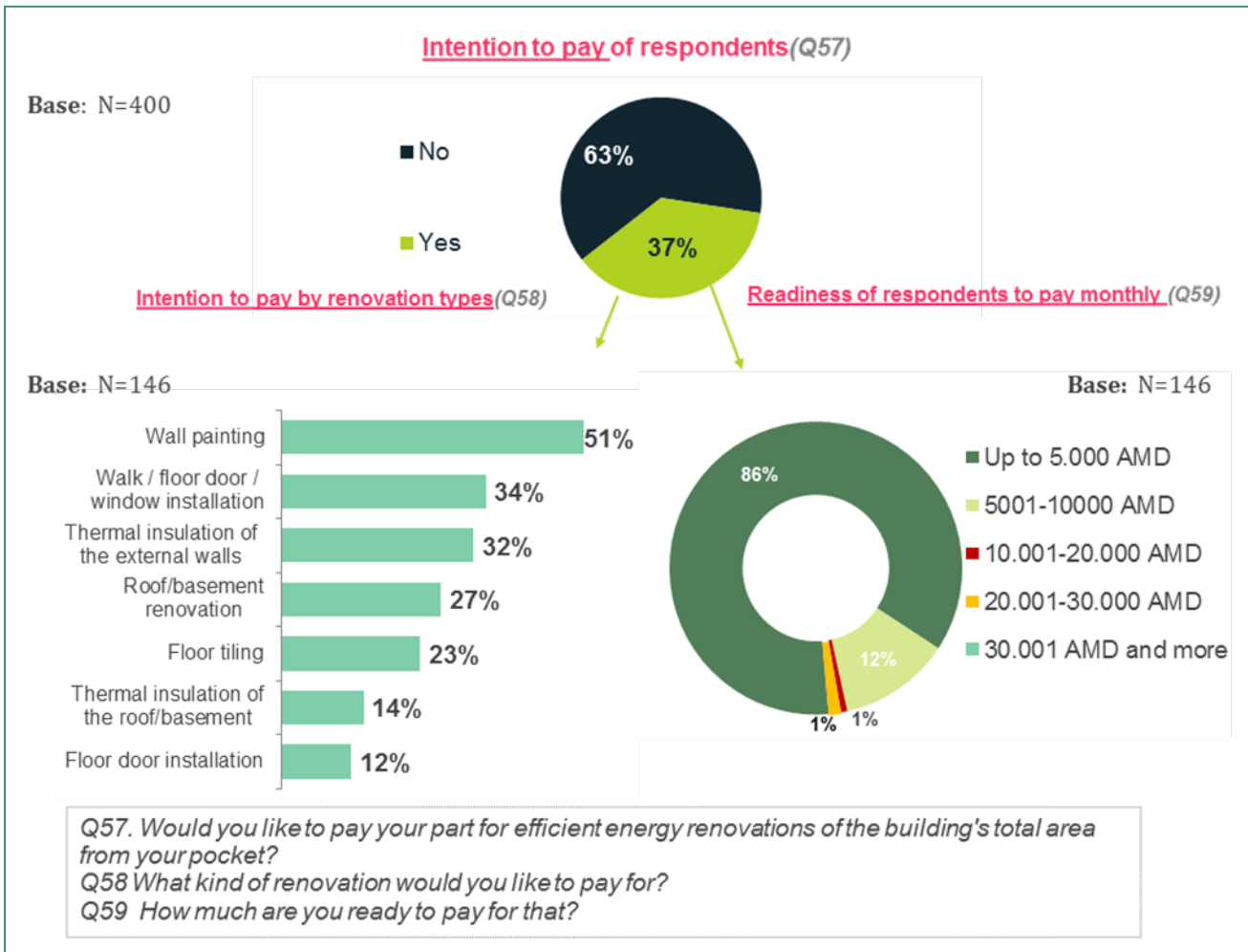
Picture 5.6



Respondent’s willingness to pay for the energy efficient renovation in the building is quite low (37%). Moreover, more than 86% are ready to pay up to 5 000 AMD; only 2% are willing to pay 10 000 AMD or more.

56% out of 25\* Avan community residents were eager to pay out of pocket for efficient energy renovations around the building’s total area. Respondents’ readiness to pay is illustrated in the picture below (Q29).

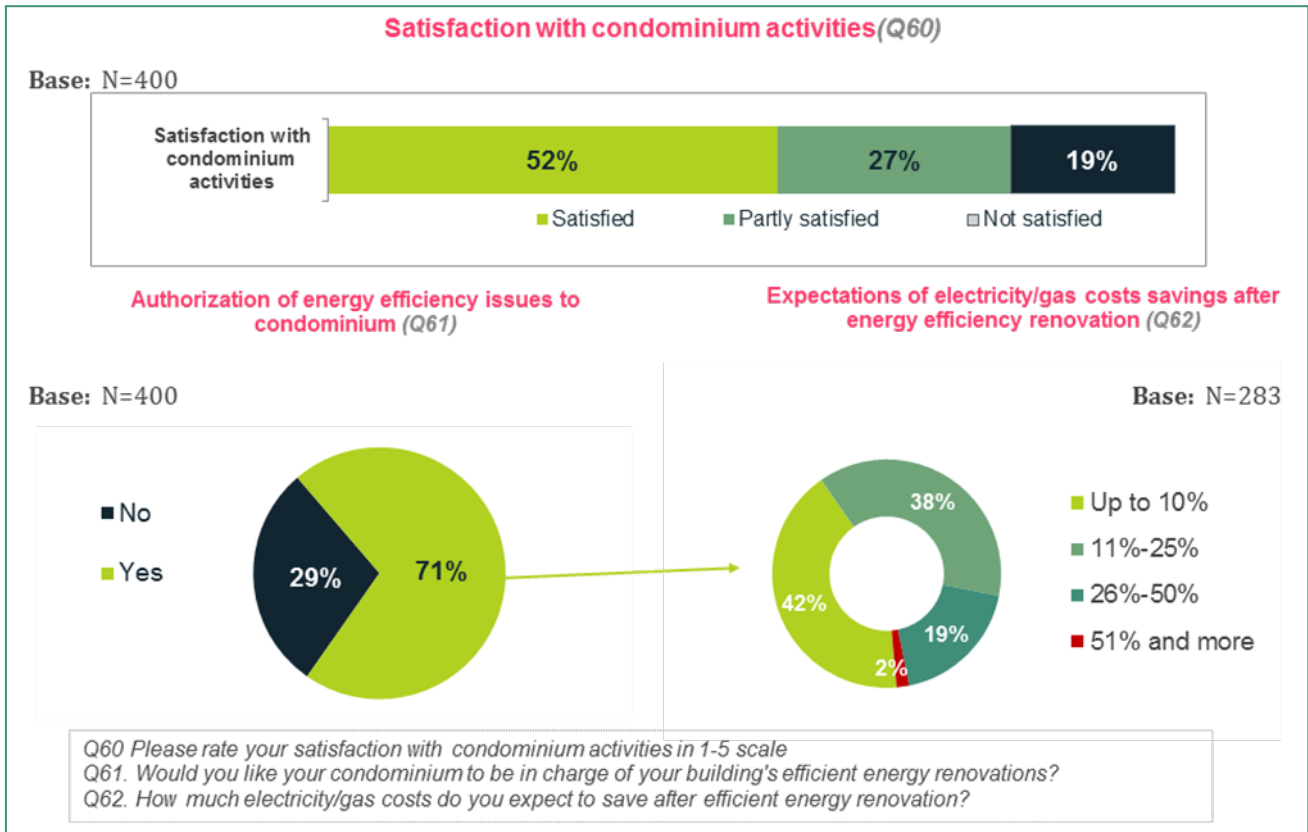
Picture 5.7



\* 25 is statistically non valid base.

Only half the respondents (52%) are satisfied with condominium activities. 71% would trust the condominium to deal with energy efficiency issues. Moreover, only 2% of these 71% are aware of the potential of energy efficiency. (51% and more).

Picture 5.8



91% of the respondents mentioned that they pay their condominium fees. 91% of them pay up to 3000 AMD. Only 9% don't pay the fees. The 76% out of the 9% do not pay their fees and report that they are dissatisfied with the work that has been done by their condominium .

Picture 5.9

