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# Assessment of Heat Supply and Heating Options in Urban Areas of Armenia

Household Survey Report



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## Acronyms

AMD	Armenian Dram(s)
EDRC	Economic Development and Research Center
HH(s)	Households in urban multi-apartment blocks of Armenia
MFE	Ministry of Finance and Economy of the Republic of Armenia
NSS RA	National Statistical Service of the Republic of Armenia
PSU	Primary Sampling Units
SAHS-2007	Household Survey on Assessment of Heating Situation for Urban Multi-apartment Blocks in 2007
SAHS-2005	Household Survey on Assessment of Heating Situation for Urban Multi-apartment Blocks in 2005
USD	United States Dollar

## Executive Summary

- During the last years, various aspects of socio-economic life, including heating and heat supply, were dynamically changing in Armenia. This is explained by increased welfare of the population, high gasification rates, stricter environmental and safety requirements. The Armenia Renewable Resources and Energy Efficiency Fund, under Urban Heating Project funded by the World Bank and the Government of Armenia, initiated the Survey on Assessment of Heating Situation for Urban Multi-apartment Blocks (SAHS-2007), which was carried out by the Economic Development and Research Center (EDRC)<sup>1</sup>.
- According to the above mentioned Survey (SAHS-2007), 99% of households in urban multi-apartment blocks of Armenia (hereinafter – HHs) heated their apartments during the 2006/2007 winter. The main source of energy was natural gas. During the last years, the shares of HHs using gas has increased dramatically along with drastic decrease of wood-heated HHs. 53% of HHs used natural gas in 2006/2007, 34.6% - electricity and only 9.8% - wood. Usage of natural gas was lower in Yerevan which was the case also under a similar assessment taken place in 2005. The latter shows that mostly private houses are connected to the natural gas supply system in Yerevan vs. multi-apartment blocks.
- Along with primary heating options, large share of HHs (40%) also use secondary heating options, mostly with electric heating appliances. The share of those who have a secondary heating option is higher among wood-heated HHs, as well as gas-heated HHs and HHs that use other sources. Thus, there is large potential to improve heating and efficiency in Armenia HHs.
- The main heating device used is manufactured gas heaters: about 40% of HHs used them in 2006/2007, as compared to 35% in the previous winter. Electric appliances (both non-manufactured and manufactured) and wood stoves are also widely used. The share of HHs using non-manufactured gas heaters decreased to 1.9%. The share of HHs that have individual heating boilers is still low (5.1% of all HHs), although it showed fast growth trends.
- Analyses of options of getting hot water show plenty of opportunities to improve and increase their safety. Main methods of boiling water are gas water heaters, non-manufactured electric immersion heaters and gas stoves.
- Only one third of HHs heated their apartments entirely. On average, the heated surface is 60% of the total area of apartments. Those who heat entire apartments are more among gas-heated HHs (47%). Moreover, more HHs in Marzes heat their apartments entirely than they do in Yerevan.
- Depending on the heating option (source of energy), devices, having children, as well as other factors, average temperatures in apartments vary. The average temperatures are the highest in gas-heated apartments, especially in those, who have individual heating boilers (19.4C°). Average temperatures are the lowest in electricity-heated HHs (13.4C°). HHs that have children, on average, have 1C° higher than those without children. The difference in temperatures between day and night times is visible: it is colder in nighttime, especially in 2<sup>nd</sup> and 3<sup>rd</sup> bedrooms. Because of lower gas usage rates and higher electricity usage rates, average aggregated temperatures in apartments in Yerevan are lower than in Marzes.
- Cases of illnesses due to heating deficiencies are widespread, although that has decreased significantly in 2006/2007 as compared to 2004/2005. The highest frequency of cases was recorded in Tavush Marz. The cases higher in wood-heated HHs and those that use other options - 56% and 70% respectively. The least cases were recorded in gas-heated apartments - 38%.
- The satisfaction with heating is still low: only 14% of HHs were satisfied with the heating of their apartment in 2006/2007. The share of HHs that are partially satisfied was higher in Marzes, while dissatisfied HHs were more numerous in Yerevan. HHs that use electricity, especially non-manufactured electric appliances, are completely dissatisfied. Lack of satisfaction is explained by deficiencies: the main deficiencies mentioned were insufficient heat or unequal distribution.

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<sup>1</sup> See [www.edrc.am](http://www.edrc.am)

- According to the Survey, 28% of HHs is willing to take loans to improve heating. Willingness to borrow is especially high in Ararat, Gegharquniq, Tavush and Lory Marzes. However, the awareness of HHs on borrowing opportunities is very low. The analyses show that there is huge demand for loans in the market for the improvement of heating.
- Increasing energy saving is also important to improving the situation with heating. 72% of HHs believes they would save heat and expenses on heating if they replaced old windows. According to the Survey, the market for loans for window replacement is also quite large on the demand side.
- Overall, social assistance for heating purposes in Armenia is extremely low. When analyzing the Survey data, one can notice that heating improvement opportunities in Armenia are limited due to insufficient social collaboration and underdeveloped state of various institutions. The latter mostly refers to condominiums, which, according to interviewed HHs, are not effective and underdeveloped. The lack of cooperation and unwillingness to take collective actions (mostly determined by social and psychological, as well as economic factors) is the next important obstacle that hinders the introduction of modern, efficient and safe heating options in multi-apartments blocks, such as small local boiler houses supplying heat and hot water to one (or several) entrances of one (or several) block(s).
- The Survey shows the progress made in Armenia during the last years toward having safe, clean and efficient heating. Usage of natural gas, manufactured appliances and hot-water-circulation-base heating options has increased significantly. For the further progress, and especially, in order to support the poorer HHs in this field, public policies and projects are very much needed. They can take the form of monetary and/or non-monetary (capital) transfers provided to poor HHs, as well as in the form of increasing awareness of the population on newest technologies, advantages thereof, projects that target improvement in heating and various opportunities. Specific steps on developing and promoting heating loans market are necessary: this can be viewed as one of the most important public policy issues.

## 1. Introduction

High rates of economic growth and development during the recent years in Armenia leave their influence on various aspects of the socio-economic life of the population, including also the situation with heating and heat supply. Improvement in the situation with heating and heat supply is largely determined by the pace of gasification in the country, as well as increased and tightened requirements to environmental and safety issues. Nonetheless, a large portion of the population is still facing serious problems in terms of efficient heating during winter, whereas achievement of clean and efficient heating in the country in terms of safety, economic, environmental and health aspects is a long-term issue. Therefore, it is extremely important to regularly monitor and evaluate the current situation, which will allow developing policies and actions targeted at ensuring safety and quality of life for the entire population and for the poor, in particular. This can be achieved only through efficient collaboration of public and private sectors.

The Republic of Armenia and the World Bank signed a Credit Agreement on July 20, 2005: the objective is to support the increased use of clean, efficient, safe and affordable heating in the Armenian urban schools and multi-apartment blocks. To that end, the project is intended to consist of the following components:

- Technical assistance,
- Funds made available for the purposes of the project,
- School heating.

Funds will be made available in the form of on-lending through financial institutions (banks, credit unions, etc.) and in the form of capital grants directly to the poor households with the purpose improving heating conditions. In order to increase the funds available for the poor households the Global Partnership for Output Based Aid (GPOBA) Trust Fund provided additional funding to the Armenia Renewable Resources and Energy Efficiency Fund. Provision of funds to the poor households is intended to be in the form of purchasing individual gas heaters or their connection to the local/centralized heat supply system.

It is envisaged to regularly evaluate the efficiency of applying various heating options, the number of those, who use affordable and safe heating option, level of development of management bodies of multi-apartment blocks from the perspective to enter into collective contracts, etc. That will allow evaluating the progress in heat supply services and implemented projects.

Studies and data on heating and heat supply situation in Armenia are very few. Some data on heating options can be found in 2001 Census; however, the rapid developments in the country reduce the validity of these data significantly. Some, although very limited, data can be found in the HH surveys of the NSS. Nonetheless, these surveys do not target the heating issues and, therefore, cannot be very useful from that perspective.

Comprehensive information on heating situation is contained in 2005 HH survey of EDRC (Survey on Assessment of Heating Situation for Urban Multi-apartment Blocks (SAHS-2005) carried out for the "Thermosupply Programme" PIU of the Ministry of Finance and Economy<sup>2</sup>. That was the only survey specifically targeted at the heating situation in Armenia.

The Armenia Renewable Resources and Energy Efficiency Fund initiated a new study in 2007 to monitor and evaluate the recent developments in this field: Survey on Assessment of Heating Situation for Urban Multi-apartment Blocks (SAHS-2007). The present report summarizes the findings of SAHS-2007.

The major objective of the present report is to present the findings and data of the Survey to beneficiaries, as well as analyze the current options of heating in urban multi-apartment blocks, opportunities for their improvement and potential for having affordable and quality heating.

The Report consists of the following sections: the next section is devoted to the general description of the Survey (SAHS-2007) and some of its findings. The third section analyzes the major sources of energy, types of devices used for heating and option of hot water supply in urban areas of Armenia. The fourth, fifth and sixth sections analyze the duration of the heating season, areas heated and average temperatures. Section 7 analyzes the expenditures on heating and hot water, whereas section 8 discusses the illnesses due to heating problems. Section 9 discusses the

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<sup>2</sup> See "Assessment of Heat Supply and Heating Options in Urban Areas of Armenia (for 2003-04 and 2004-05 winters)", EDRC, May 2005 (online: <http://www.edrc.am/public.html?ID=25>)

trends of introducing safe and clean heating options. Section 10 discusses such issues as satisfaction of HHs with heating and their preferences. Section 11 assesses the readiness to borrow loans to improve heating, energy saving, development of condominiums and cooperation among neighbours. Analytical statistical tables are attached as an annex to the Report per 5 sections, along with an annex containing the sampling methodology. CD enclosed contains the Survey database (in SPSS environment) for further analysis.

## 2. Survey on Assessment of Heating Situation for Urban Multi-apartment Blocks

The first statistical sample survey of households on heating was carried out in 2005, followed by a second survey in 2007. The surveys covered the urban households of Armenia living in multi-apartment blocks and refer to the data on heating situation of the previous winters. The present report titled "Assessment of Heat Supply and Heating Options in Urban Areas of Armenia" is prepared based on the findings of the 2007 Survey on Assessment of Heating Situation for Urban Multi-apartment Blocks (SAHS-2007)<sup>3</sup>. The SAHS-2007 methodology allows for the compatibility of data with the 2005 survey (SAHS-2005), at the same time, providing additional and more detailed data.

The main tool of the survey was the household questionnaire. The latter and the survey methodology were developed by the Economic Development and Research Center. The SAHS-2007 Questionnaire was developed based on SAHS-2005 Questionnaire improved both technically and content-wise.

The Questionnaire allows collecting such data with the analysis of which the main dependant variables can be estimated depending on various indicators: demographic, educational, employment, welfare, housing conditions, type of building, etc.

The SAHS-2007 Questionnaire consists of 10 sections with 70 questions. The first section contains the questions on HH members, including their socio-demographic characteristics. The second section refers to the type of apartment and building, number of floors, communal conditions, activities of condominiums, relations with neighbours, etc.

Sections 3 and 4 covered the aspects of heated surface and rooms, duration of heating, temperatures, type of energy and equipment used. Section 5 refers to the assessment of the used heating option and preferences, demand for heating loans, etc. Section 6 of the questionnaire refers to the expenditures of the HH that allows estimating the level of consumption expenditures and, thus, assessing poverty. Section 7 covers the situation with various illnesses due to insufficient or low-quality heating. Section 8 covers additional data for assessing the welfare per income groups and types, as well as self-assessment of poverty. Section 9 contains several questions that aimed at assessing energy saving issues, in particular, regarding the conditions of windows and loans to replace them with new ones. At the end, the assessment of interviewers and technical data are summarized.

Prior to starting the field works, we first developed modules for interviewers' trainings: 4 training courses were conducted. One of them was entirely for Marz supervisors, while the other three – both for interviewers and Marz supervisors. Pilot interviews were conducted in Yerevan, Dilijan and Gyumri following trainings. The final questionnaire was developed based on the analysis of pilot interviews and verbal reports and comments of interviewers.

The full-fledged survey was carried out in all Marzes of Armenia in March, 2007. Interviews did not take place in about one quarter of addresses due to refusal or close doors. Refusal rate is quite high in Yerevan. In other urban areas interviews did not take place in about one third of addresses: the main reason was close doors (or not finding the address). This is in line with our past experience in other surveys. Each address, where no interview took place, was replaced with mirror-address from the reserve list (which is selected with same methodology as well).

The surveyed HHs were selected through two-stage stratified random sampling approach that implies a sequence of certain steps. The sampling methodology is described in details in Annex 1. The applied sampling methodology allows ensuring reliable representation at Yerevan and Marz levels, as well as for total Armenia.

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<sup>3</sup> Based on the 2005 survey "Assessment of Heat Supply and Heating Options in Urban Areas of Armenia", household survey report was published which can be found at <http://www.edrc.am/public.html?ID=25>

The actual size of the sample was 2010 HHs that were included in 201 PSUs spread in almost all urban settlements in Armenia (see Table below and Annex 1).

### Summary of Survey Sample per Marzes

	Total Number of Urban Communities	Number of Communities in the Sample	Number of PSUs	Sample HHs
Yerevan	12	12	70	700
Provinces (Marzes), o/w:	47	41	131	1310
Lory	8	6	28	280
Kotayq	7	6	28	280
Shirak	3	3	18	180
Syuniq	7	6	15	150
Armavir	3	3	11	110
Ararat	4	4	10	100
Gegharquniq	5	4	8	80
Tavush	4	3	6	60
Aragatsotn	3	3	4	40
Vayots Dzor	3	3	3	30
<b>Total</b>	<b>59</b>	<b>53</b>	<b>201</b>	<b>2,010</b>

For the purposes of our survey, the term Household refers only to those (groups of) individuals living in multi-apartment blocks in towns and cities that have a single budget and mostly live together.

The following indicators are used as needed for the analyses of welfare: self-assessment of poverty, interviewer's assessment, poverty incidence calculated based on consumption aggregate, quintile groups of population per consumption aggregate and HHs belonging to proposed income level group. As a subjective assessment we used HH members' self-assessment of welfare, as well as the responses to the question whether the actual income of the HH is lower, higher or equals to the minimum required amount of income. Poverty indicators calculated for consumption aggregate were calculated based on actual consumption expenditures of HHs in February, excluding the expenses for durable goods and apartment rent, as well as the economies of scale and adult equivalence effects. The method does not take into account the possible seasonal fluctuations as well. However, since our objective was not to assess poverty, but rather, analyses of major variables depending on welfare levels, our approach was quite sufficient. HHs, where per capita consumption aggregate per month was lower than AMD 15 000, were considered extremely poor. If per capita consumption aggregate was in the range of AMD 15 000 -20 000, the HH was considered poor, while those with per capita monthly consumption of more than AMD 22 000 – non-poor. These poverty lines are close to the 2005 poverty lines used in the NSS RA Household Survey: we used those poverty lines since the more recent data (for 2006 and 2007) was not available.

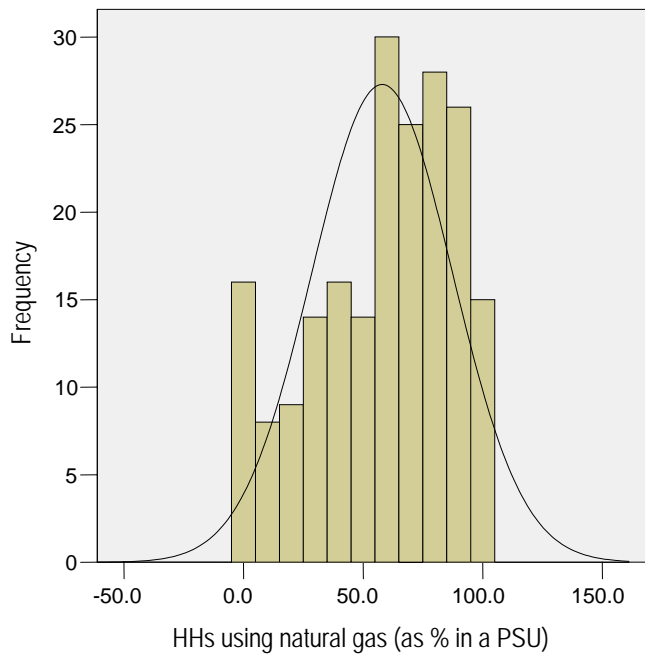
One of the main dependent variables of the survey was the share of HHs using natural gas for heating: according to estimates under our survey, it equals 53%. The Error Margin for this variable is 2.2%, under which, with 95% Confidence Interval, the share of HHs using natural gas will be from 51% to 55%. Under 95% Confidence Interval, the shares of HHs that use electricity and wood is estimated 33-37% and 9-11% respectively.

	Point Estimate	Error Margins	95% Confidence Interval
Number of HHs that heat with natural gas	53.0%	2.2%	50.8%-55.2%
Number of HHs that heat with electricity	34.6%	2.1%	32.6%-36.7%
Number of HHs that heat with solid fuel (wood)	9.8%	1.3%	8.5%-11.2%

The Histogram below shows the share of HHs using natural gas per PSU. The Histogram shows that the distribution of HHs using natural gas is not a normal distribution. That can be explained by the fact the access to natural gas in all urban settlements is not distributed normally. In 17 PSUs out of total 201, none of the HHs used natural gas for heating,

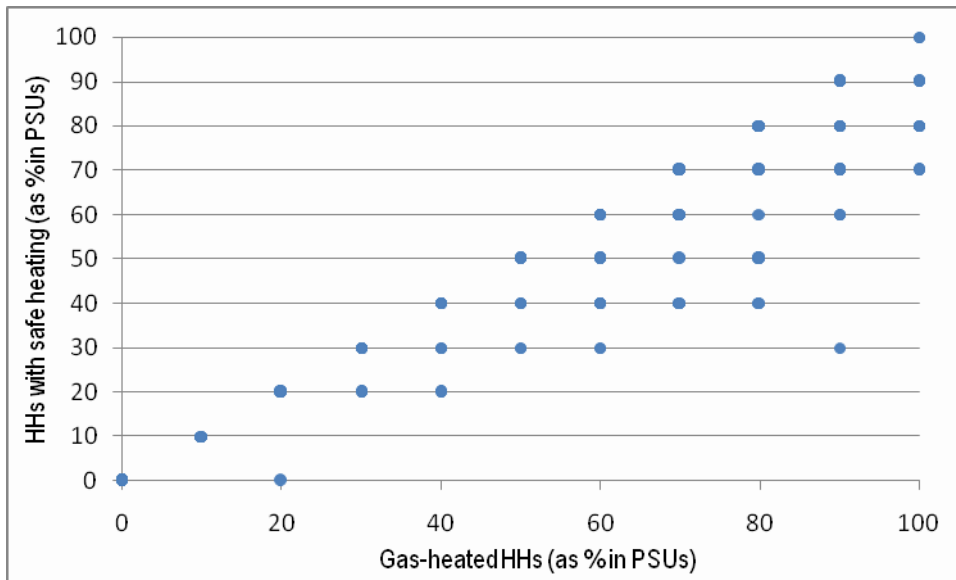
while in 15 – all HHs used natural gas. Most frequently, more than 50% of HHs in a PSU used natural gas (see Histogram 1).

Histogram 1: Share of HHs Using Natural Gas for Heating per PSUs, in %



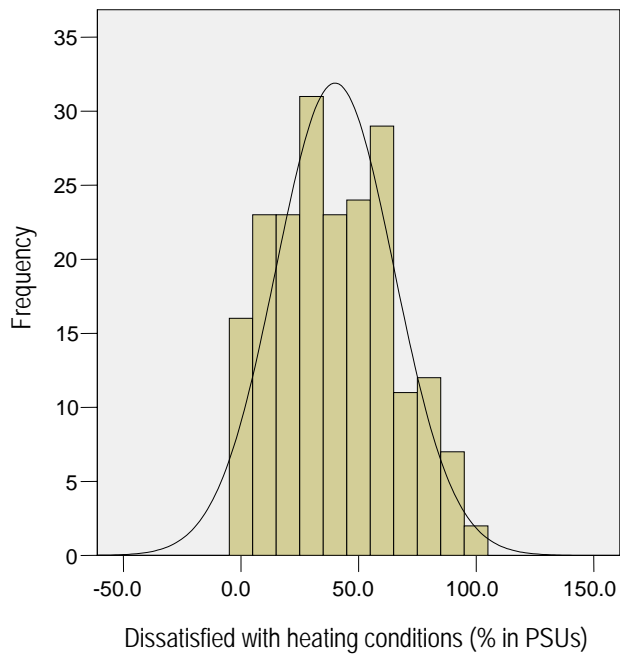
The Scatter below shows the relationship between the number of HHs that use natural gas and the number of safe heating HHs per PSUs. It shows that along with increase in usage of natural gas, the level of safe heating increases, too. The scatter shows that the findings are logical and proportional in almost all PSUs.

Scatter 1: Relationship between the Share of Gas-heated HHs and Safe heating HHs in Sample PSUs, %



The next important variable of the study is the satisfaction with heating option used. Section 10 summarizes the analysis of this indicator, however, below we present the statistics of HHs in PSU that are not satisfied with the heating option they have had. According to our survey, the number of PSUs where the share of non-satisfied HHs is less than 50% is more than the number of PSUs, where more than 50% of HHs are dissatisfied with their heating.

Histogram 2: Share of HHs Dissatisfied with their Heating Conditions per PSU, %



Average expenditures on heating totaled AMD 15,150 per month which is almost the same as Mode and Median. The Standard Deviation is AMD 9,057: it is relatively higher in Yerevan and among HHs that heat with electricity.

	Mean	Median	Mode	Standard Deviation	Range
Armenia	15,150	15,000	15,000	9,057	99,400
Yerevan	17,582	15,000	20,000	10,255	99,000
Marzes	12,244	12,000	10,000	6,247	49,400
Electricity	16,878	15,000	20,000	11,563	99,400
Natural Gas	14,635	15,000	15,000	6,646	49,000
Solid fuel (wood)	13,148	10,499	10,000	9,183	71,000

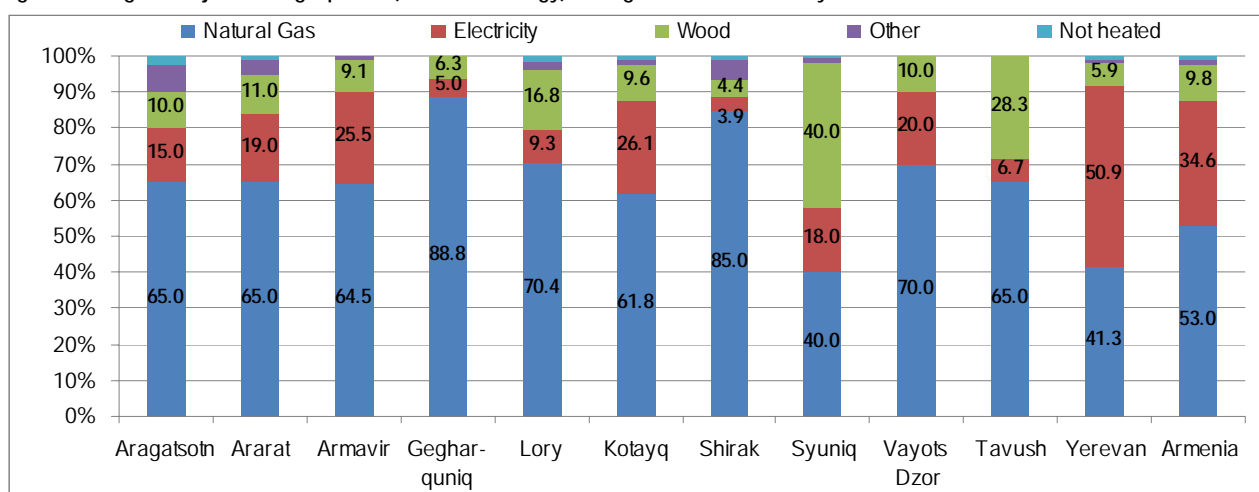
### 3. Heating and Hot Water Options

Heating and hot water options and energy sources used by household in Armenia are dynamically changing. That takes place due to a number of factors. High rates of gasification, stricter forest reservation requirements, as well as increased welfare of population and higher safety requirements are the most important factors that change the heating situation rapidly. This section is devoted to the analyses of heating options and heating equipment used by Armenian urban HHs in multi-apartment blocks, as well as hot water supply options.

Thus, according to our Survey, 99% of HHs in urban multi-apartment blocks heated their apartments during the season 2006/2007 (96.8% - in 2005/2006). The major energy source was natural gas: 53% of HHs used natural gas. An important source of energy was electricity (34.6% of HH). Solid fuel (wood) has lost its importance – only 9.8% of HHs used it. Other sources of energy and centralized heat supply have insignificant shares (see Table 1.1.).

Figure 1 shows the usage of various energy sources per Marzes. It is seen that the largest share of HHs using natural gas falls on Gegharquniq and Shirak Marzes: 89% and 85% respectively. Usage of natural gas is the lowest in Syuniq and Yerevan – about 40-41%<sup>4</sup>. Wood is largely used in Syuniq (40%), whereas electricity – in Yerevan (50.9%).

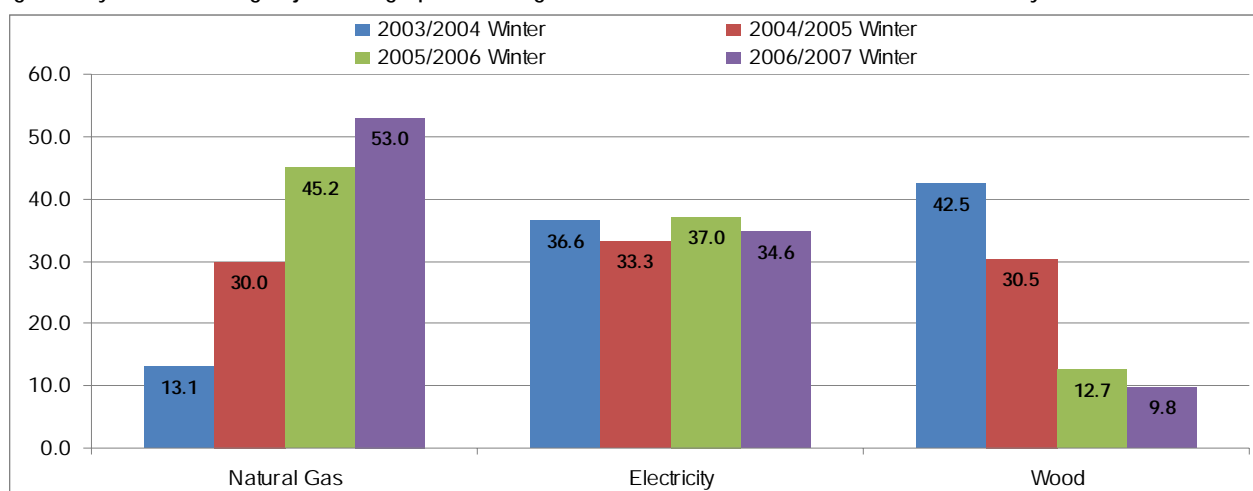
Figure 1: Usage of Major Heating Options (Source of Energy) during 2006/2007 Winter by Marzes, as % in the total for each Marz



Source: SAHS-2007

Figure 2 shows the dynamics of usage of various heat sources during the past 4 years. It is obvious that use of natural gas has increased drastically, whilst the usage of woods – decreased.

Figure 2: Dynamics of Using Major Heating Options During the Past 4 Winters, % in the total of all HHs in each year

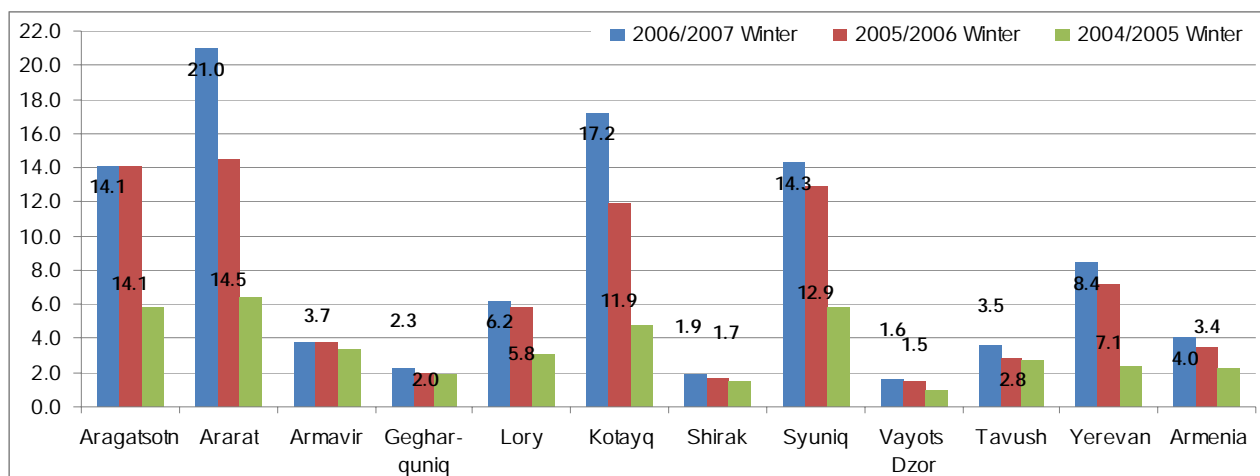


Source: SAHS-2007 and SAHS-2005

<sup>4</sup> According to SAHS (2005) findings, the shares of gas-heated HHs in Yerevan in 2003/2004 and 2004/2005 were 4.9% and 11.3% respectively. In 2004/2005 and 2005/2006, the shares of gas-heated apartments in Yerevan was lower than in any other Marz in Armenia.

The number of those HHs using natural gas for heating in multi-apartment blocks has grown 4 times, mostly at the expense of those using wood. In some Marzes, the gasification rates or rates of transferring to natural gas is very high. For example, the number of HHs using natural gas for heating in Ararat grew 21 times during the last 4 years, in Kotayq – 17 times, followed by 14 times in Aragatsotn and 8 times in Yerevan (see Figure 3).

Figure 3: Increase in the Number of Gas-heated HHs as Compared to 2003/2004 Winter, times



Source: SAHS-2007 and SAHS-2005

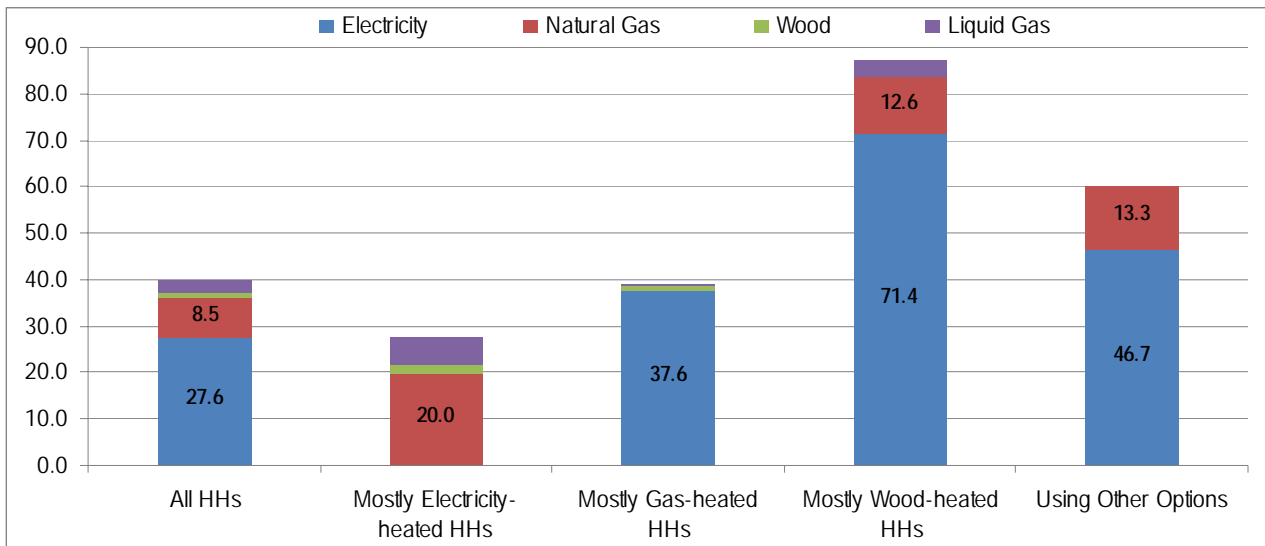
Heating options differ significantly depending on the number of floors, building type and apartment ownership. E. g. the shares of HHs using electricity and wood for heating is higher than average in high-rise blocks. In Marzes, the major source of energy for 43% of HHs in multi-apartment blocks with 10 and more floors is electricity, whereas the average for the country is 15.4%. Only 14% of HHs in similar blocks in Yerevan use wood, when the average use of wood in Yerevan is 5.9% (see Table 1.10). Use of electricity is higher than the average in rented apartments vs. owned ones. Use of natural gas is higher in monolithic blocks – 81% (see Table 1.11).

Choice of heat options depends also on the welfare of HH. Poor or less wealthy HHs prefer wood more. Among HHs, whose living conditions were estimated as “very bad” and “bad”, windows were in “bad condition”, monthly income was lower USD 100, the HH head or the interviewer assessed as “extremely poor” or “poor”, as well as were assessed as “poor” or “extremely poor” according to consumption aggregate thresholds or were in the first two quintiles, usage of wood was higher than among the rest of HHs. At least 13% of the above described HHs use wood against average of 9.8% for the country (see Tables 1.13-1.17).

With regard to electricity and natural gas, HH welfare impact was not clearly seen. Electricity is used both by the poor and non-poor.

A large portion of HHs (40%), along with the main heating option, also uses additional, secondary heating option. The major option for secondary heat supply is electricity. 28% of all HHs or 69% of those who do have secondary option used electricity (see Tables 1.1 and 1.3). Secondary option is mostly used by those who are heated with wood (see Figure 4). About 71% of the latter use electricity as secondary option, while 12.6% - natural gas. The share of HHs that have secondary option is also high among those, who use natural gas as primary option: about 39%. These HHs use electricity as secondary heating option as well.

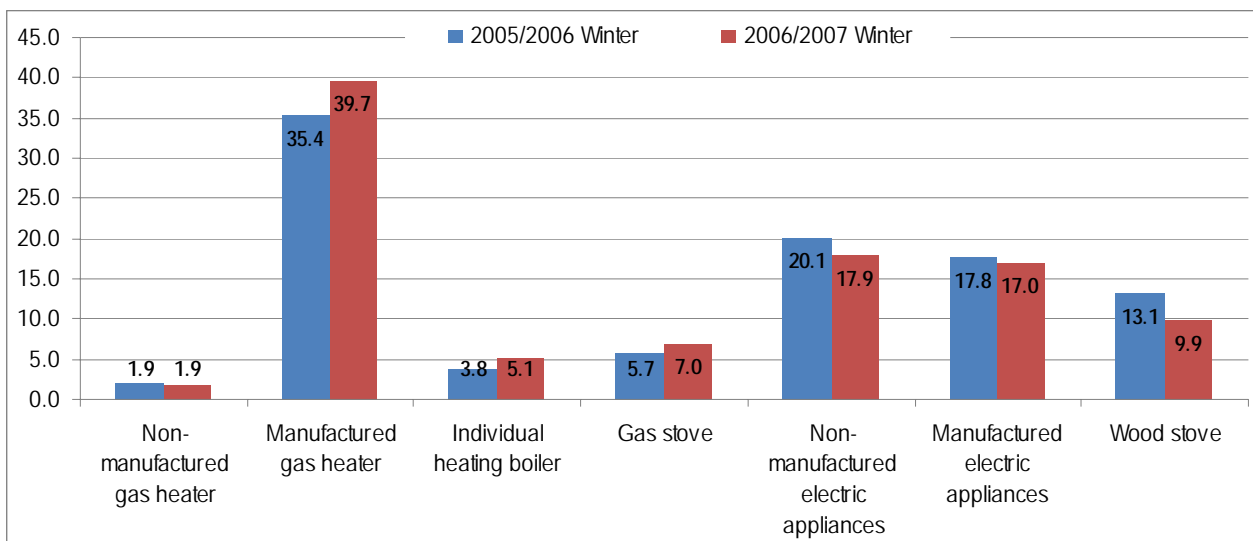
Figure 4: Secondary Heating Options in 2006/2007 per Primary Heating Option, as % of HHs in the same option



Source: SAHS-2007

The main device used by HHs is manufactured gas heater: about 40% of HHs used them in 2006/2007 against 35% in 2005/2006. The next most used heating devices are non-manufactured electric heaters (18%), manufactured electric heaters (17%) and wood stoves (10%). The use of non-manufactured gas heaters has reduced significantly during the last 2 years by stabilizing at 1.9%. The use of individual heating boilers, although increases rapidly, but is still rather limited: only 5.1% of HHs (see Figure 5 and Table 1.18-1.21).

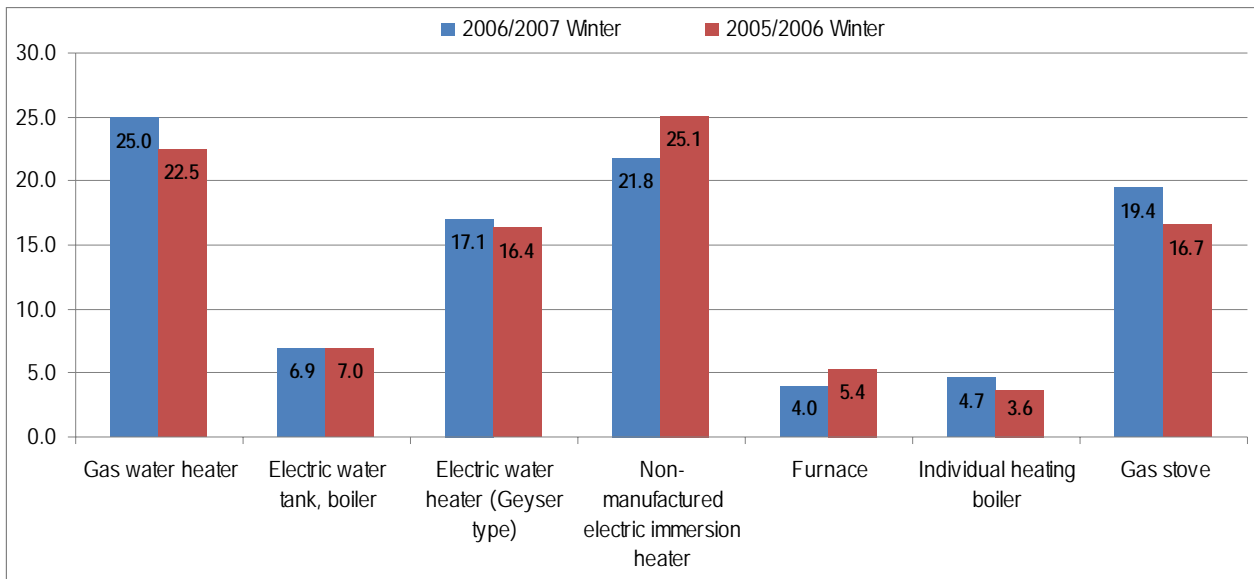
Figure 5: Major Heating Devices Used in 2005/2006 and 2006/2007, %



Source: SAHS-2007

Major options of getting hot water used by HHs are gas water heaters (25%), non-manufactured electric immersion heaters (22%) and gas stove (19%). Figure 6 shows the dynamics of HH shares using the above listed options (see also Table 1.22 and 1.23).

Figure 6: Options for Getting Hot Water (including for shower), %



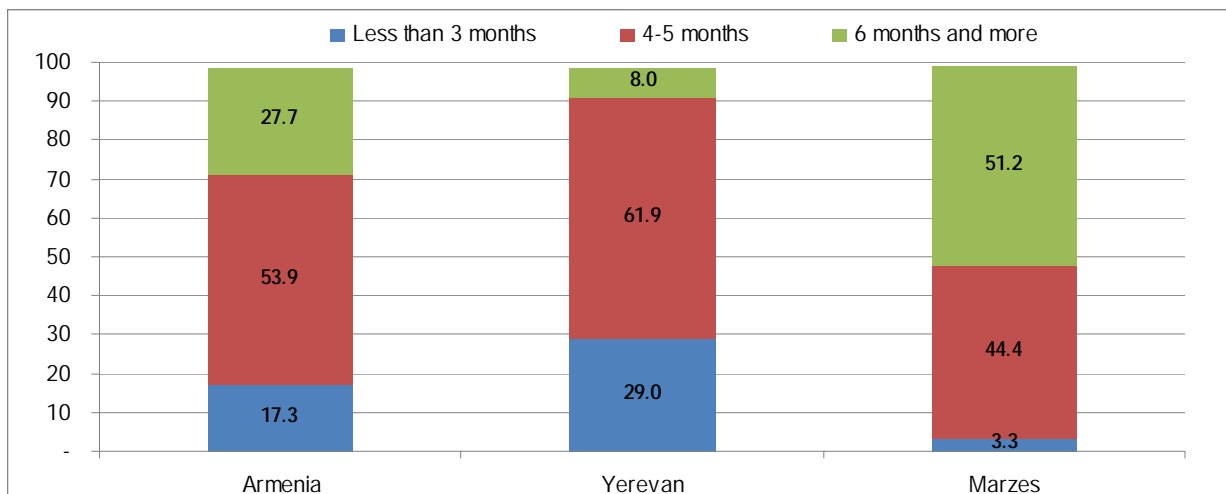
Source: SAHS-2007

41% of HHs using natural gas for heating also gets hot water through gas water heater, 30% boils it on the gas stove and 10% - use electric heaters (see Table 1.23).

#### 4. Duration of Heating Season

The duration of the heating season mostly depends on the climate, as well as other factors, such as HH welfare, heating option, type of building, number of children, etc. For 54% of HHs in Armenia, the heating season is 4-5 months, while for 28% - 6 months and more. The average heating season is relatively short in Yerevan. Here, only 8% of HHs heated apartments for more than 6 months (see Figure 7).

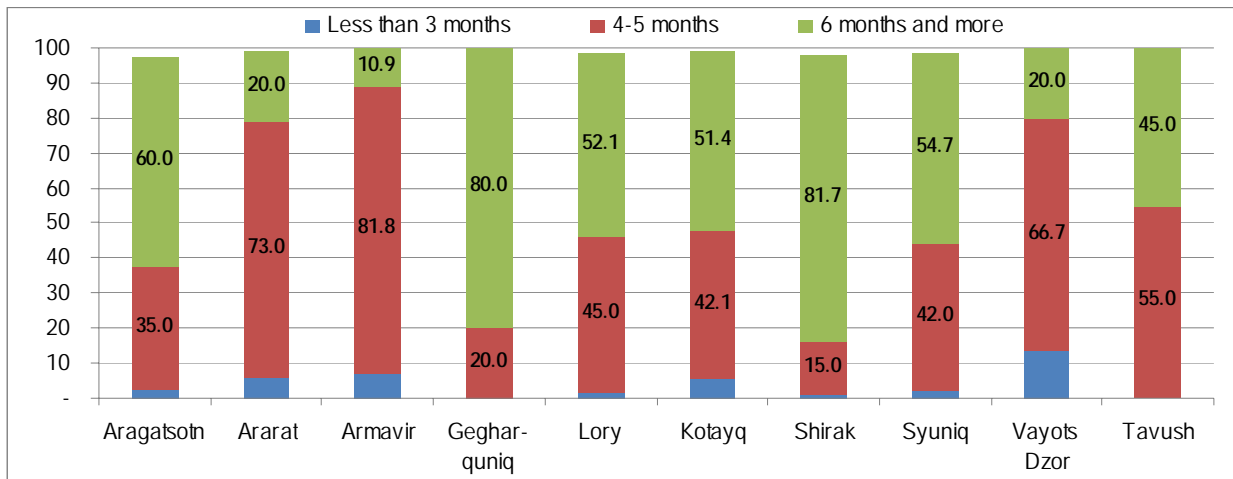
Figure 7: Distribution of HHs per Length of Heating Season, as % of the total for the given area



Source: SAHS-2007

Figure 8 shows the distribution of HHs per length of heating season. It can be seen that, in contrast to Yerevan, the share of HHs heated for less than 3 months is small in Marzes. As it can be expected, heating season is longer in Shirak, Gegharquniq and Aragatsotn.

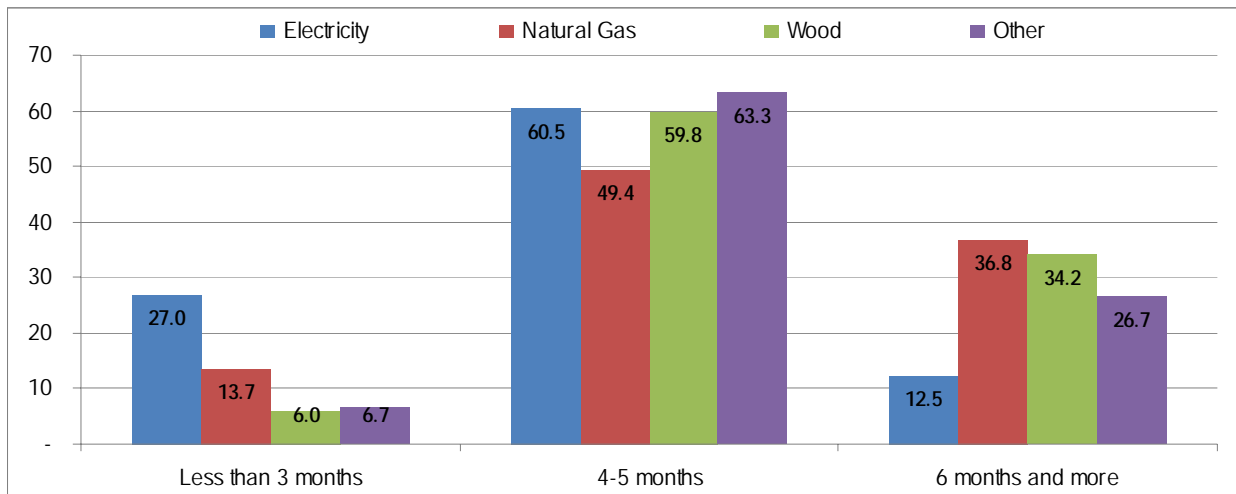
Figure 8: Distribution of HHHs per Duration of Heating Season, % of total for each Marz



Source: SAHS-2007

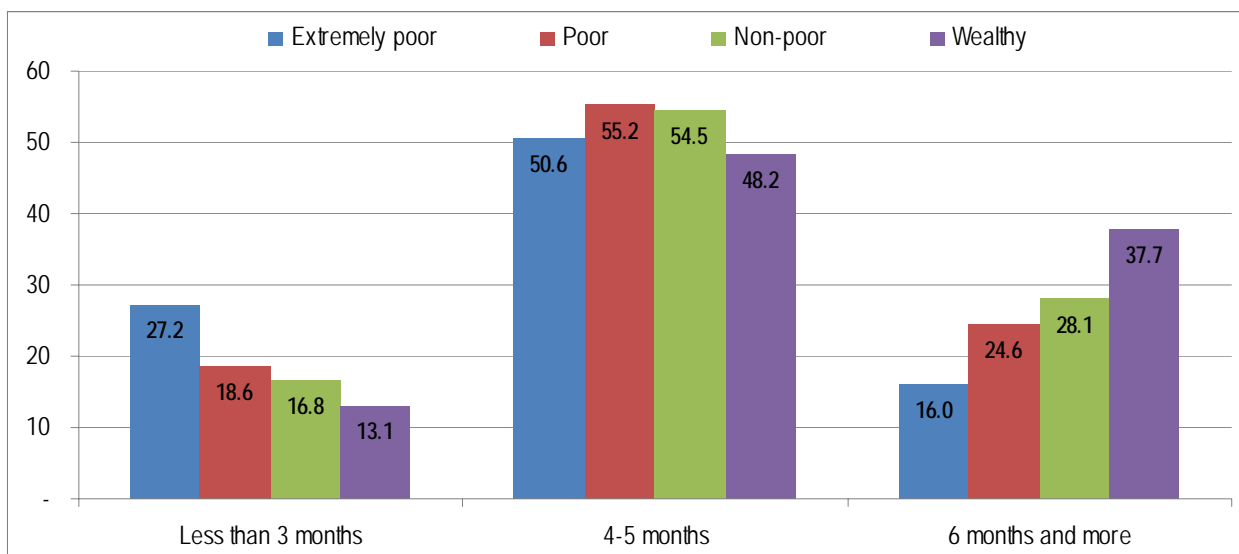
The duration of heating season is obviously dependent on the option of heating. Figure 9 shows that the heating season is considerably shorter for those who heat with electricity, and longer for those use natural gas.

Figure 9: Duration of Heating Season in HHHs Depending on the Heating Option, % of the total in given option



Source: SAHS-2007

Figure 10: Duration of Heating Season in HHHs Depending on Welfare Self-Assessment, as % in the total for each welfare group



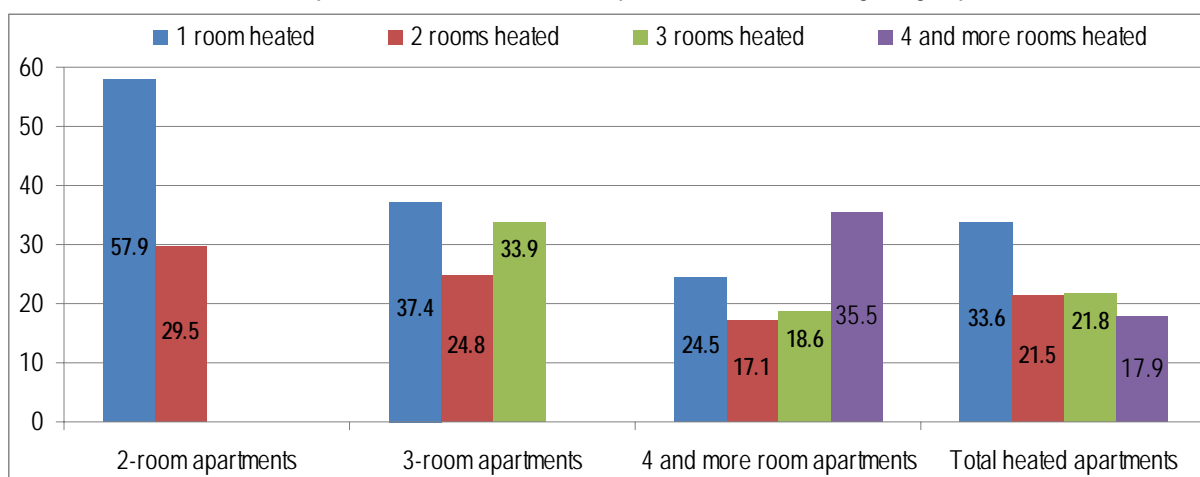
Source: SAHS-2007

Figure 10 shows the duration of heating season depending on the HH welfare. Here, the welfare is measured through self-assessment of HHs. According to the Figure, HHs considered themselves wealthy enjoy longer heating seasons. Nonetheless, this trend is not clearly seen for different groups of HHs calculated per consumption aggregates (see Table 2.1-2.8).

## 5. Heated Area

According to the Survey, only one third of HHs heat entire apartments. On average, the heated area slightly exceeds 60% of the apartment area. Figure 11 shows the number of heated rooms as share of total number of rooms. During 2006/2007 winter, 58% of HHs in 2-room apartments heated only 1 room, 37% of 3-room apartments and 25% of HHs in 4 and more rooms apartments (see Figure 11).

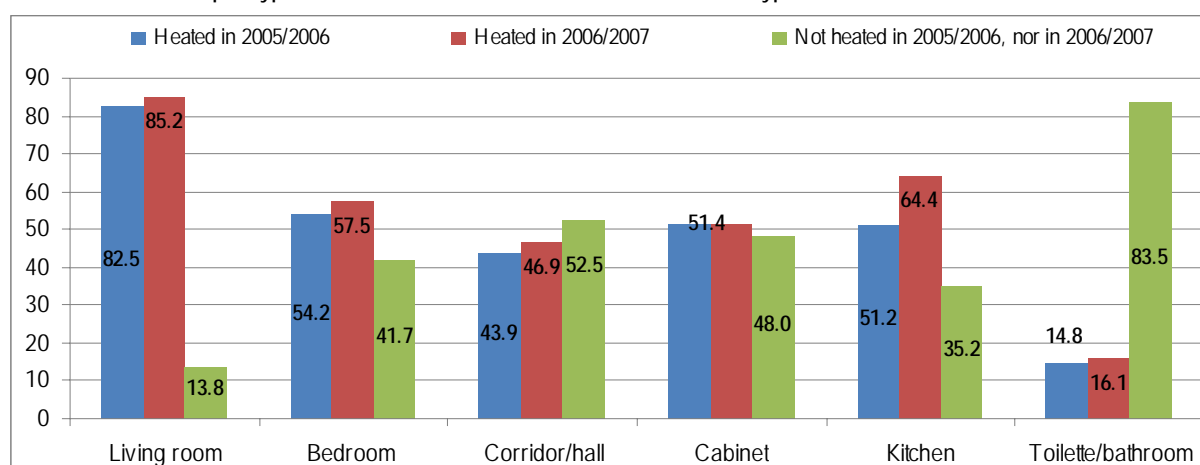
Figure 11: Number of Heated Rooms per Total Number of Rooms in Apartments, % of total in a given group



Source: SAHS-2007

Figure 12 shows the level of heating per types of rooms. Usually, bathroom/toilette, corridor, cabinet and kitchen are not heated. Most frequently, the living room is heated. In 2006/2007 winter, 85% of living rooms were heated, which is slightly higher than in the previous winter. 13.8% of living rooms were heated neither in 2006/2007, nor in 2005/2006.

Figure 12: Heated Rooms per Types in 2006/2007 and 2005/2006, as % in each room type

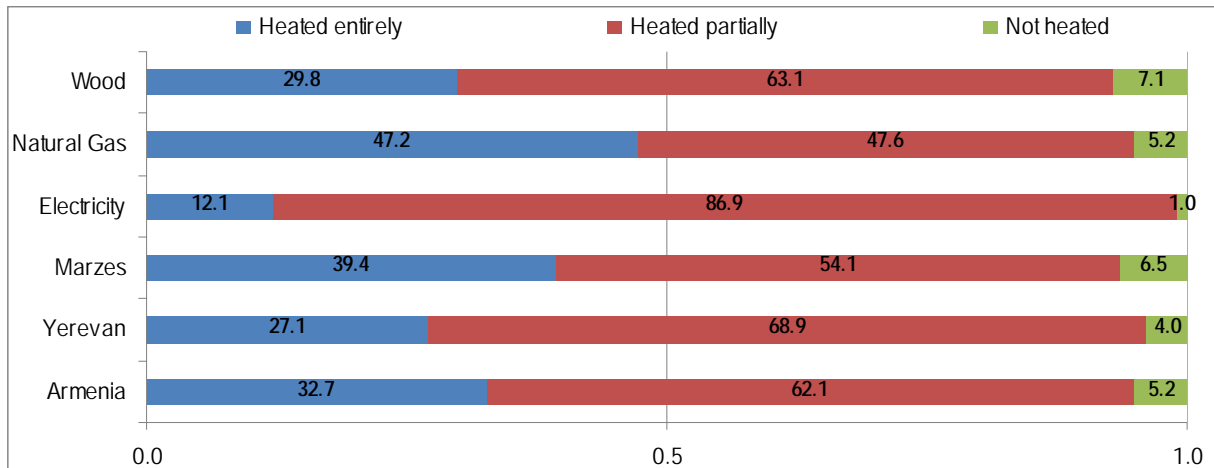


Source: SAHS-2007

In 2006/2007, 58% of bedrooms were heated. 42% of bedrooms were not heated in 2006/2007, nor in 2005/2006. 35% of kitchens and 84% of bathrooms/toilettes are not heated usually (see Figure 12).

Figure 13 presents whether the apartment is heated entirely for each option of heating. Majority of HHs using natural gas – 47% of them – have heated the entire apartment, whereas only 30% of HHs using wood heated the whole apartment and 12% of those who use electricity. Furthermore, more HHs in Marzes have heated entire apartments than in Yerevan.

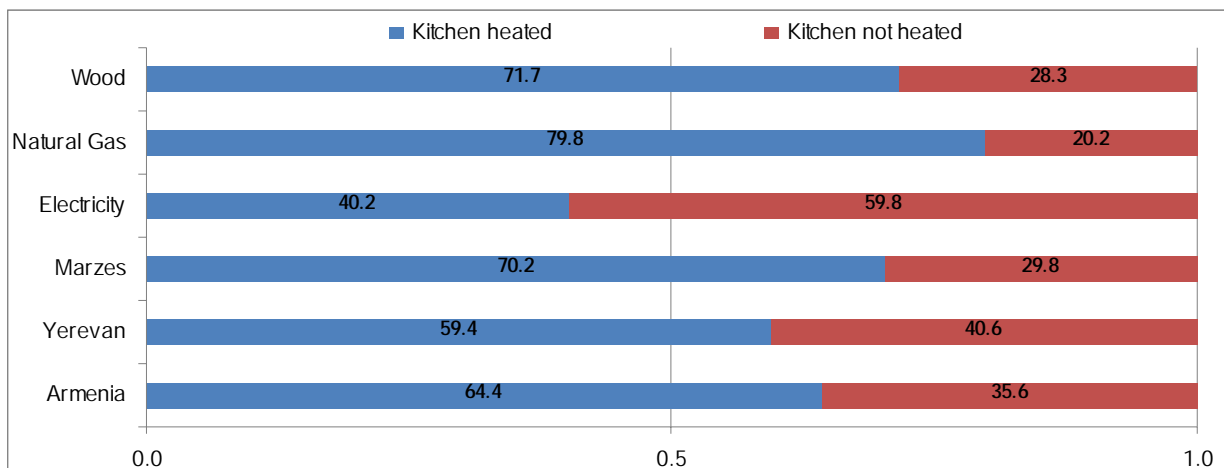
Figure 13: Partial/Entire Heating per Heating Options, %



Source: SAHS-2007

Overall 64% of HHs heat kitchens. 60% of HHs heated with electricity do not heat their kitchen, while only 20% of those who heat with natural gas (see Figure 14).

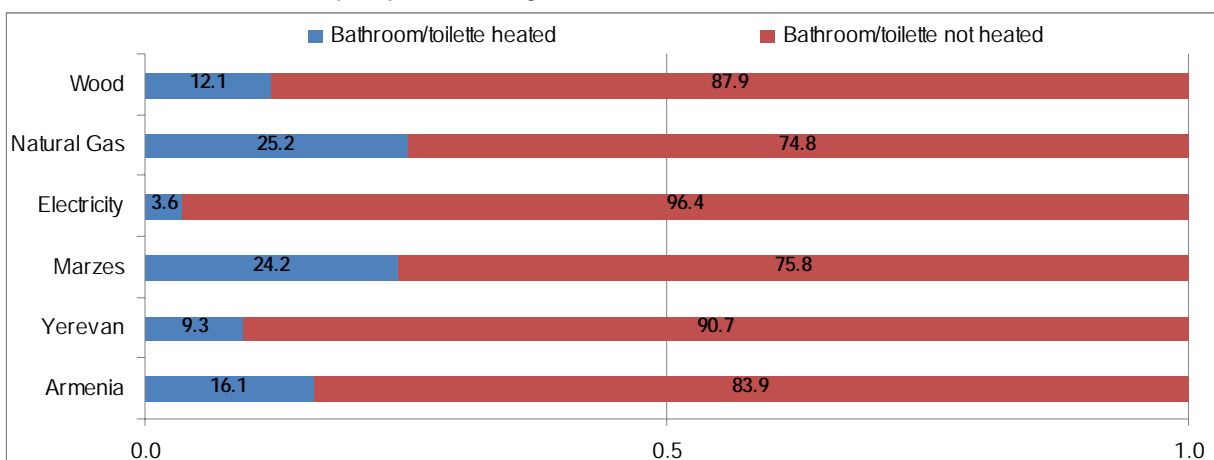
Figure 14: Kitchens Heated per Heating Options, %



Source: SAHS-2007

Bathrooms and toilettes are usually not heated: especially among those, who use electricity and HHs in Yerevan. Only 25% of those who use natural heating do heat bathrooms/toilettes (see Figure 15).

Figure 15: Bathrooms/Toilettes Heated per Option of Heating, %

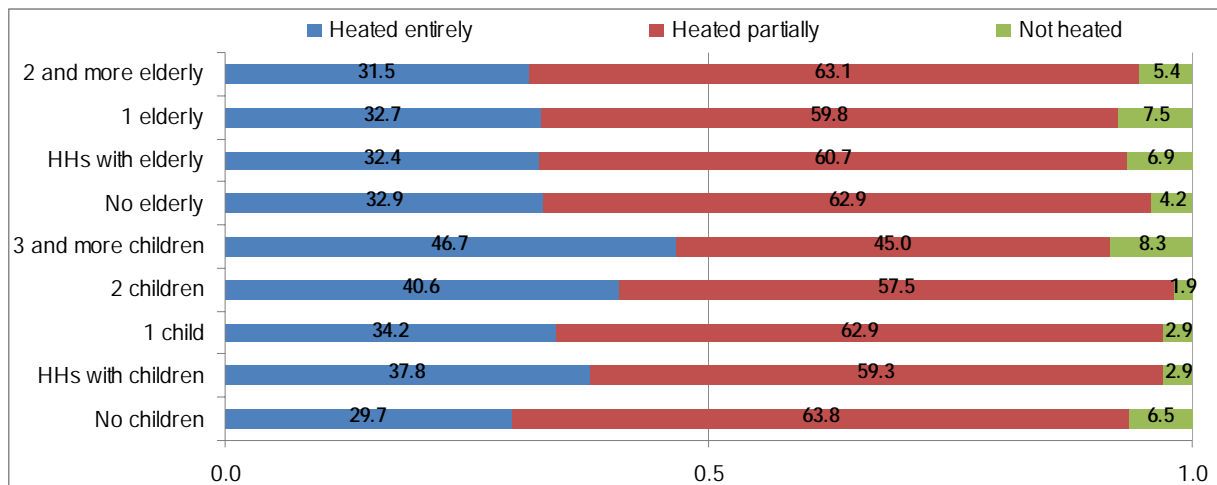


Source: SAHS-2007

The fact that apartments are heated entirely or partially does not differ much depending on having elderly in the HH or not. Having children, however, does affect the same decision to a certain extent. Only 30% of those who do not have children heat the apartment entirely, while among those who have children this goes up to 38%. Along with the increase

in the number of children, the probability of the apartment to be heated entirely increases. If 34% of HHs with 1 child are heated entirely, in HHs with 3 and more children this goes up to 47% (see Figure 16).

Figure 16: Partial/Entire Heating Depending on Having Elderly or Children in a HH, %

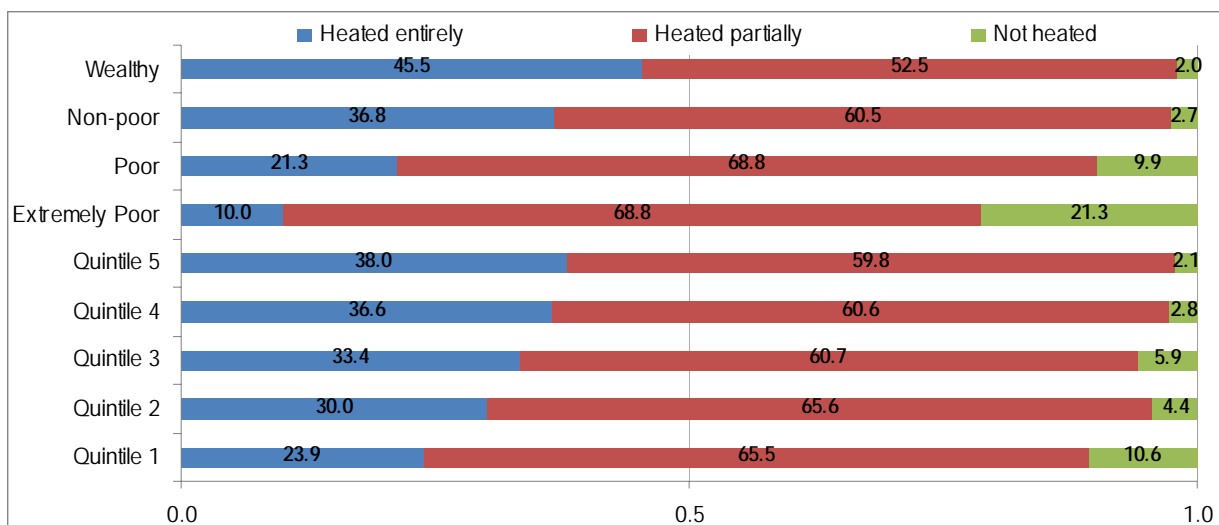


Source: SAHS-2007

The correlation between entirely heating of apartment and welfare is quite visible. Figure 17 shows the self-assessment of HHs on their welfare. Only 10% of those who have assessed their HH “extremely poor” heated their apartments entirely, while among “non-poor” this share goes up to 46%.

The same trend is visible also in quintiles that are determined per consumption aggregates. The share of those who heated the apartment entirely increases in higher quintiles (see Figure 17).

Figure 17: Partial/Entire Heating Depending on Self-Assessment of Welfare and Quintiles, %



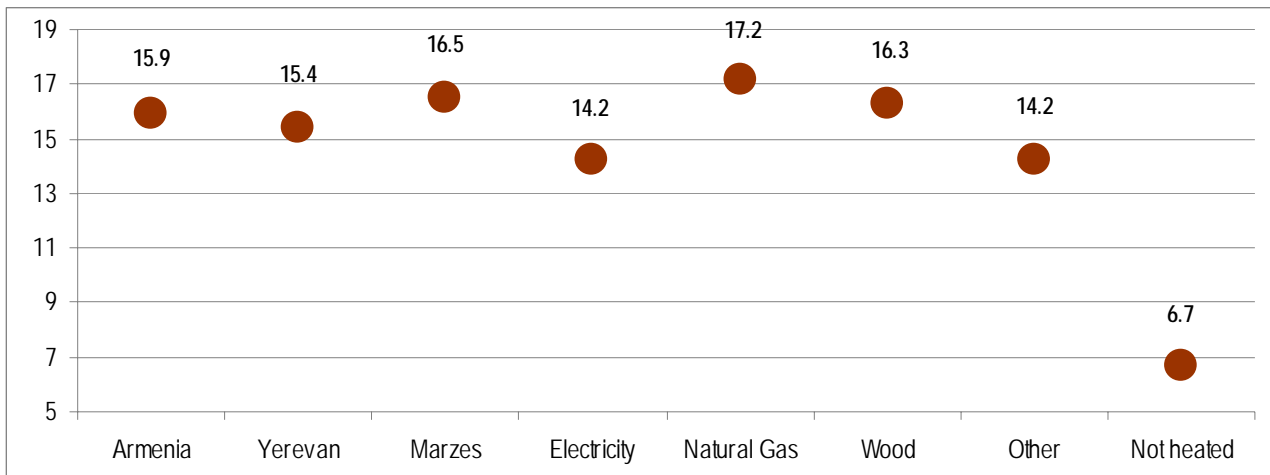
Source: SAHS-2007

## 6. Average Temperatures

The average temperatures during the heating season depend on the type of heating devices and option of heating, as well as welfare and presence of children/elderly in the HH.

According to the Survey, the average temperature in multi-apartment blocks in January 2007 was 15.9C°. The average temperature was higher in Marzes – 16.5C°, while in Yerevan – 15.4C°. Figure 18 shows that the average temperature in January was the highest in gas-heated HHs (17.2C°), while in wood-heated HHs – 16.3C°. In HHs that use other sources of energy and electricity, the average temperature is lower – 14.2C°.

Figure 18: Average Temperatures per Settlements and Heating Option Used, C°

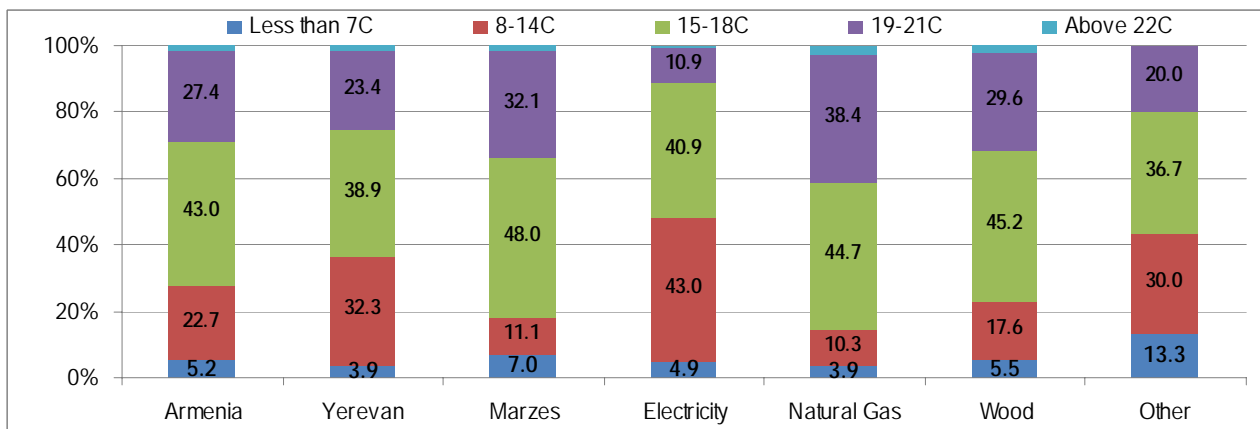


Source: SAHS-2007

Figure 19 shows the distribution of HHs per groups of average temperatures. The HHs are broken down into the following groups: very cold (less than 7C°), cold (8-14C°), not warm, mostly cold (15-18C°), warm (19-21C°) and very warm (above 22C°). Thus, apartments of 22.7% of Armenian HHs were cold, 43% - mostly cold and 27.4% - warm. Only in 7% of HHs, apartments were either very cold or very warm. The picture varies in Yerevan and Marzes, and also depending on the heating option. In Marzes, the number of cold apartment is lower than in Yerevan, while warm apartments – higher.

The temperatures were below 14C° for 48% HHs that used electricity for heating, while temperatures were above 19C° for only 11% of HHs. Average temperature is slightly higher in the majority of gas-heated HHs: in 41% of them it was above 19C° (see Figure 19).

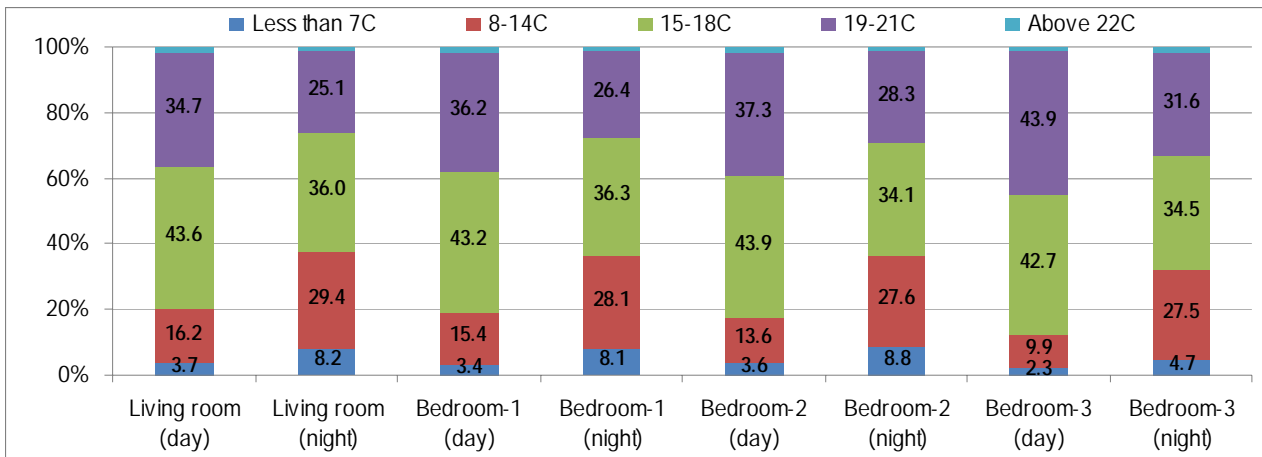
Figure 19: Distribution of HHs per Average Temperature Groups per Marzes Depending on the Heating Option, %



Source: SAHS-2007

Average temperatures vary between day and night times. Figure 20 shows the differences in temperatures in living rooms, first, second and third bedrooms during day and night times. It is warm during the day in 34.7% of living rooms, whilst only in 25.1% during nights, or it is cold at daytime in 16.2% of living rooms with 29.4% of them during nights. It is worth noting that it is mostly cold in second and third bedrooms (see Figure 20).

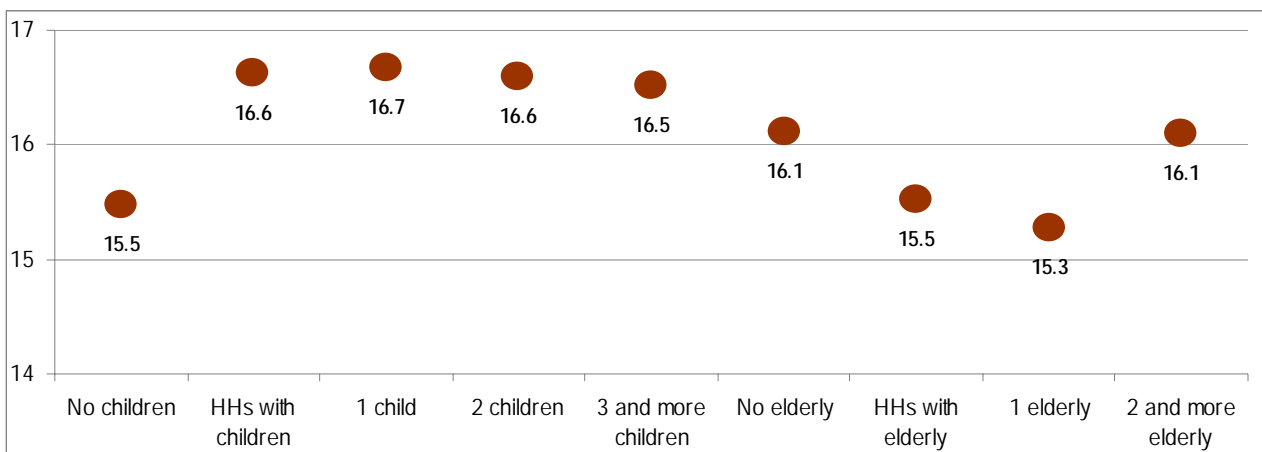
Figure 20: Share of Living Rooms and Bedrooms per Average Temperature Groups at Day and Night Times, %



Source: SAHS-2007

Figure 21 shows the average temperatures in apartments depending on presence of children/elderly. Overall, average temperature in HHs without children equaled 15.5C°, while in HHs with children – 16.6C°. Along with the increase in the number of children in a HH, the temperatures do not increase visibly. In contrast to HHs with children, apartments of HHs with elderly are cold, especially when they live alone, whereas in HHs without elderly temperatures are higher.

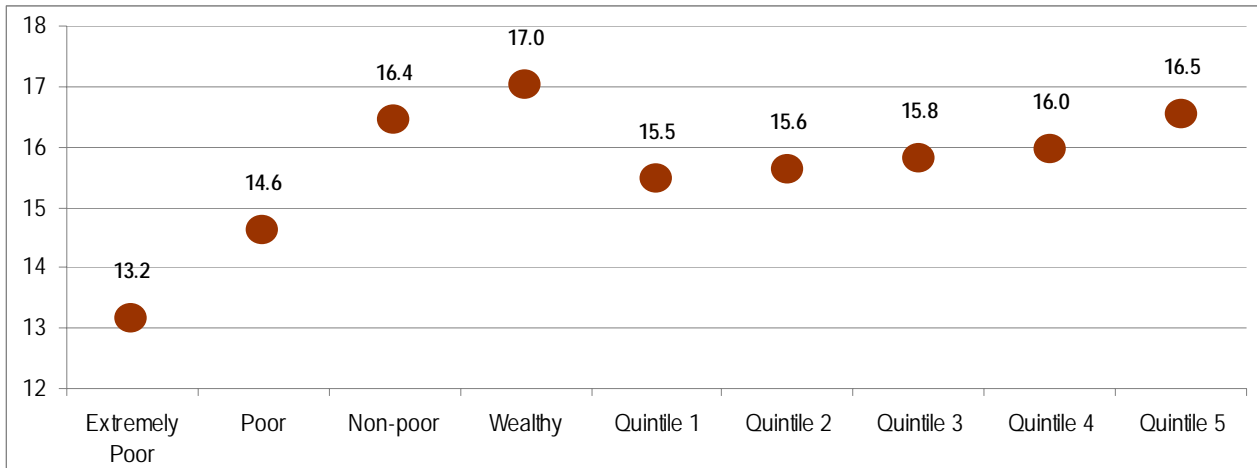
Figure 21: Average Temperatures Depending on Having Children or Elderly, C°



Source: SAHS-2007

This picture is, probably, explained by the fact of having single and elderly, who are socially vulnerable. In general, welfare considerably determines the average temperature in an apartment in winter. Figure 22 depicts the average temperatures in apartments depending on the self-assessment of welfare and quintile groups (per consumption aggregate). HHs that assessed themselves “poor” had average temperature of 13.2C°; while those who reported to be “wealthy” had 17C°. A winter is cold for the poor, and warm – for the non-poor. This trend is also visible per consumption quintiles. Nevertheless, winters can be cold also to HHs in higher quintiles, i.e. there are both poor and non-poor, whose apartments are cold in winter. That depends on the selected heating option and heating device used.

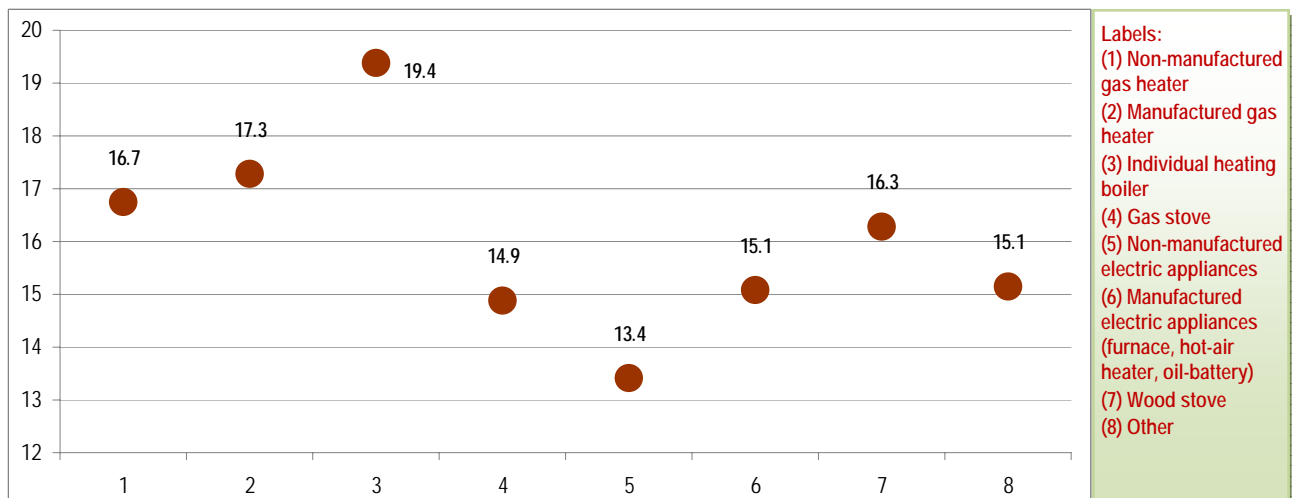
Figure 22: Average Temperatures per Self-Assessed Welfare Groups and Quintiles, C°



Source: SAHS-2007

Figure 23 shows that average temperature largely depends on the heating device. The highest temperatures are recorded in HHs with individual heating boilers (19.4C° on average), followed by manufactured gas heaters (17.3 C° on average). Wood stove provides higher temperatures than electric heating appliances, however lower than non-manufactured gas heaters. Temperatures in HHs using the gas stoves and manufacture electric appliances are about the same. Apartments heated by electric heating appliances, namely, non-manufactured ones, are cold (see Figure 23).

Figure 23: Average Temperatures per Heating Device Type, C°

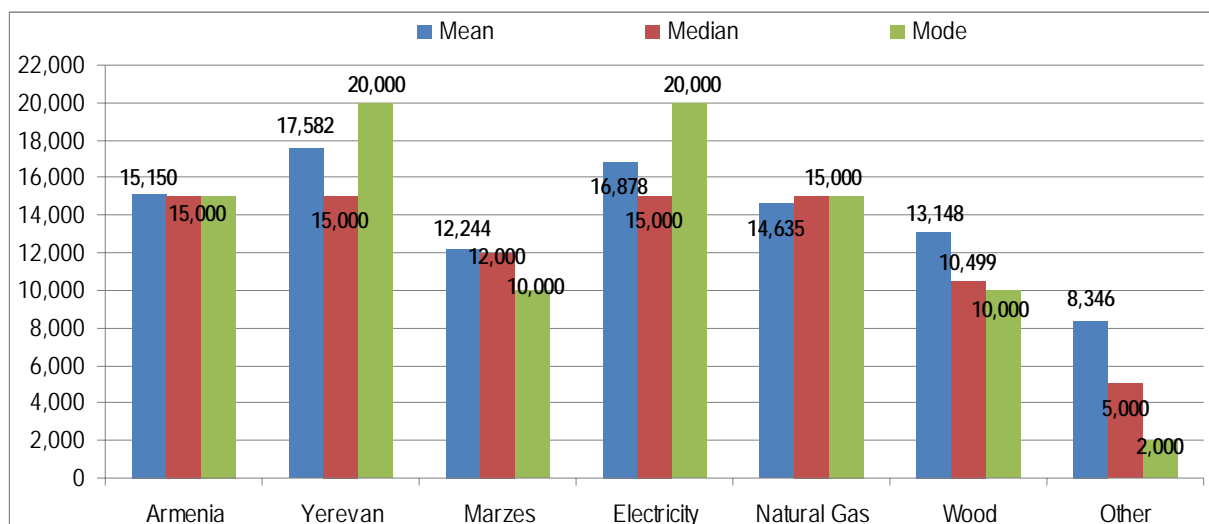


Source: SAHS-2007

## 7. Expenditures on Heating and Hot Water

According to the Survey, average expenditures on heating in Armenia in 2006/2007 totaled AMD 15,150. Heating cost slightly higher in Yerevan than in Marzes. The mode and median for heat expenditures in Armenia were the same. The most frequently recorded average monthly expenditure amount in Yerevan was AMD 20,000, while in Marzes – AMD 10,000. Heating is most expensive when electricity is used: average AMD 16,878 with mode of AMD 20,000. The average for gas-heated apartments is slightly higher than for wood-heated apartments; however, the mode for gas-heated apartments was AMD 15,000, while for wood-heated apartments – AMD 10,000. Heating with other sources of energy is the cheapest (see Figure 24).

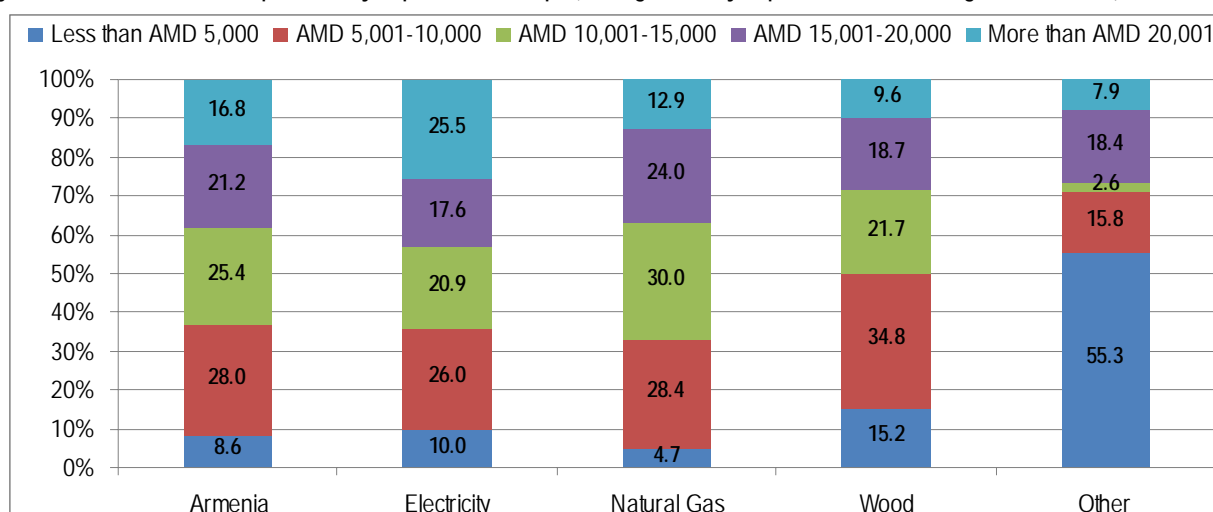
Figure 24: Average Monthly Expenditures on Heating and Hot Water in Armenia, Yerevan and Marzes Broken Down per Heating Options, AMD



Source: SAHS-2007

Average monthly expenditures on heating in 2006/2007 exceeded AMD 20,000 for 16.8% of all HHs; while it exceeded AMD 20,000 for 25.5% of electricity-heated HHs and 12.9% of gas-heated HHs.

Figure 25: Distribution of HHs per Monthly Expenditure Groups (Average Monthly Expenditures on Heating and Hot Water), %

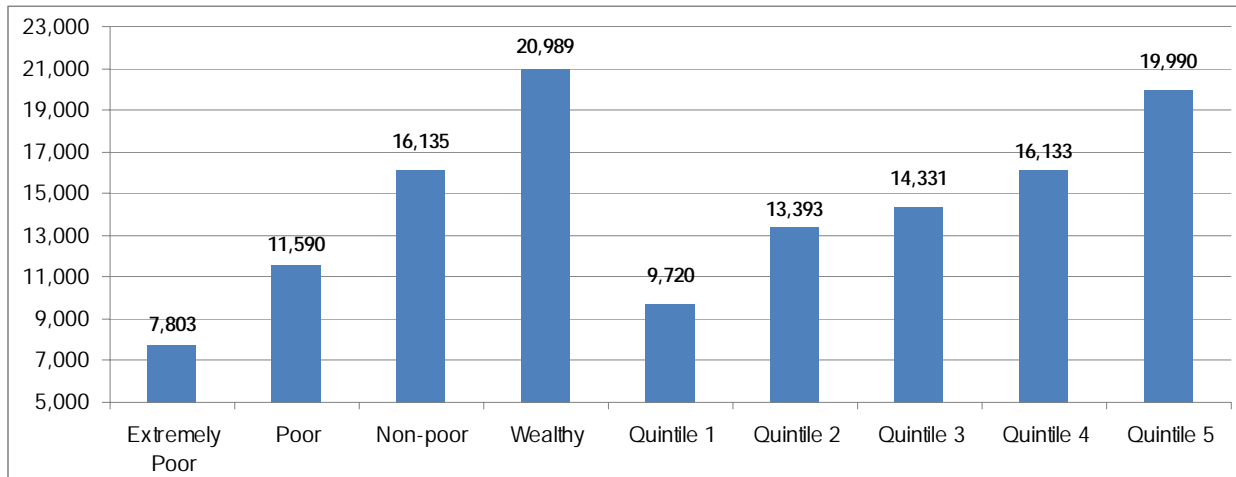


Source: SAHS-2007

10% of electricity-heated HHs, 15.2% of wood-heated and 55.3% of HHs using other options spent monthly less than AMD 5,000 (see Figure 25).

Figure 26 shows the average expenditures on heating and hot water per welfare groups. On average, HHs who consider themselves “extremely poor” spent AMD 7,803, the “poor” – AMD 11,590, the “wealthy” – AMD 20,989. The average expenditures of HHs broken down per quintiles also show positive correlation between welfare and expenditures on heating and hot water (see Figure 26).

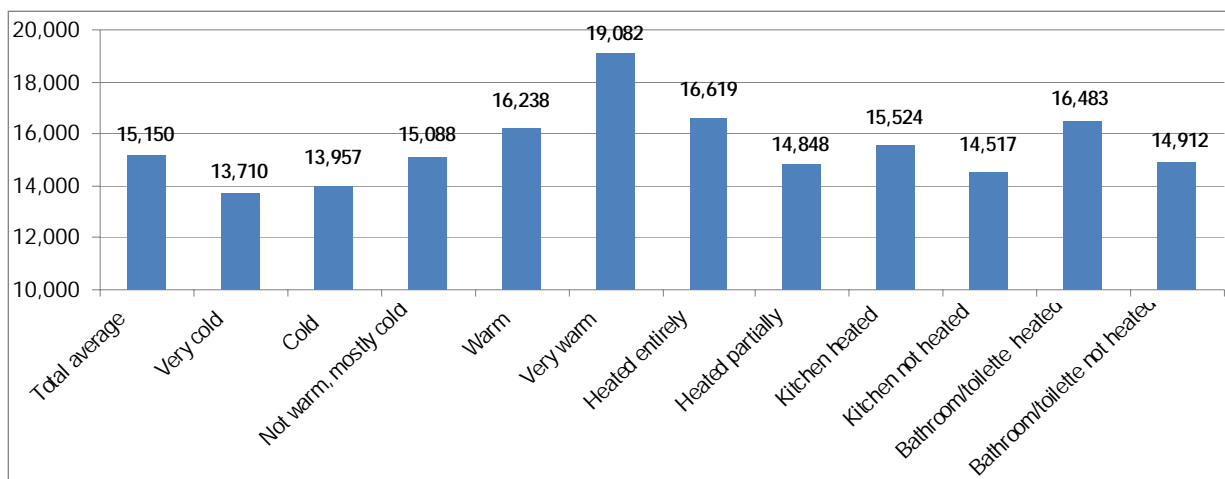
Figure 26: Average Monthly Expenditures on Heating and Hot Water Broken Down per Self-Assessed Welfare Groups and Quintiles, AMD



Source: SAHS-2007

Nevertheless, the ranges of expenditures on heating within welfare groups are larger than the ranges of expenditures in HHs groups broken down per temperatures in apartments. E.g. Figure 27 shows that in cold and very cold apartments average monthly expenditures did not differ much - maximum by AMD 2,500.

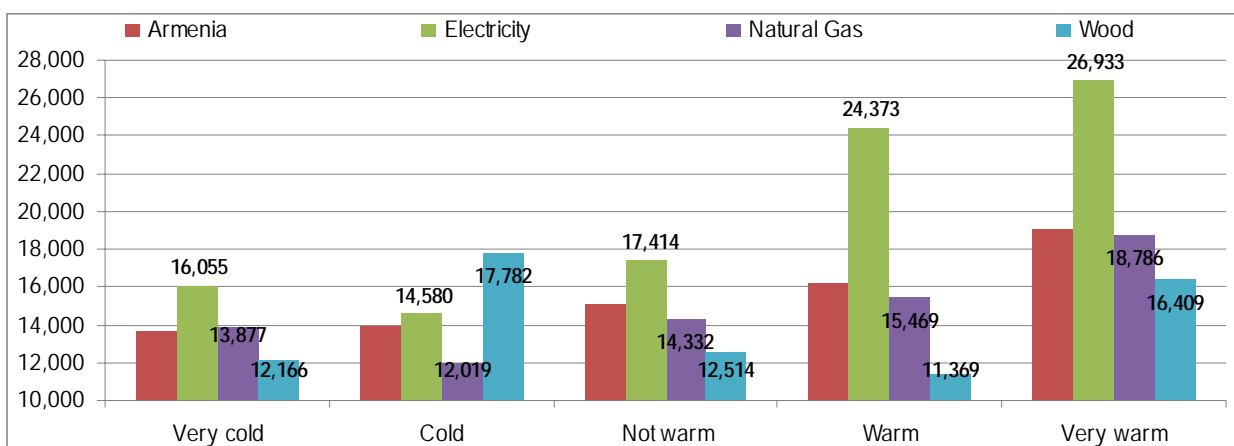
Figure 27: Average Monthly Expenditures on Heating and Hot Water Broken Down per Groups of HHs that Heat Partially or Entirely and per Temperature Groups, AMD



Source: SAHS-2007

I. e. the fact that the apartment is heated entirely or the temperature is higher is not conditioned with huge differences in heating expenditures (see Figure 27). This also hints that the chosen option is the most important factor.

Figure 28: Average Monthly Expenditures on Heating and Hot Water Broken Down per Heating Option and per Average Temperatures, AMD

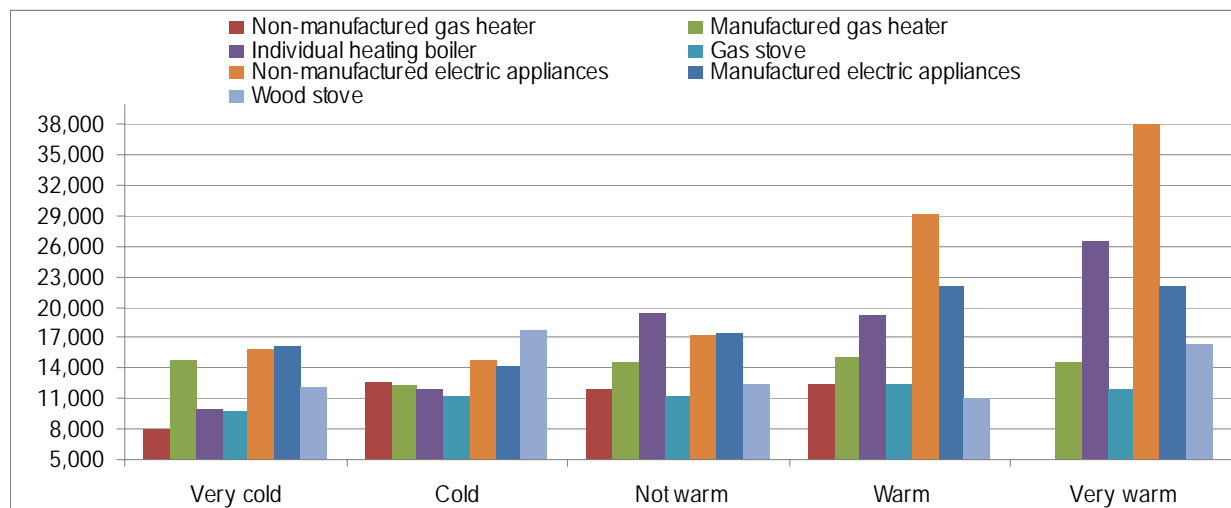


Source: SAHS-2007

Figure 28 displays the average monthly expenditures on heating and hot water broken down for different heating options. It shows that electricity is the most expensive heating option, especially taking into account that it provides lower temperature than other options. Apartments with warm temperatures (19-21C°) spent on average monthly AMD 24,373 if heated with electricity, AMD 15,469 – if heated with natural gas and AMD 11,369 – if heated with wood (see Figure 28).

Figure 29 summarizes the average monthly expenditures on heating for different heating devices. It shows that higher temperatures with non-manufactured electric appliances can be ensured only with significantly higher expenditures on heating.

Figure 29: Average Monthly Expenditures on Heating and Hot Water Broken Down per Heating Device Type And Average Temperatures, AMD

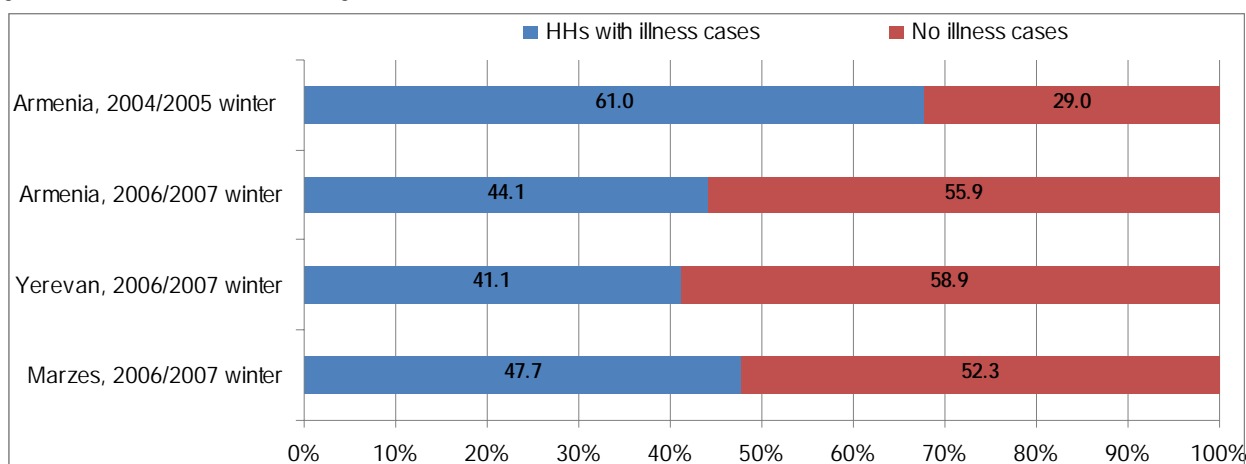


Source: SAHS-2007

## 8. Cases of Illnesses Due to Insufficient Heating

In 2006/2007 winter, cases of illnesses due to insufficient heating were recorded in 44% of HHs. This has significantly improved since 2004/2005 when, according to the 2005 survey, 66% of HHs had at least one case of illness.

Figure 30: Illness Cases due to Heating Conditions in HHs, %

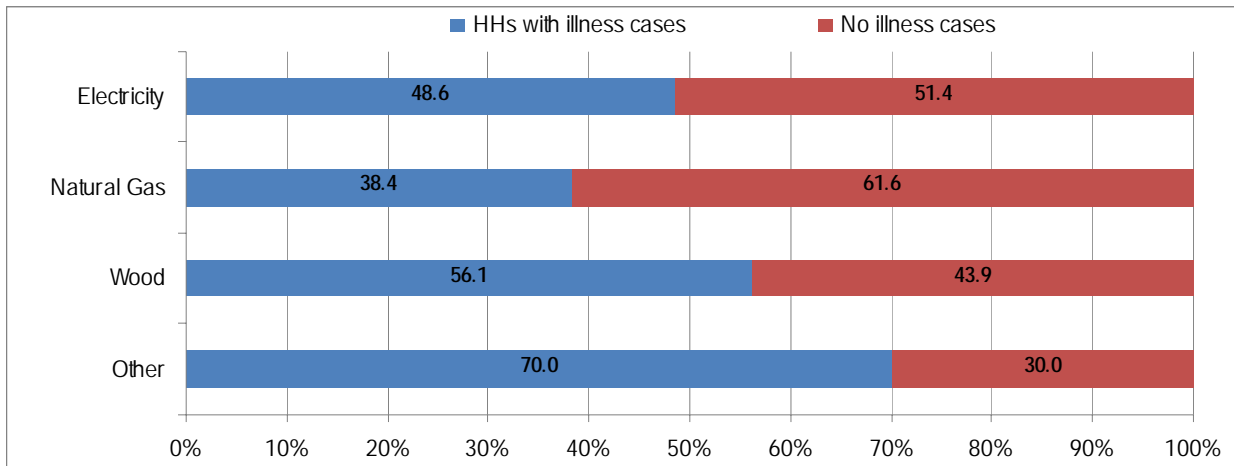


Source: SAHS-2007 and SAHS-2005

The level of illnesses due to heating conditions is considerably higher in poorer regions with colder climate and longer winters - Shirak and Gegharquniq (see Table 6.3). Duration of heating season in these regions is 6 months. The highest frequency of illnesses was recorded in Tavush Marz, where heating season is relatively short and winter is comparatively mild.

Illnesses due to heating conditions, as the Survey showed, significantly depend on heating option (source of energy) chosen.

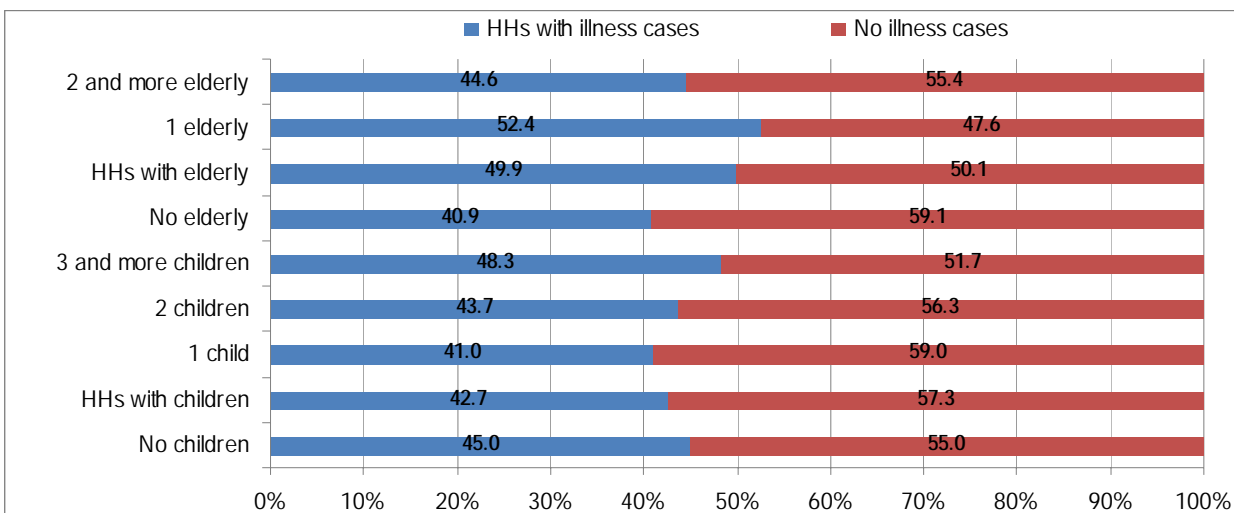
Figure 31: Illness Cases due to Heating Conditions in HHs Broken Down per Heating Options, %



Source: SAHS-2007

Illnesses are more frequently recorded in wood-heated HHs and HHs that used other heating options - respectively 56% and 70% of HHs had illness cases. The least cases were recorded in gas-heated HHs - 38% (see Figure 31).

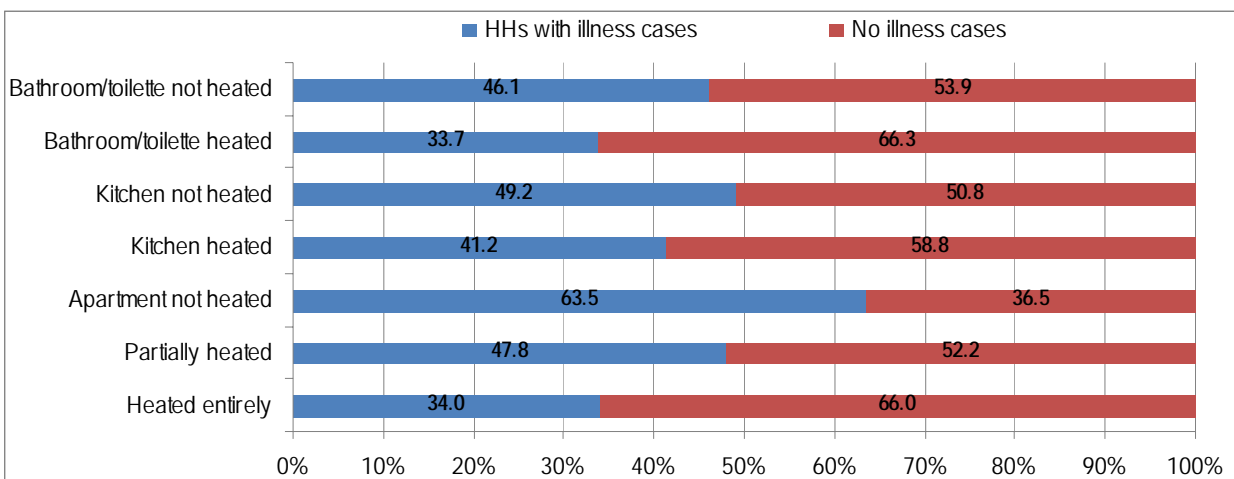
Figure 32: Illness Cases Due To Heating Conditions in HHs Broken Down per Groups of HHs Having Children or Elderly, %



Source: SAHS-2007

Illness cases are higher than the national average in HHs without children, in HHs with 3 and more children and elderly. Illness cases were recorded in 52% of HHs with one elderly (see Figure 32).

Figure 33: Illness Cases due to Heating Conditions in HHs Broken Down per Entirely/Partially Heated Groups, %

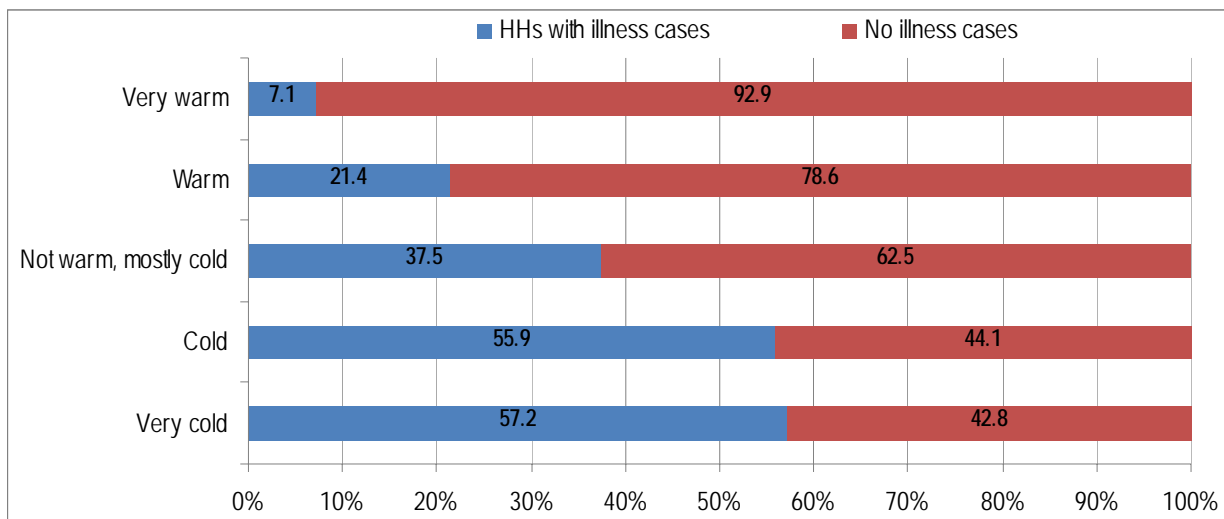


Source: SAHS-2007

Illness cases were high in HHs, who do not heat<sup>5</sup> the apartment or heat partially. 34% of HHs that were heated entirely have illness, as well as 47.8% of those, who heated partially and 63.5% of not heated ones. Illness cases are also high when kitchen is not heated - 49.2% (see Figure 33).

Illness cases depend also on average temperatures in apartments. Figure 34 proves that the higher is the average temperature in the apartment, the less are the cases. In very warm apartments, only 7% of HHs had illness cases. In very cold and cold apartments, the cases were recorded respectively in 42.8% and 44.1% of HHs.

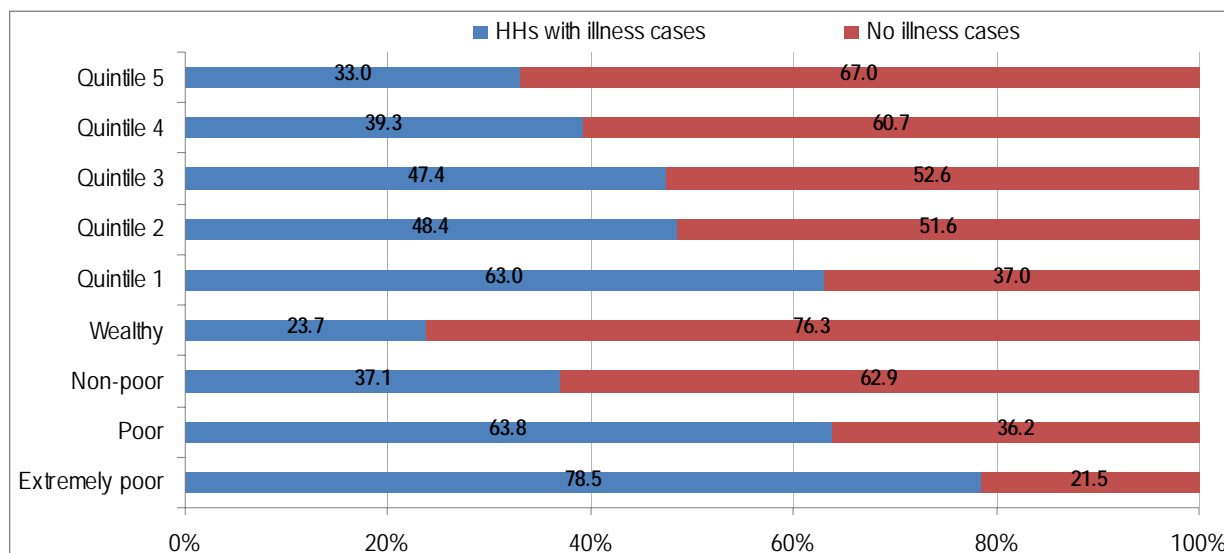
Figure 34: Illness Cases due to Heating Conditions in HHs Broken Down per Temperature Groups, %



Source: SAHS-2007

Illness cases depend also on the level of welfare. Figure 35 shows the correlation between self-assessment of welfare and quintile groups and cases of illnesses. 78.5% of HHs, who assessed themselves “extremely poor” and 63% of those included in the first quintile had illness cases. Along with the increase in welfare, the illness cases decrease. Number of cases was lower than the average among HHs, who consider themselves “wealthy” and those, who were included in quintiles 4 and 5.

Figure 35: Illness Cases due to Heating Conditions in HHs per Self-Assessed Welfare Groups and Quintiles, %

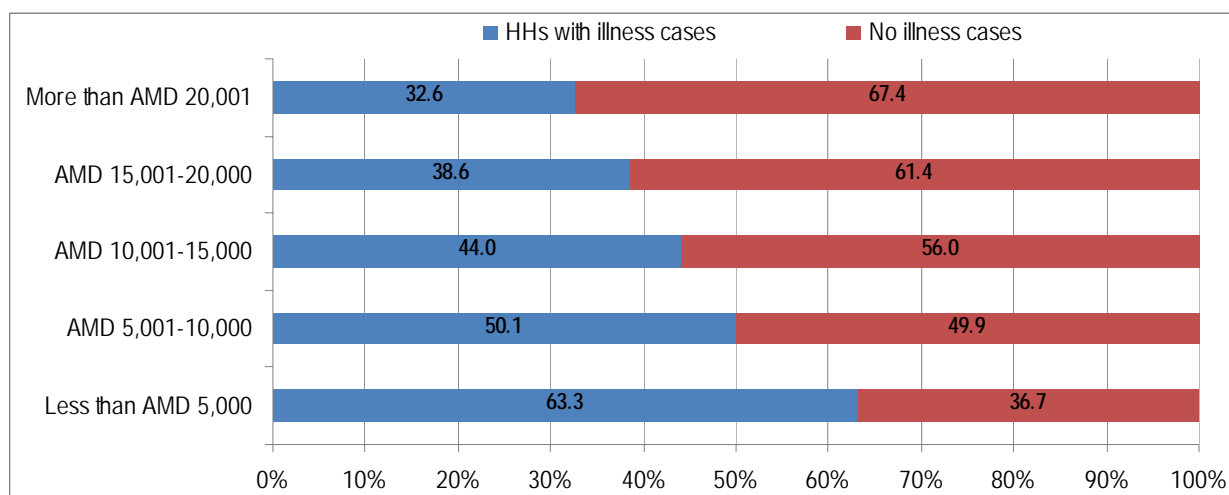


Source: SAHS-2007

Illness cases are lower than the average for the country when the average monthly expenditures on heating exceed AMD 15,000. Nevertheless, illness cases were recorded in a large share (32.6%) of HHs with more than monthly AMD 20,000 expenditures on heating (see Figure 36).

<sup>5</sup> Those HHs that did not heat the living room, bedroom, corridor and cabinet, were included into “not heated” group.

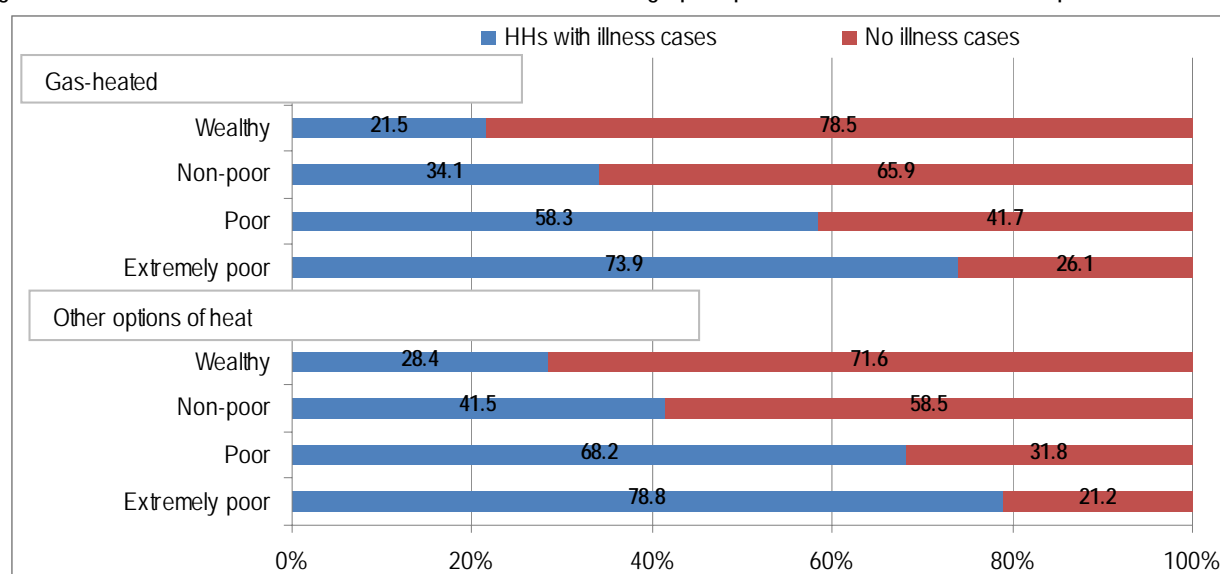
Figure 36: Illness Cases due to Heating Conditions in HHs per Average Monthly Expenditure Groups, %



Source: SAHS-2007

Figure 37 shows the illness cases in gas-heated HHs and HHs that used other options per self-assessment of welfare. 74% of HHs, who consider themselves “extremely poor” had illness cases if they use natural gas and 79% of them had cases if they use other heating options. For HHs that considered themselves “wealthy” and “non-poor”, the share of HHs with cases of illnesses differed with 7 percentage points depending on whether gas or other option is used (see Figure 37).

Figure 37: Illness Cases in HHs that Used Natural Gas and Other Heating Option per Welfare Self-Assessment Groups, %



Source: SAHS-2007

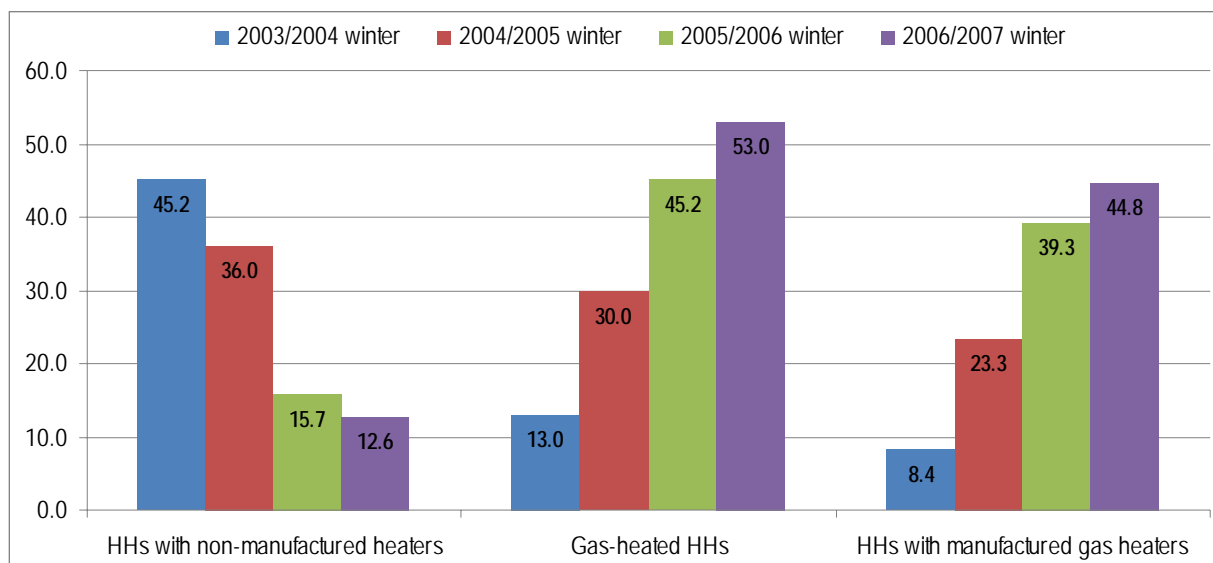
## 9. Moving towards to Safe and Clean Heating

According to the Survey, substantial progress is recorded in moving towards clean, safe and efficient heating in Armenia. As a result of high gasification rates, stricter controls over forest usage and, eventually, increased welfare of the population the heating situation was significantly improved during the last years. The number of HHs using natural gas, manufactured heating devices, as well as devices heating on the basis of hot water circulation has expanded significantly. Consequently, this has led to increased opportunities to organize safe, clean and efficient heating options in terms of economic, health and environmental aspects.

The drastic increase in the number of gas-heated HHs decreased the usage of wood stoves and non-manufactured heaters. Along with increased usage of natural gas, the usage of manufactured gas heaters increased significantly. As a

result, 45% of Armenian HHs use manufactured gas heaters (stoves and boilers) that are quite efficient in terms of safety and cleanness. Figure 38 summarizes a number of indicators of heating for the recent 4 winters.

Figure 38: Trends of Moving Towards Safe and Clean Heating, %



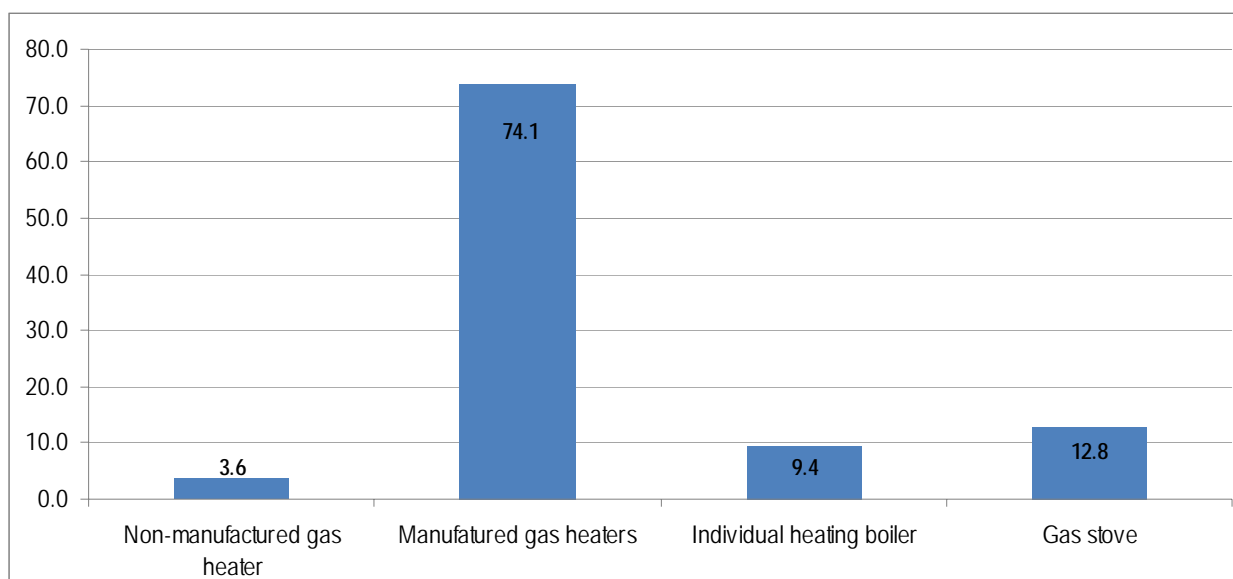
Source: SAHS-2007 and SAHS-2005

Analysis of the HHs per devices used in 2006/2007 proves that the usage of non-manufactured heaters has decreased to the minimum: from 45% in 2003/2004 to 12.6%. More specifically, non-manufactured heaters are mainly used for heating with wood. Only 3.6% of all gas-heated HHs use non-manufactured heaters (see Figure 39). Three of each four gas-heated HHs use manufactured gas heaters.

The number of HHs using individual heating boilers has also increased. Only 0.3% of HHs had individual boilers in 2003/2004, 0.9% - in 2004/2005, 3.8% - in 2005/2006 and 5.1% - in 2006/2007. Thus, 9.4% of gas-heated HHs used individual heating boilers, and this has huge potential to accelerate.

Figure 39 shows the breakdown of devices used for heating in 2006/2007 winter. The number of HHs using the gas stove is still high; however, the overall picture allows stating that the level of using safe and efficient heat options has improved significantly.

Figure 39: Devices Used for Heating with Natural Gas in 2006/2007 Winter, %

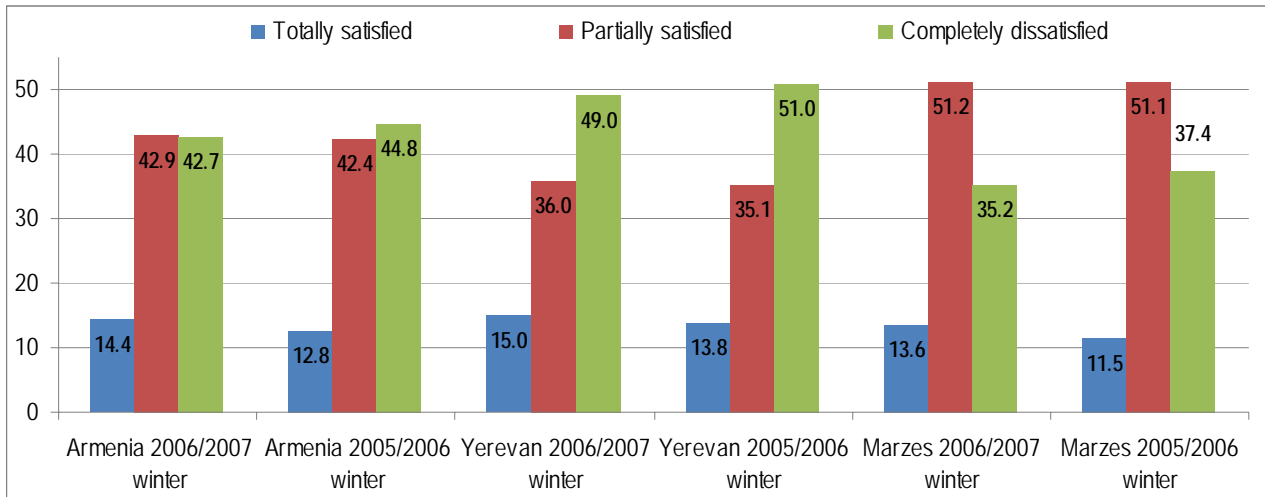


Source: SAHS-2007

## 10. Satisfaction and Preferences

Despite the recent trends, the satisfaction of population with heating is very low. 14% of HHs were satisfied with heating conditions of their apartments in 2006/2007 winter, the half of the remaining was only partially satisfied, while the other half – dissatisfied. In particular, the share of partially satisfied HHs is higher in Marzes, while the share of HHs dissatisfied is higher in Yerevan. This picture has not changed in the past years: this proves that dynamic changes in satisfaction and requirements towards heating take place.

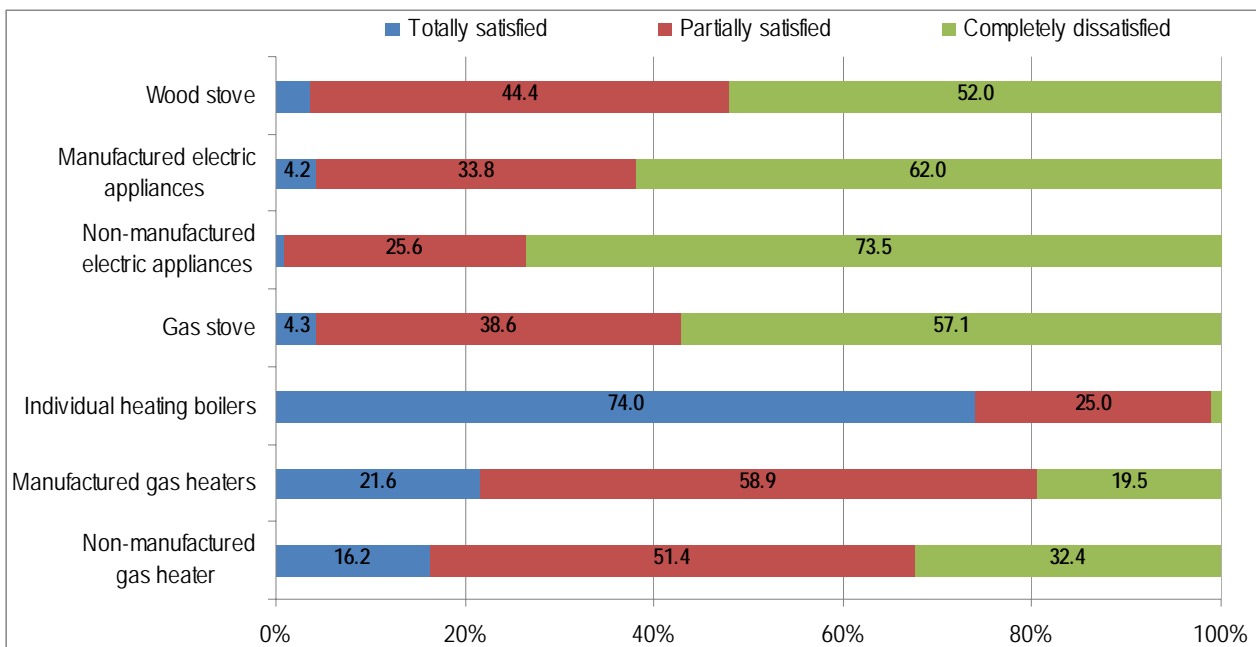
Figure 40: Satisfaction with Heating Conditions, 2006/2007 and 2005/2006, Armenia and Marzes, %



Source: SAHS-2007

Figure 41 shows the estimates of HHs satisfaction with heating devices they used. HHs that use electricity are dissatisfied with heating, especially those, who use non-manufactured electric heaters (74% of them). 74% of HHs that use individual heating boilers are entirely satisfied, followed by 22% of those, who use manufactured gas heaters and 16% of those, who use non-manufactured gas heaters.

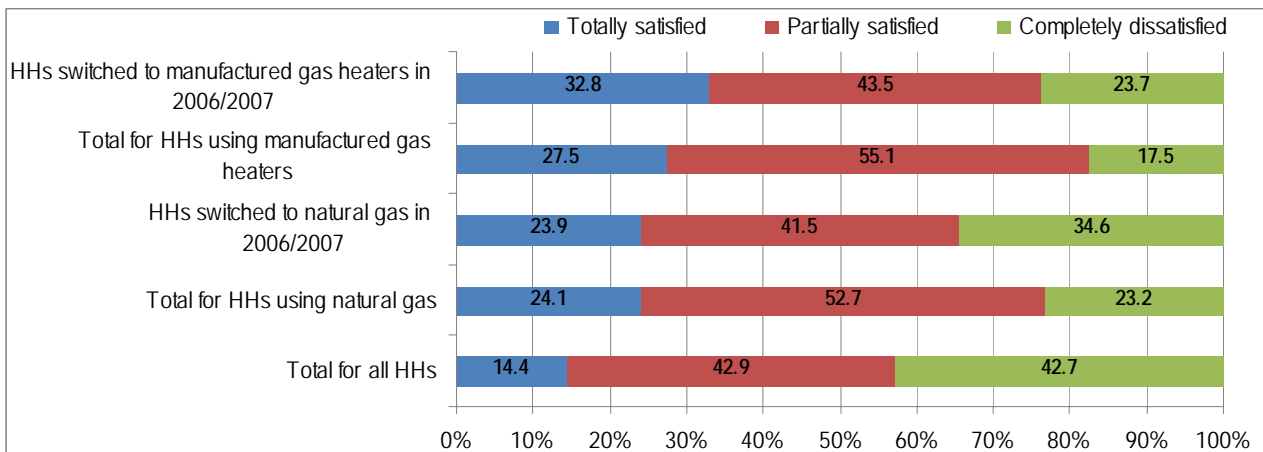
Figure 41: Estimates of Satisfaction with Heating Devices, %



Source: SAHS-2007

The satisfaction is lower among those HHs that shifted to natural gas and manufactured gas heaters last winter (see Figure 42). 34.6% of those, who shifted to natural gas and manufactured gas heaters last winter, are dissatisfied with heating (against 23% of gas-heated HHs).

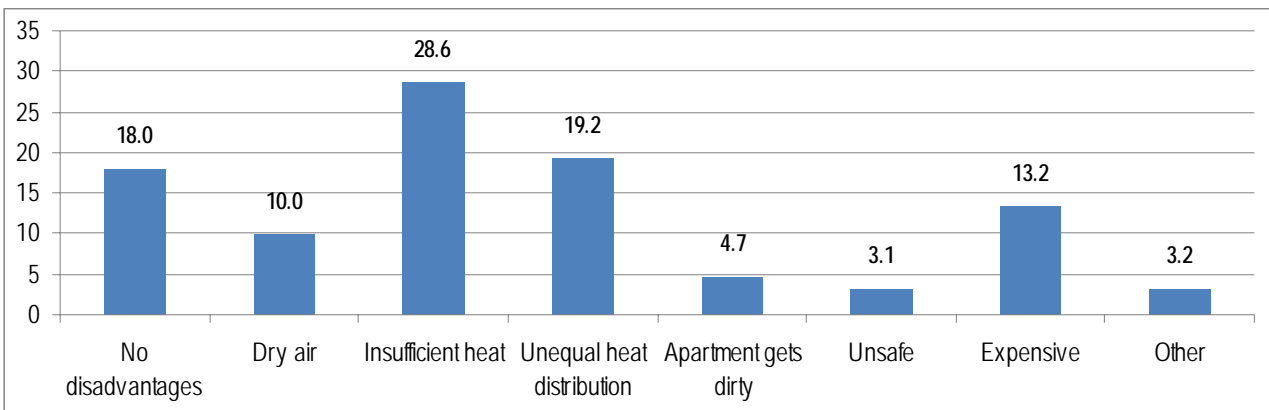
Figure 42: Satisfaction with Heating Conditions per Heating Devices, %



Source: SAHS-2007

The lack of satisfactions is explained by certain disadvantages. Only 18% of HHs mentioned that the option they use does not have any disadvantages. The major disadvantage is insufficient heating or unequal distribution of heat. These two disadvantages (or at least one of them) were mentioned by about half of HHs in Armenia (47.8%). Figure 43 summarizes the reasons of dissatisfaction of heating options.

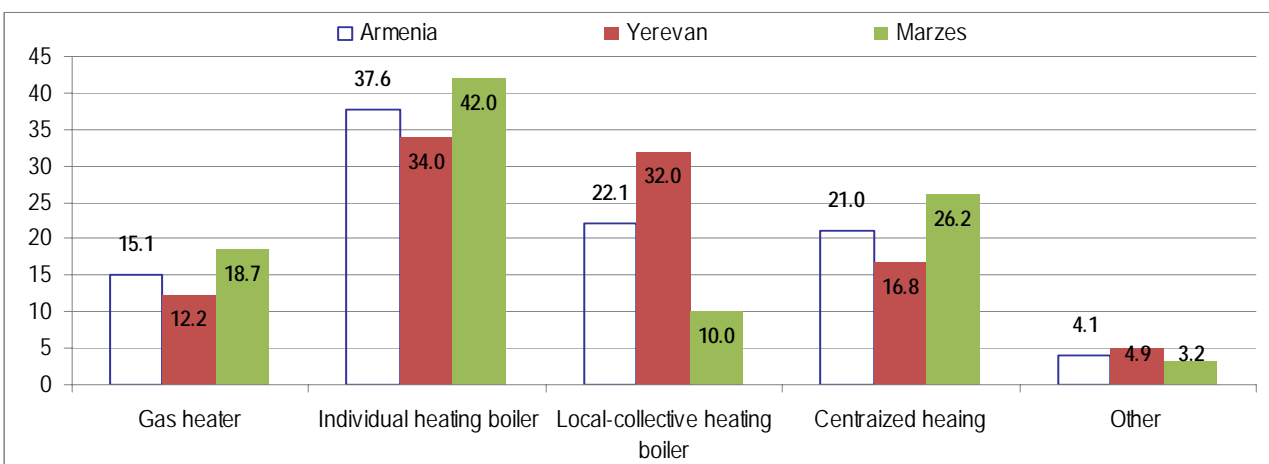
Figure 43: Satisfaction Levels with Used Heating Options, %



Source: SAHS-2007

Majority of HHs prefer heating options that base on hot water circulation. The highest preference was given to individual heating boilers: 38% of HHs. Preference of local-collective boiler houses and centralized heat supply is also quite high - 21-22%. Only 15% of HHs prefer gas heaters and 4% - other options. When comparing with the 2005 findings, one should note that the preference of individual heating boilers has increased, while the preference of gas heaters and other options - decreased.

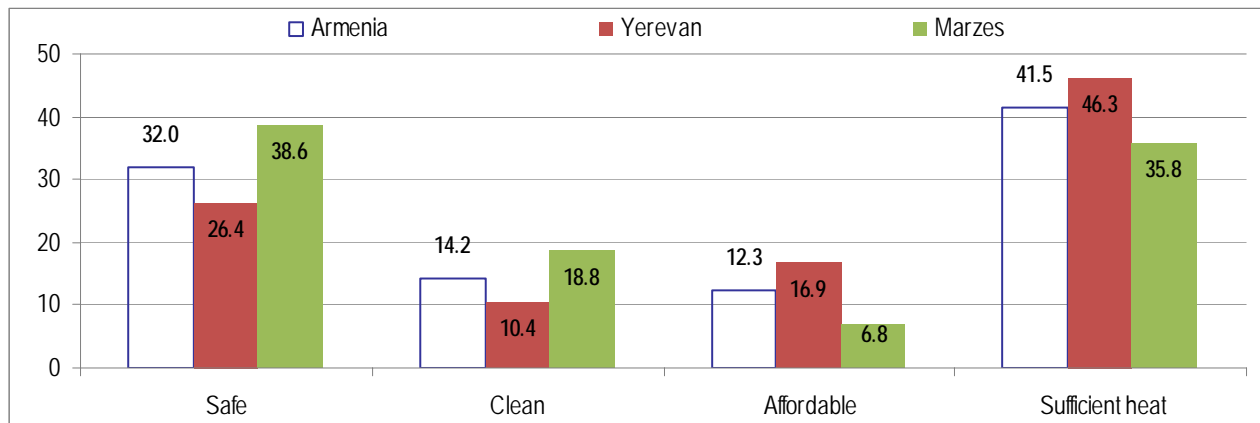
Figure 44: Heating Option Preferences in Armenia and Marzes, as % of total of each locality



Source: SAHS-2007

For the majority of HHS, especially in Yerevan, the reason for preference of other option is the expectation of sufficient heat level in apartments. The safety requirements are also quite high: 32% of HHS prefer one or the other option expecting better safety. If the main problem in Yerevan is the insufficiency of heat, HHS in Marzes give importance to safety. Having clean heating is also more required in Marzes over Yerevan. This shows that safe and clean heating problems are higher in Marzes than in Yerevan.

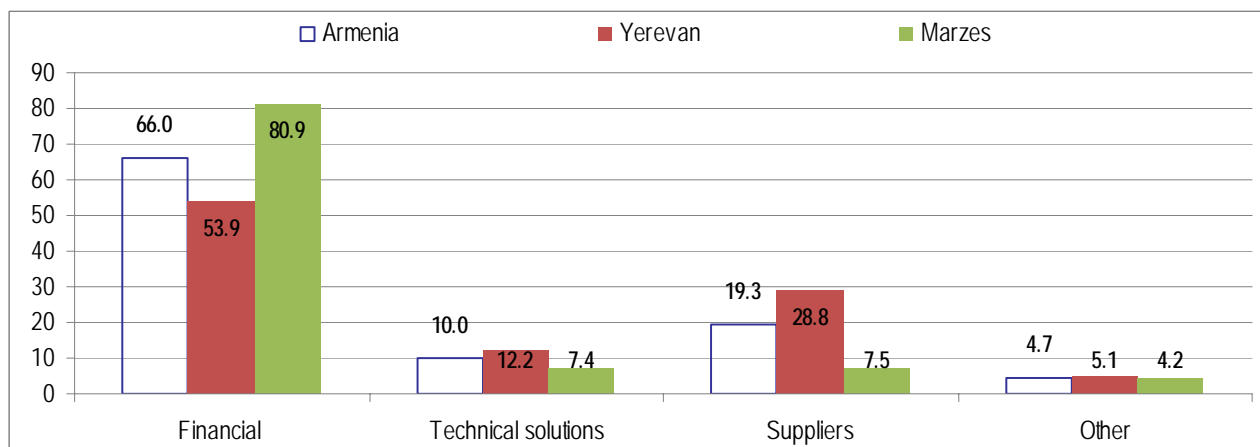
Figure 45: Reasons for Preferring Other Heating Options, Armenia and Marzes, % in the total of the given Marz



Source: SAHS-2007

The main reason for not using the most preferred heating option is the financial constraints. 81% of HHS in Marzes do not use the option they prefer due to financial reasons. In Yerevan, 54% of HHS mentioned financial reasons, 29% mentioned lack of suppliers and 12% - difficulties in technical solutions (see Figure 46).

Figure 46: Reasons for Not Using the Preferred Heating Option in Armenia and Marzes, % of total for each locality

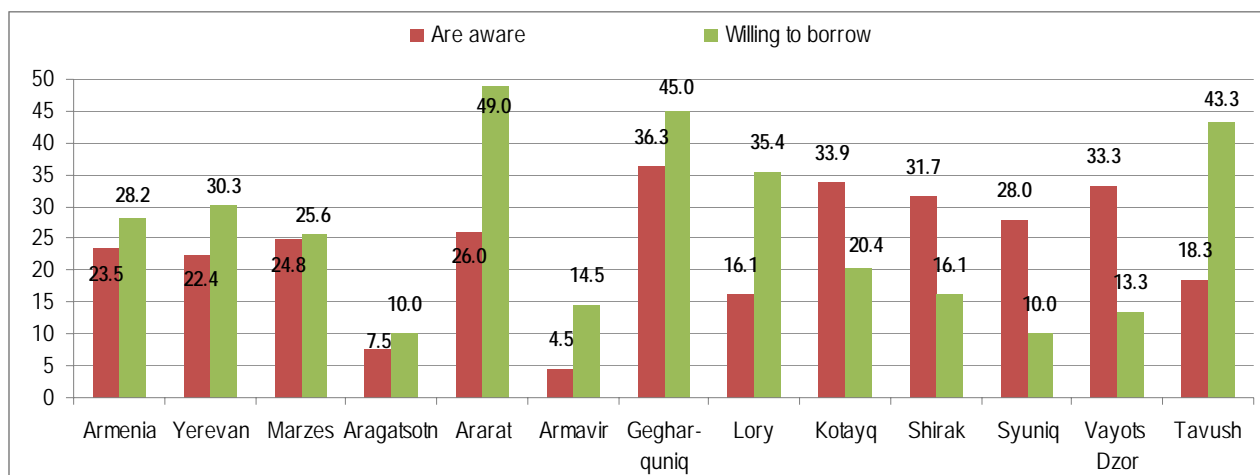


Source: SAHS-2007

## 11. Opportunities of Improving Heat Supply and Social Collaboration

28% of HHs would like to borrow for the improvement of heating conditions. Preparedness to borrow from banks is especially high in Ararat, Gegharquniq, Tavush and Lory. Awareness of population on heating loans in some Marzes is considerably higher; however, overall, it is insufficient. Figure 47 depicts the situation with awareness and preparedness to borrow.

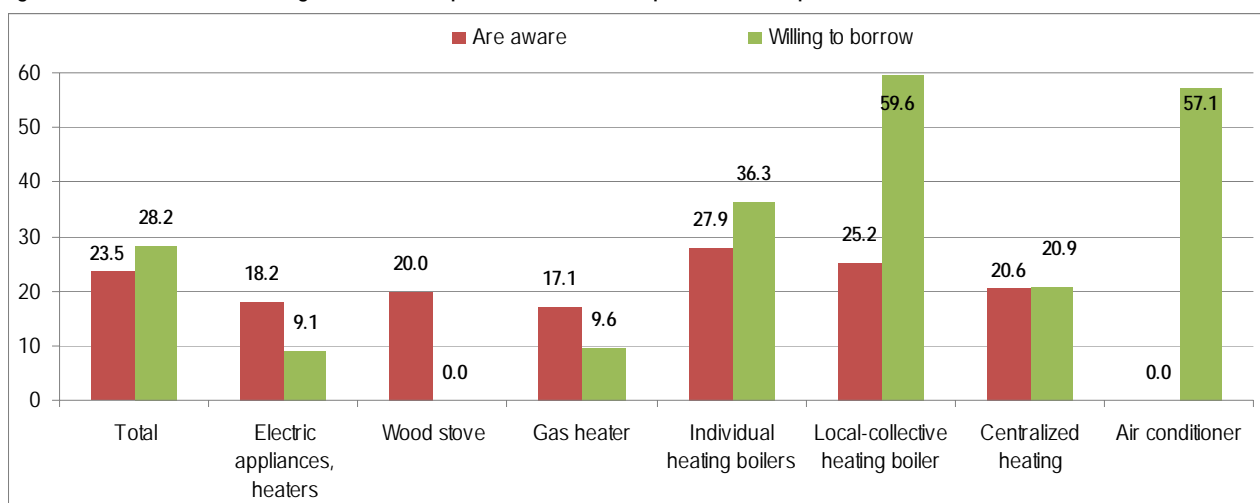
Figure 47: Awareness on Heating Loans and Preparedness to Borrow per Marzes, %



Source: SAHS-2007

60% of HHs that would prefer local-collective boiler-supplied heating are ready to borrow money for that purpose. The preparedness to borrow for purchasing air-conditioners or individual heating boilers is also high; however, only quarter of these HHs are aware of borrowing opportunities (see Figure 48).

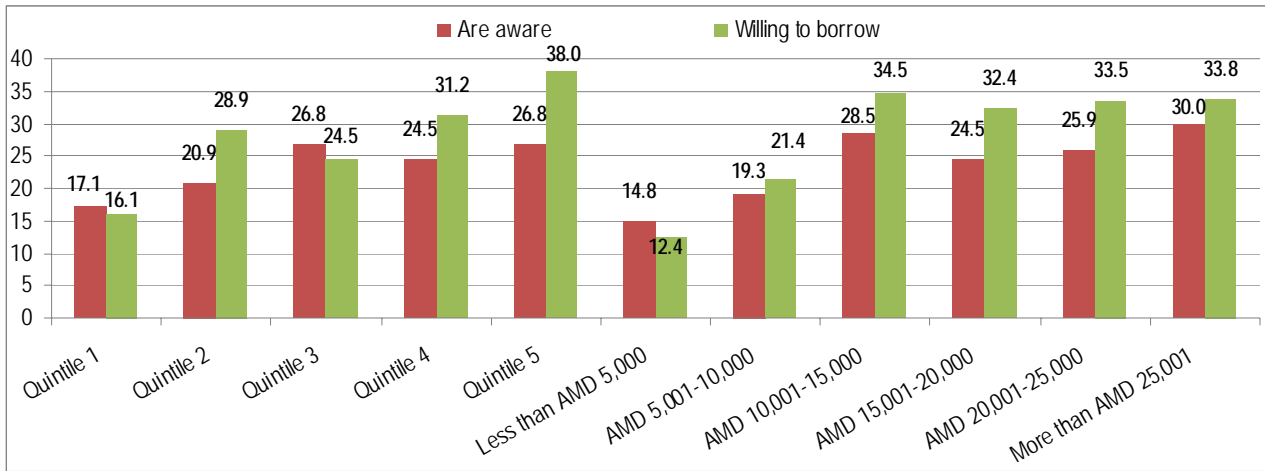
Figure 48: Awareness on Heating Loans and Preparedness to Borrow per Preferred Options, %



Source: SAHS-2007

The share of HHs, ready to borrow, increases per quintiles and actual expenditures for heating. In 4<sup>th</sup> and 5<sup>th</sup> quintiles, respectively 31% and 38% of HHs are ready to borrow for improving heating. Every third HH that spends on average monthly AMD 10,000 and above on heating are also ready to borrow (see Figure 49).

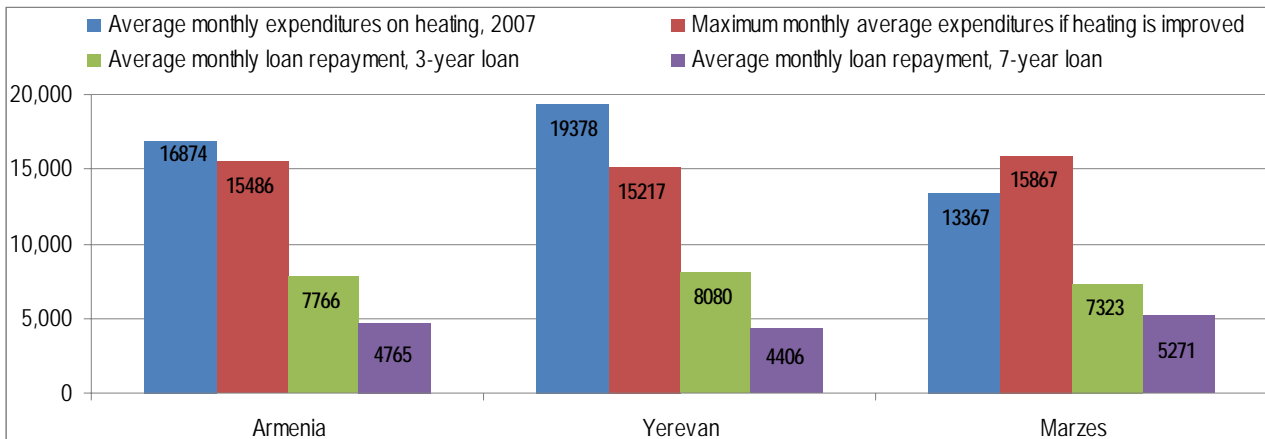
Figure 49: Awareness on Heating Loans and Preparedness to Borrow per Quintiles and Actual Expenses on Heating, %



Source: SAHS-2007

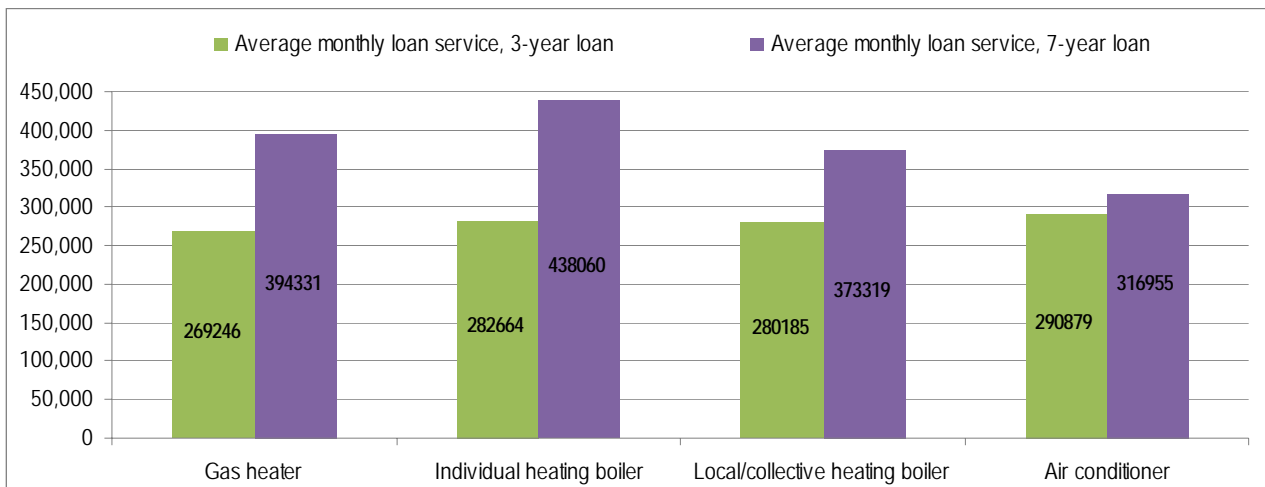
Figure 50 summarizes the statistic of heating expenditures and monthly payments under a potential loan. According to it, HHs ready to borrow are prepared to pay monthly AMD 7,766 during 3 years, or AMD 4,765 during 7 years. The monthly amount that HHs are ready to pay under a 3-year loan are higher in Yerevan, while under a 7-year option – in Marzes. Once a loan is borrowed, HHs in Marzes are ready to pay more as monthly expenditure for heating, whereas HHs in Yerevan are more inclined to pay less as monthly payments for heating.

Figure 50: Monthly Loan Repayments and Heating Expenditures, AMD



Source: SAHS-2007

Figure 51: Estimates of Debt Service (interest + principal payments) on Heating Loans per Preferred Appliances, AMD



Source: SAHS-2007

Figure 51 summarizes the average estimates of a hypothetical credit to improve heating for HHs in current prices, per preferred heating option. For example, HHs that prefer gas heaters are ready to pay AMD 269,000 in case of a 3-year

loan or AMD 394,000 – in case of a 7-year loan. Similar statistics are also summarized in Figure 51 for heating boilers and air conditioners.

Based on the Figure above, the Tables below summarize the sizes of the loan under different interest rates, i.e. the potential amount to be paid for purchasing and installing one of the preferred devices and the average monthly interest payments. For example, under 12% interest rate, HHs are ready to pay AMD 225,000 for the gas heater and to pay on average AMD 1,224 each month as interest payments in excess of loan amortization. Under 20% interest rate, the loan amount would be AMD 201,000 and monthly interest payments - AMD 1,889.

**Borrowing for a 3-year term to improve heating conditions: demand indicators, AMD**

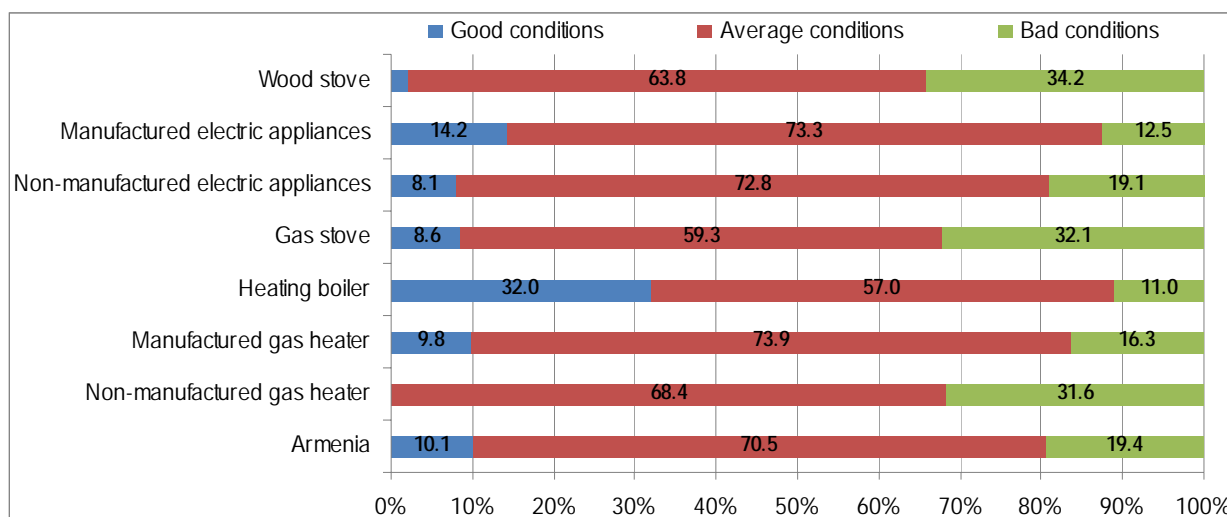
	Under assumption of 12% annually		Under assumption of 16% annually		Under assumption of 20% annually	
	Average annual interest payment	Credit Amount	Average annual interest payment	Credit Amount	Average annual interest payment	Credit Amount
Gas heater	1,224	225,176	1,570	212,733	1,889	201,247
Individual heating boiler	1,285	236,397	1,648	223,334	1,983	211,276
Local-collective heating boiler	1,274	234,324	1,634	221,376	1,966	209,423
Air Conditioner	1,323	243,268	1,696	229,825	2,041	217,416

**Borrowing for a 7-year term to improve heating conditions: demand indicators, AMD**

	Under assumption of 12% annually		Under assumption of 16% annually		Under assumption of 20% annually	
	Average annual interest payment	Credit Amount	Average annual interest payment	Credit Amount	Average annual interest payment	Credit Amount
Gas heater	968	312,998	1,170	296,039	1,332	282,466
Individual heating boiler	1,076	347,708	1,300	328,867	1,479	313,790

The major disadvantage of all used options, or rather the objective of improving the heating conditions is to increase energy saving. In this regard, the improvement of windows in apartments is crucial. In 70% of Armenian HHs, average condition of windows can be estimated as average, while in 19% - bad. The windows are bad especially in HHs that use wood stoves, gas stoves, non-manufactured gas heaters (see Figure 52). I.e. windows are in bad condition mostly in poor HHs (see Tables 9.3-9.5).

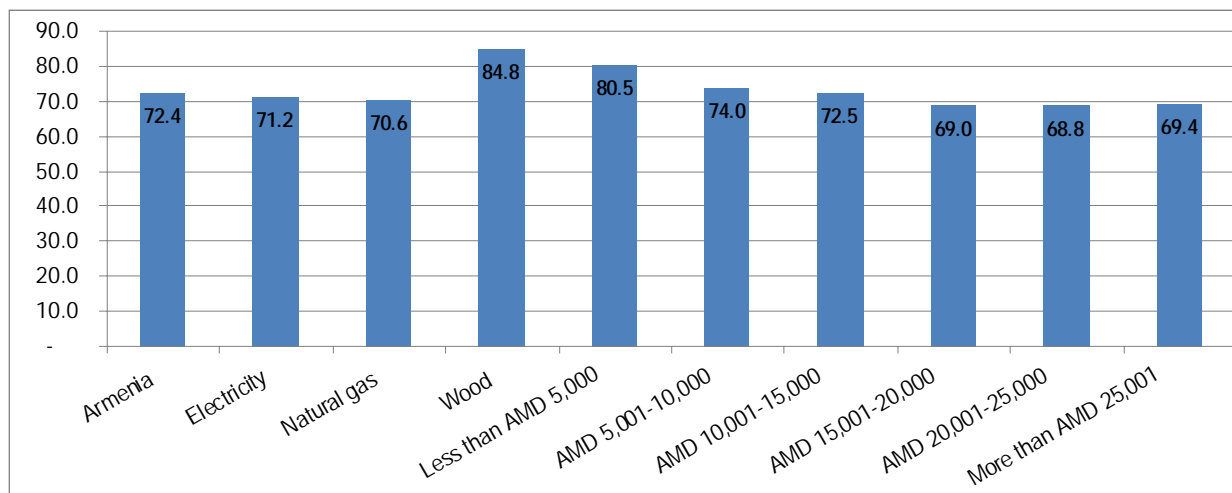
Figure 52: Assessment of Windows per Types of Heating Device Used, %



Source: SAHS-2007

About 72% of Armenian HHs believe they would save heat and heating expenses if they replaced windows. This is mostly the same across all types of HHs, except for those who spend less than AMD 5,000 per month and those who use wood for heating (see Figure 53).

Figure 53: Shares of HHs per Heating Option and per Settlements that Believe They Would Save Heat and Expenses on Heating in Case of Windows Replacement, %



Source: SAHS-2007

According to the Survey, about 20-25% of Armenian HHs are ready to borrow to replace windows. The Tables below summarize the HHs demand indicators under interest rate assumption of 20% annually. According to these Tables, HHs are ready to borrow 3-year loan paying on average AMD 125,000 total service payments to replace 1-2 windows. In particular, in our example (see Table below), HHs are ready to pay AMD 93,000 to buy and replace windows and pay monthly AMD 877 as interest payments during 3 years along with the loan amortization payments.

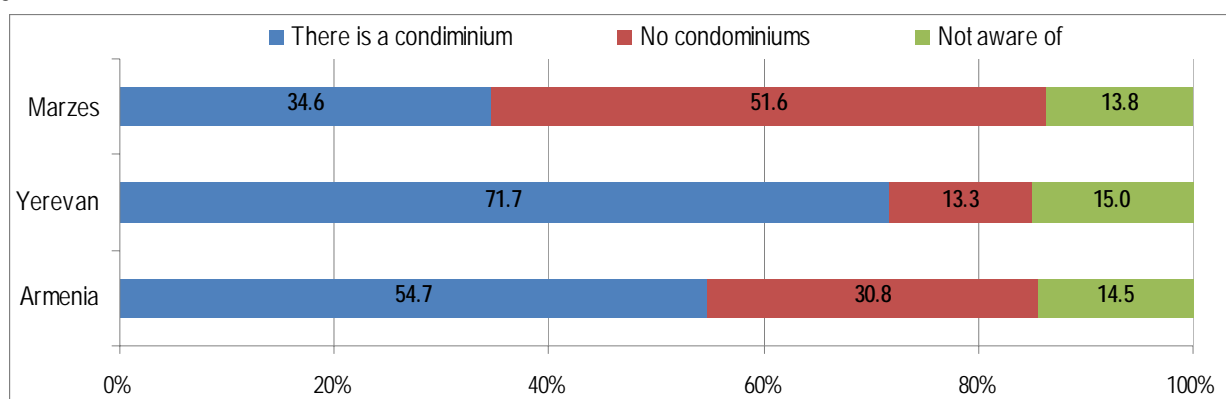
**Borrowing for a 3-year Term to Replace Windows: demand indicators, AMD**

Under 3-year loan assumption	Total Service	Interest Payments		Total Credit
		Total	Monthly average	
1-2 windows	125,072	31587	877	93,485
3-4 windows	145,018	36625	1017	108,394
5 and more windows	191,549	48376	1344	143,172
<b>Under 1-yea loan assumption</b>				
1-2 windows	57,993	5823	485	52,170
3-4 windows	65,563	6583	549	58,980
5 and more windows	99,411	9982	832	89,430

From the perspective of improving heating conditions, social collaboration and assistance are crucial. The Survey revealed that social assistance for heating purposes in Armenia is extremely low. Only 1-2% of Armenia HHs received social support to improve heating conditions or to pay recurrent heating expenses.

Social collaboration is also one of the pre-conditions of heating improvement and introduction of efficient, clean and safe heating. In this regard, development and effectiveness of condominiums, as well as collaboration opportunities within communities, districts, blocks and among neighbors, are important pre-requisites.

Figure 54: Condominiums, Armenia and Marzes, assessment of HHs

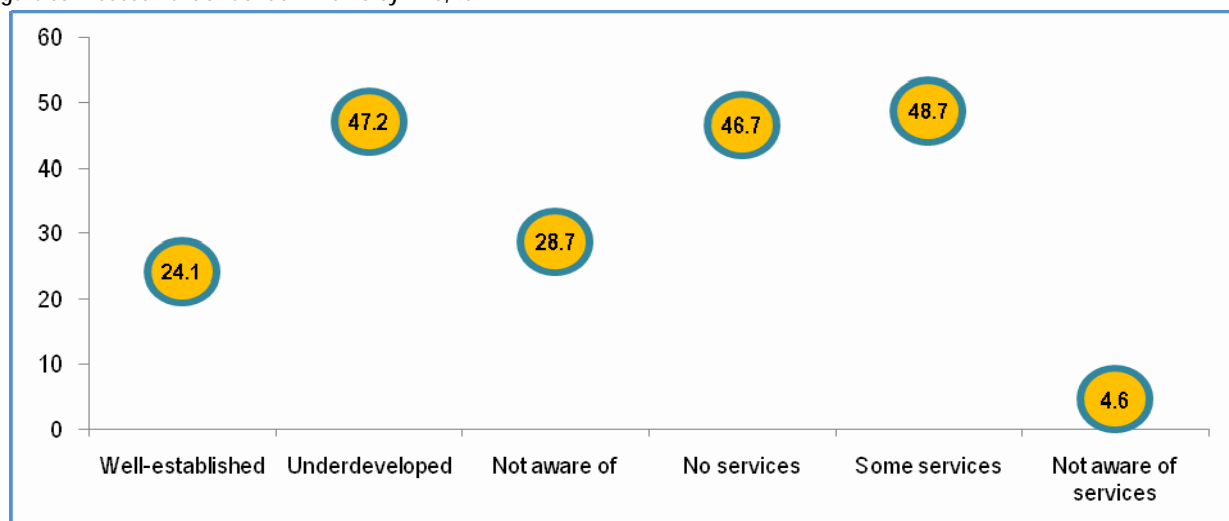


Source: SAHS-2007

Figure 54 presents the assessment of HHs on effectiveness of condominiums. According to it, 55% of HHs are included in condominiums, 15% of them are not aware whether their block has one or not, while 31% are confident that their block does not have any. The assessment of condominiums effectiveness is especially low in Marzes.

24% of HHs that have condominiums believes that condominiums are well-established, while 47% believe that they are underdeveloped. At the same time, 47% of HHs believes that condominiums do not provide any services (see Figure 55). Thus, the current situation or a mere nominal existence of condominiums, along with other problems, does not contribute to the improvement of heating and does not provide opportunities of having efficient heating.

Figure 55: Assessment of Condominiums by HHs, %



Source: SAHS-2007

It is important to increase the levels of social capital and social collaboration in communities in order to be in the position to improve heating conditions. This can be implemented through preparedness and ability of neighbors to take collective actions. The Table below summarizes the responses of HHs to the question “whether they have ever done one of the following activities together with your neighbors or some of them?” According to their responses, 24% of HHs have renovated and cleaned their yards, 23% - planted trees, 19% - repaired pipes, 18% - renovated entrances, etc. As it can be seen from the Table, number of HHs that have done more than one activity collectively is less: 19.6% of HHs have ever done only one, 17% - two activities. 52.5% of HHs have never done anything collectively with neighbors.

Activities or Works Carried Out Collectively with Neighbours, % of HHs (multiple responses)

Renovation, rehabilitation of the yard	24.2
Planting trees and plants	23.3
Construction of a playing ground	4.0
Renovation of the entrance	17.8
Renovation of pipes	19.2
Illumination of the yard	2.7
<b>Have done at least one of the listed improvements</b>	<b>47.5</b>
Have done only one of the listed	19.6
Have done only two of the listed	17.1
Have done only three of the listed	7.1
Have not done only two of the listed	2.7
Have not done only one of the listed	0.7
Have done all of the listed	0.3
<b>Never done any of the listed</b>	<b>52.5</b>

The Table below summarizes the responses to the question “Whether it is feasible to organize the construction of a small boiler house for several apartments, one entrance or entire block in order to have clean and safe heating and hot water supply?” Even positive responses also show that such collaboration is hardly realistic, however, negative responses are more worrying, namely responses 7, 8 and 10. I.e. 39.6% of HHs believe that neighbors would not collaborate, while 33% (23.6% and 9.0%) are not ready to collaborate themselves.

Thus, insufficient social collaboration impedes efficient heating.

**Possibilities to collectively build a small boiler house, % (multiple responses possible)**

1	Yes, if there is someone to organize and coordinate	55.6
2	Yes, if a small monthly payments is required	50.9
3	Yes, if a long-term loan is available	11.4
4	Yes, if all understand the advantages	17.0
5	Yes, if the heating as a result of investment is more affordable than currently	44.4
6	Yes, other	0.8
7	No, apartment-owners will not collaborate	39.6
8	No, no need	23.6
9	No, it is too expensive, we cannot afford that	36.6
10	No, we do not trust such options	9.0
11	No, technical solutions will be difficult to find for our block	13.1
12	No, apartment owners are mostly very poor	33.1
13	No, other	7.6

## Annex 1: Sampling methodology

The 2007 Household Survey on Assessment of Heating Situation for Urban Multi-apartment Blocks was carried out on a basis of a random sampling, constructed through stratified, two-stage, multi-step plan. The first stage of sampling included stratification of the general population per Marzes and preliminary determination of the target sample in each stratum for the maximum sample size. Thereafter, HHs were grouped in PSUs and the total number of PSUs was determined in each stratum. The next stage included the determination of numbers of Sample PSUs per each stratum by adjusting the target sample size so that the number can be divided by 10. Then, Sample PSUs were randomly selected taking into account probability weights (by proportion in the population size). In the last stage, 10 HHs were randomly selected among the selected PSUs with the condition that HHs have equal probability to be selected.

The basis for stratification and clustering of the general population was the official statistics. In particular, the NSS RA reports were used ("Housing and Communal Infrastructure of the Republic of Armenia"). According to that source<sup>6</sup>, the number of people living in multi-apartment blocks in urban areas of Armenia equaled 385.8 thousands, with 54% of that living in Yerevan.

Based on these statistics, the general population was stratified, along with the determination of the number of PSUs in each stratum. To that, the following assumptions were made: first, we assumed that each apartment has only 1 household and, second, the deviation in proportions of lived-in and empty apartments is not statistically significant and will not trigger distortion of the sample. Nevertheless, the above described official statistics on multi-apartment blocks was slightly adjusted, base on the numbers of actual population in each area according to 2001 Census.

### Definition of the Sample Size in Yerevan

According to the official statistics (see the same source), the number of people living in multi-apartment blocks in Yerevan was 210 thousands as of the beginning of 2006, i.e. more than 54% of all population living in multi-apartment block in Armenia. At the same time, the number of multi-apartment blocks in Yerevan was 4,821, which is 40% of all urban multi-apartment blocks of Armenia. That implies that the average number of HHs living in 1 block in Yerevan is higher than the average for the country (43.6 HHs on average in Yerevan, and 24.5 HHs in Marzes).

Overall, the assumption for the stratification of the general population was that the expected behavior in selecting the heat option by HHs in Yerevan is less widely spread, than in other Marzes and communities of Armenia. Therefore, each HH in Yerevan may represent more number of HHs in Yerevan, than any HH in Marzes. Two justifications are presented below for this assumption:

1. Selection and usage of a certain type of heating option by HHs, along with other factors, is largely determined by the specifics of the block and the community, namely, gasification, welfare of HHs, possible technical solutions, etc. The number of HHs living in one block in Yerevan is higher than in all Marzes. Therefore, when comparing, the more HHs in Yerevan will take similar decisions on heat options.
2. Districts of Yerevan have more similarities than urban communities in Marzes. In particular, 12 communities of Yerevan can be grouped into 3-4 groups with similar behavior and choices. Therefore, a randomly chosen HH in Yerevan is more likely to have similar characteristics with other HHs, than a randomly selected HH from Marzes would have (to other HHs in the same Marz).

These assumptions are brought as a logical basis for the determination of the sample size in Yerevan. When constructing the sample, it was decided to assign only the minimum necessary sample size to Yerevan, so that we have more HHs surveyed in Marzes. This allows for increasing the chances of HHs in Marzes to be included in the sample.

	Number of Communities	Number of Multi-apartment blocks	Number of Apartments	Share in total, %	Proportional distribution under sample size of 2000
Yerevan	12	4,821	210036	54.4	1088
Marzes	47	7186	175761	45.6	912
Lory	8	1,759	37971	9.8	196
Kotayq	7	1,078	37470	9.7	194
Shirak	3	1,758	23977	6.2	124
Syuniq	7	761	20165	5.2	104

<sup>6</sup> See "Housing and Communal Infrastructure in Armenia in 2005" analytic report, NSS RA, Yerevan 2006

Armavir	3	386	15031	3.9	78
Ararat	4	430	13402	3.5	70
Gegharquniq	5	362	10996	2.9	58
Tavush	4	249	7524	2.0	40
Aragatsotn	3	220	4787	1.2	24
Vayots Dzor	3	183	4438	1.2	24
<b>Total</b>	<b>59</b>	<b>12,007</b>	<b>385,797</b>	<b>100</b>	<b>2,000</b>

As it can be seen from the Table above, when proportionally dividing the general population, due to larger weight of Yerevan, the half of the sample will fall to HHs in Yerevan (1,088 HHs). In this case, in 6 Marzes out of 10, the number of HHs in the sample will be less than 80, while in Aragatsotn and Vayots Dzor only 24 HHs will be included. Based on this risk that the representation and coverage of such Marzes may be jeopardized, as well as taking into account that more HHs in Yerevan are likely to take similar decisions, it was decided to take 700 HHs (instead of proportional 1,088) in Yerevan, while taking 1,310 (instead of 912) in Marzes.

It is worth noting that the sampling plan constructed for the 2005 Assessment of Heating Situation by the EDRC also did not take the linear proportional method: the sample size in Yerevan was taken 595. In this case, the maximum standard deviation in Yerevan did not exceed the standard deviation in Marzes.

Thus, the sample size is 2,010 HHs, of which 700 – in Yerevan and 1,310 – in Marzes. The distortion of the linear proportion implies re-adjusting of survey findings to have the national indicators as accurate as possible.

#### **Definition of the Sample Size in Marzes**

The requirements of representation and coverage of the Survey findings, as it was already noted, refer to national and Marz levels. I. e. the findings should be representative for each Marz. That implies that each HH selected from any cluster or settlement, “talks” on behalf of the entire Marz. General population of each Marz is the HHs living in multi-apartments in that Marz. Nevertheless, in order to avoid possible cluster effects and to ensure probability of including the maximum variety of HHs in the sample, the sample was constructed through PSUs. I.e. the number of PSUs in each stratum was determined based on probability scores per stratum. Each PSU contains 10 observations. This comes from the specifics of the survey and is justified by previous experience.

	Number of Urban Communities	Number of Apartments	Share in Total Number of Apartments	Proportional distribution in the sample	Sample structure, number of HHs to be surveyed	Number of PSUs in the Survey
Lory	8	37,971	21.6	280.8	280	28
Kotayq	7	37,470	21.3	277.1	280	28
Shirak	3	23,977	13.6	177.3	180	18
Syuniq	7	20,165	11.5	149.1	150	15
Armavir	3	15,031	8.6	111.2	110	11
Ararat	4	13,402	7.6	99.1	100	10
Gegharquniq	5	10,996	6.3	81.3	80	8
Tavush	4	7,524	4.3	55.7	60	6
Aragatsotn	3	4,787	2.7	35.4	40	4
Vayots Dzor	3	4,438	2.5	32.8	30	3
<b>Total Marzes</b>	<b>47</b>	<b>175,761</b>	<b>100</b>	<b>1,300</b>	<b>1,310</b>	<b>131</b>

Thus, on a Marz level each Marz is a stratum, where the number of PSUs is calculated based on their share in the general population, with some approximation, so that the each PSU has 10 HHs. The Table represents the breakdown of the sample and PSUs per Marzes. Approximation has triggered distortion of linear proportions that, again, will lead to the necessity to re-adjust the findings for the entire country.

#### **Dispersion of PSUs and clusters**

Number of PSUs per clusters in each stratum was determined based on probability scored, however, in a way that all towns and cities will be included in the Survey. In this regard, the Survey is unprecedented, since the sample covers 41 cities and towns (out of total 47) or 53 urban communities (out of total 59). Only very small towns are not included in the Survey where

the probability score of apartments in multi-apartment blocks is very small. The list of selected towns and cities and numbers of PSUs there, as well as the sample size are given below.

For the selection of PSUs, first, all potential PSUs in each town/city were initially included: the necessary number of PSUs was selected randomly. HHs were selected from the database of HHs in each PSU on a simple random basis, with the sequence of random steps. Thus, the sample definitely ensures the representation and spread over the entire territory of Armenia. The sample includes almost all towns/cities per small PSUs, which allows stating that no cluster effects of certain areas or distortion can occur. Total 201 PSUs were included as a result, the sample size reached 2010.

The Survey data is representative at each Marz level and the sample is self-weighted. At the national level, as it was noted, the sample is not proportional to the general population in order to increase chances of HHs in small Marzes to be included; therefore the data needs to be re-adjusted for the national levels. Re-adjustment coefficients per Marzes are presented in the Survey database.

#### Survey Sample per Marzes and Towns

NN	Urban Communities	Number of Apartments	Adjusted Number of Apartments	Share in Total, %	Number of Sample PSUs	Sample HHs
1	<b>Aragatsotn</b>	<b>4787</b>	<b>4787</b>	<b>100</b>	<b>4</b>	<b>40</b>
	Ashtarak	3103	3103	64.8	2	20
	Talin	947	947	19.8	1	10
	Aparan	737	737	15.4	1	10
2	<b>Ararat</b>	<b>13402</b>	<b>13402</b>	<b>100</b>	<b>10</b>	<b>100</b>
	Artashat	5102	5102	38.1	4	40
	Masis	3772	3772	28.1	3	30
	Ararat	3541	3541	26.4	2	20
	Vedi	987	987	7.4	1	10
3	<b>Armavir</b>	<b>15031</b>	<b>14774</b>	<b>100</b>	<b>11</b>	<b>110</b>
	Vagharshapat	7259	7259	49.1	5	50
	Armavir	5023	5023	34.0	4	40
	Metsamor	2749	2492	16.9	2	20
4	<b>Gegharquniq</b>	<b>10996</b>	<b>10996</b>	<b>100</b>	<b>8</b>	<b>80</b>
	Sevan	5070	5070	46.1	4	40
	Gavar	2600	2600	23.6	2	20
	Vardenis	1558	1558	14.2	1	10
	Martuni	1059	1059	9.6	1	10
	Chambarak	709	709	6.4	0	0
5	<b>Lory</b>	<b>37971</b>	<b>36115</b>	<b>100</b>	<b>28</b>	<b>280</b>
	Vanadzor	26450	26450	73.2	20	200
	Alaverdi	5646	4367	12.1	3	30
	Stepanavan	1876	1876	5.2	2	20
	Tashir	1114	1114	3.1	1	10
	Spitak	1010	1010	2.8	1	10
	Akhtala	896	620	1.7	1	10
	Shamlugh	524	223	0.6	0	0
	Tumanyan	455	455	1.3	0	0
6	<b>Kotayq</b>	<b>37470</b>	<b>33730</b>	<b>100</b>	<b>28</b>	<b>280</b>
	Abovyan	13227	11253	33.4	9	90
	Hrazdan	10760	10760	31.9	9	90
	Charentsavan	8021	6322	18.7	5	50
	Nor Hajn	2215	2215	6.6	2	20
	Byureghavan	2126	2058	6.1	2	20
	Yeghvard	965	965	2.9	1	10
	Tsakhkadzor	156	156	0.5	0	0
7	<b>Shirak</b>	<b>23977</b>	<b>23977</b>	<b>100</b>	<b>18</b>	<b>180</b>
	Gyumri	20163	20163	84.1	15	150
	Artik	2932	2932	12.2	2	20
	Maralik	882	882	3.7	1	10
8	<b>Syuniq</b>	<b>20165</b>	<b>19994</b>	<b>100</b>	<b>15</b>	<b>150</b>
	Kapan	10989	10989	55.0	8	80
	Goris	2519	2519	12.6	2	20
	Sisian	2366	2366	11.8	2	20

	Qajaran	2294	2131	10.7	1	10
	Agarak	1191	1191	6.0	1	10
	Meghri	726	726	3.6	1	10
	Dastakert	80	72	0.4	0	0
<b>9</b>	<b>Vayots Dzor</b>	<b>4438</b>	<b>3985</b>	<b>100</b>	<b>3</b>	<b>30</b>
	Jermuk	2074	1621	40.7	1	10
	Vayq	1229	1229	30.8	1	10
	Yeghegnadzor	1135	1135	28.5	1	10
<b>10</b>	<b>Tavush</b>	<b>7524</b>	<b>7524</b>	<b>100</b>	<b>6</b>	<b>60</b>
	Ijevan	3321	3321	44.1	3	30
	Dilijan	2878	2878	38.3	2	20
	Berd	757	757	10.1	1	10
	Noyemberyan	568	568	7.5	0	0
<b>Total Marzes</b>		<b>175,761</b>	<b>169,284</b>	<b>-</b>	<b>131</b>	<b>1310</b>

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## Section 1: Analysis of Heating Options

Table 1.1: Usage of Heating Options (Source of Energy) in HHS, %

	2006/2007 Winter		2005/2006 Winter	
	Major	Secondary	Major	Secondary
Electricity	34.6	27.7	37.0	25.8
Natural Gas	53.0	8.4	45.2	7.0
Wood	9.8	1.2	12.7	1.2
Centralized Heating	0.4	0.0	0.9	0.0
Other	1.1	2.8	1.0	2.6
Heated HHS	99.0	40.1	96.8	36.8
Non-heated HHS	1.0	59.9	3.2	63.2
Total HHS	100.0	100.0	100.0	100.0

Table 1.2: Estimates of Usage of Major Heating Options, %

	Point Estimate	Maximum Error	95% Confidence Interval
<b>Natural Gas-heated HHS</b>			
Armenia	53.0	2.2	50.8-55.2
Yerevan	41.3	3.6	37.6- 44.9
Marzes	66.9	3.0	63.9-70.0
<b>Electricity-heated HHS</b>			
Armenia	34.6	2.1	32.6-36.7
Yerevan	50.9	3.7	47.2-54.6
Marzes	15.3	2.3	13.0-17.6
<b>Wood-heated HHS</b>			
Armenia	9.8	1.3	8.5-11.2
Yerevan	5.9	1.7	4.1-7.6
Marzes	14.6	2.3	12.3-16.9

Table 1.3: Usage of Secondary Heating Options per Major Heating Option in 2006/2007 Winter, %

<i>Heated HHS per Major Heating Option</i>	Not using	Use	<i>Secondary Heating Option</i>				
			Electricity	Natural Gas	Wood	Liquid Gas	Other
Total HHS	59.9	40.1	27.6	8.5	1.2	2.5	0.3
Electricity	71.7	28.3	0.0	20.0	1.7	6.0	0.6
Natural Gas	60.8	39.2	37.6	0.2	1.2	0.1	0.1
Wood	12.1	87.9	71.4	12.6	0.0	3.5	0.5
Other	40.0	60.0	46.7	13.3	0.0	0.0	0.0

Table 1.4: Non-heated HHs by Marzes, %

	2006/2007 Winter	2005/2006 Winter
Aragatsotn	2.5	0.0
Ararat	1.0	2.0
Armavir	0.0	0.9
Gegharquniq	0.0	1.3
Lory	1.4	2.5
Kotayq	1.1	2.5
Shirak	1.1	8.9
Syuniq	0.7	4.0
Vayots Dzor	0.0	3.3
Tavush	0.0	1.7
Yerevan	1.1	3.3
Armenia	1.0	3.2

Table 1.5: Usage of Major Heating Options in 2006/2007 Winter by Marzes, %

	Electricity	Natural Gas	Wood	Other	Not heated
Aragatsotn	15.0	65.0	10.0	7.5	2.5
Ararat	19.0	65.0	11.0	4.0	1.0
Armavir	25.5	64.5	9.1	0.9	0.0
Gegharquniq	5.0	88.8	6.3	0.0	0.0
Lory	9.3	70.4	16.8	2.1	1.4
Kotayq	26.1	61.8	9.6	1.4	1.1
Shirak	3.9	85.0	4.4	5.6	1.1
Syuniq	18.0	40.0	40.0	1.3	0.7
Vayots Dzor	20.0	70.0	10.0	0.0	0.0
Tavush	6.7	65.0	28.3	0.0	0.0
Yerevan	50.9	41.3	5.9	0.9	1.1
Armenia	34.6	53.0	9.8	1.5	1.0

Table 1.6: Dynamics of Mainly Electricity-heated HHs by Marzes, %

	2006/2007 Winter	2005/2006 Winter	2004/2005 Winter	2003/2004 Winter
Aragatsotn	15.0	15.0	11.9	16.9
Ararat	19.0	25.0	27.9	31.3
Armavir	25.5	23.6	22.4	27.3
Gegharquniq	5.0	6.3	11.5	19.5
Lory	9.3	8.9	5.3	6.9
Kotayq	26.1	30.4	30.1	37.2
Shirak	3.9	2.8	15.6	15.6
Syuniq	18.0	18.0	20.7	19.2
Vayots Dzor	20.0	20.0	19.2	20.8
Tavush	6.7	5.0	3.1	3.1
Yerevan	50.9	54.3	67.7	72.7
Armenia	34.6	37.0	33.3	36.6

**Table 1.7: Dynamics of Mainly Natural Gas-heated HHHs by Marzes, %**

	2006/2007 Winter	2005/2006 Winter	2004/2005 Winter	2003/2004 Winter
Aragatsotn	65.0	65.0	26.9	4.6
Ararat	65.0	45.0	19.9	3.1
Armavir	64.5	64.5	58.7	17.3
Gegharquniq	88.8	77.5	72.6	38.9
Lory	70.4	66.1	35.1	11.3
Kotayq	61.8	42.9	17.2	3.6
Shirak	85.0	76.1	67.5	44.4
Syuniq	40.0	36.0	16.2	2.8
Vayots Dzor	70.0	63.3	42.3	43.1
Tavush	65.0	51.7	50.0	18.4
Yerevan	41.3	35.0	11.3	4.9
Armenia	53.0	45.2	30.0	13.1

**Table 1.8: Dynamics of Mainly Wood-heated HHHs by Marzes, %**

	2006/2007 Winter	2005/2006 Winter	2004/2005 Winter	2003/2004 Winter
Aragatsotn	10.0	12.5	49.3	64.6
Ararat	11.0	24.0	40.4	60.9
Armavir	9.1	10.0	14.7	41.0
Gegharquniq	6.3	15.0	15.9	41.6
Lory	16.8	21.4	55.7	78.4
Kotayq	9.6	16.8	34.7	40.1
Shirak	4.4	7.2	16.3	16.9
Syuniq	40.0	41.3	61.5	76.3
Vayots Dzor	10.0	13.3	30.8	36.1
Tavush	28.3	41.7	45.9	74.5
Yerevan	5.9	6.6	15.1	18.0
Armenia	9.8	12.7	30.5	42.5

**Table 1.9: Usage of Major Heating Options in Buildings with Natural Gas Supply by Marzes, %**

	Electricity	Natural Gas	Wood	Other	Not heated
Aragatsotn	3.4	89.7	0.0	6.9	0.0
Ararat	0.0	97.0	1.5	1.5	0.0
Armavir	5.2	92.2	2.6	0.0	0.0
Gegharquniq	2.7	95.9	1.4	0.0	0.0
Lory	5.7	86.0	6.1	2.2	0.0
Kotayq	15.2	79.7	3.7	0.5	0.9
Shirak	0.6	95.0	1.9	2.5	0.0
Syuniq	4.7	69.8	23.3	1.2	1.2
Vayots Dzor	12.0	84.0	4.0	0.0	0.0
Tavush	7.4	72.2	20.4	0.0	0.0
Yerevan	26.7	70.6	1.0	0.7	1.0
Armenia	16.0	78.7	3.6	0.9	0.8

**Table 1.10: Usage of Major Heating Options by Number of Floors in a Building, In Armenia, Marzes and Yerevan, %**

	Electricity	Natural Gas	Wood	Other	Not heated
Up to 4 Floors	28.9	58.2	9.9	2.3	0.7
5 Floors	22.8	66.6	8.3	1.5	0.8
6-8 Floors	36.5	55.6	4.8	0.0	3.2
9 Floors	51.6	34.8	11.7	1.4	0.4
10 and more Floors	60.5	20.4	14.2	0.0	4.9
<b>Total Armenia</b>	<b>34.6</b>	<b>52.9</b>	<b>9.8</b>	<b>1.5</b>	<b>1.1</b>
Up to 4 Floors	15.0	66.4	13.4	4.0	1.2
5 Floors	13.6	70.6	13.2	1.8	0.8
6-8 Floors	11.1	55.6	33.3	0.0	0.0
9 Floors	21.5	54.8	20.7	1.5	1.5
10 and more Floors	42.9	42.9	14.3	0.0	0.0
<b>Total Marzes, without Yerevan</b>	<b>15.4</b>	<b>66.8</b>	<b>14.6</b>	<b>2.3</b>	<b>1.0</b>
Up to 4 Floors	49.1	46.4	4.5	0.0	0.0
5 Floors	36.1	60.4	1.3	1.3	0.9
6-8 Floors	41.2	55.9	0.0	0.0	2.9
9 Floors	63.0	27.4	8.3	1.3	0.0
10 and more Floors	61.6	19.2	14.1	0.0	5.1
<b>Yerevan</b>	<b>50.9</b>	<b>41.3</b>	<b>5.9</b>	<b>0.9</b>	<b>1.1</b>

**Table 1.11: Usage of Major Heating Options by Type of Building and Apartment Ownership, %**

	Electricity	Natural Gas	Wood	Other	Not heated
Stone Building, Stalin Design	34.8	54.3	8.7	0.0	2.2
Stone Building, Khrushchev Design	34.8	52.0	11.5	1.1	0.7
Stone Building, Other Design	19.4	71.7	6.6	1.5	0.8
Bearing-wall Building, Khrushchev Design	26.6	67.1	5.1	1.3	0.0
Bearing-wall Building, Other Design	48.7	36.0	12.6	1.4	1.3
Monolith	2.1	80.9	8.5	6.4	2.1
Other Design	55.6	22.2	11.1	11.1	0.0
Apartment is Private	33.2	55.0	9.5	1.3	1.0
Apartment is Rented	56.1	26.2	13.1	3.7	0.9
Neither Private, nor Rented	45.7	34.8	15.2	4.3	0.0

**Table 1.12: Usage of Major Heating Option per Number of Rooms in Apartment, %**

	Electricity	Natural Gas	Wood	Other	Not heated
1 Room	40.1	45.0	9.0	2.7	3.2
2 Rooms	34.9	53.0	9.8	1.5	0.8
3 Rooms	31.8	57.9	7.9	1.4	1.0
4 Rooms	35.3	51.5	11.0	1.2	0.9
5 and more Rooms	37.9	44.4	17.0	0.7	0.0

**Table 1.13: Usage of Major Heating Options per Interviewer Assessment of the Overall Condition of the Apartment, %**

	Electricity	Natural Gas	Wood	Other	Not heated
Very Bad	41.8	36.7	16.5	4.4	0.6
Bad	38.9	43.4	13.3	2.4	2.0
Average	30.5	60.6	7.4	0.8	0.7
Good	34.7	57.8	6.2	0.9	0.4
Very Good	34.6	52.9	9.9	1.6	1.1

**Table 1.14: Usage of Major Heating Options per Overall Condition of Windows in the Apartment, %**

	Electricity	Natural Gas	Wood	Other	Not heated
Good	37.7	60.3	2.0	0.0	0.0
Average	36.0	52.7	9.0	1.2	1.1
Bad	28.4	50.3	17.3	2.8	1.3

**Table 1.15: Usage of Major Heating Options per Assessment of HH Average Monthly Income, %**

	Electricity	Natural Gas	Wood	Other	Not heated
1001 USD and more	44.4	55.6	0.0	0.0	0.0
601-1000 USD	43.6	56.4	0.0	0.0	0.0
301- 600 USD	39.1	53.2	6.5	0.7	0.5
101-300 USD	31.5	55.7	10.9	1.3	0.6
Up to 100 USD	32.4	45.3	15.7	3.5	3.0

**Table 1.16: Usage of Major Heating Options per Assessment of HH Welfare, %**

	Electricity	Natural Gas	Wood	Other	Not heated
<i>According to Subjective Assessment of HH head</i>					
Extremely Poor	35.4	29.3	19.5	11.0	4.9
Poor	38.8	43.2	14.5	2.2	1.4
Non-poor	33.8	56.6	8.1	0.9	0.6
Wealthy	28.3	65.7	5.1	0.0	1.0
<i>According to Subjective Assessment of Interviewer</i>					
Extremely Poor	35.2	29.6	18.5	13.0	3.7
Poor	39.6	40.4	16.1	2.2	1.8
Non-poor	32.7	57.6	8.1	0.9	0.7
Wealthy	32.7	61.3	4.8	0.7	0.4

**Table 1.17: Usage of Major Heating Options per Welfare and Quintile Groups, %**

	Electricity	Natural Gas	Wood	Other	Not heated
Extremely Poor HHS	22.5	47.8	20.2	7.3	2.2
Poor HHS	25.8	57.6	14.2	2.0	0.3
Non-poor HHS	37.6	52.9	8.0	0.9	0.7
Quintile 1	24.5	50.9	18.0	5.3	1.2
Quintile 2	27.6	57.3	13.4	1.2	0.6
Quintile 3	34.5	52.6	10.6	1.0	1.3
Quintile 4	39.3	52.9	6.9	0.5	0.5
Quintile 5	41.9	52.1	4.7	0.9	0.4

Table 1.18: Major Heating Devices Used, %

	2006/2007 Winter			2005/2006 Winter		
	Armenia	Yerevan	Marzes	Armenia	Yerevan	Marzes
Non-manufactured Gas Heater	1.9	0.7	3.3	1.9	0.7	3.3
Manufactured Gas Heater	39.7	28.6	52.9	35.4	25.8	46.8
Individual Heating Boiler	5.1	5.4	4.7	3.9	4.2	3.5
Gas Stove	7.0	7.2	6.8	5.8	5.7	5.9
Non-manufactured Electric Appliances	17.9	26.8	7.3	20.1	30.0	8.5
Manufactured Electric Appliances	17.0	24.5	8.1	17.8	25.8	8.3
Wood Stove	9.9	5.8	14.7	13.1	6.7	20.7
Other	1.5	1.0	2.1	2.0	1.0	3.1

Table 1.19: Major Heating Devices Used per Heating Options, %

	Electricity	Natural Gas	Wood	Other
Non-manufactured Gas Heater	0.0	3.6	0.0	0.0
Manufactured Gas Heater	0.0	74.1	0.0	0.0
Individual Heating Boiler	0.0	9.4	0.0	0.0
Gas Stove	0.0	12.8	0.0	13.3
Non-manufactured Electric Appliances	51.4	0.0	0.0	0.0
Manufactured Electric Appliances	48.6	0.0	0.0	0.0
Wood Stove	0.0	0.0	99.0	0.0
Other	0.0	0.2	1.0	86.7

Table 1.20: Major Heating Devices Used per Subjective Assessment of Welfare, %

	Extremely Poor	Poor	Non-poor	Wealthy
Non-manufactured Gas Heater	4.0	2.6	1.6	0.5
Manufactured Gas Heater	16.0	27.8	44.9	46.4
Individual Heating Boiler	1.3	1.8	4.8	16.8
Gas Stove	12.0	11.7	5.6	2.6
Non-manufactured Electric Appliances	22.7	21.1	17.0	13.8
Manufactured Electric Appliances	14.7	18.1	17.1	14.3
Wood Stove	21.3	14.7	8.1	4.6
Other	8.0	2.2	0.9	1.0

Table 1.21: Major Heating Devices Used per Quintile Groups, %

	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5
Non-manufactured Gas Heater	3.8	2.0	3.1	0.9	0.9
Manufactured Gas Heater	33.9	42.7	39.6	41.9	38.6
Individual Heating Boiler	2.2	5.0	4.7	2.8	9.4
Gas Stove	12.3	8.2	6.3	7.4	3.2
Non-manufactured Electric Appliances	15.2	19.0	16.1	16.7	22.3
Manufactured Electric Appliances	9.5	8.8	18.8	22.7	19.7
Wood Stove	18.4	13.5	10.7	6.7	4.7
Other	4.7	0.9	0.8	0.9	1.1
Total	100.0	100.0	100.0	100.0	100.0

Table 1.22: Options for Getting Hot Water (including for shower), %

	2006/2007 Winter		2005/2006 Winter	
	Major	Secondary	Major	Secondary
Gas Water Heater	25.0	0.4	22.5	0.4
Electric Water Tank, Boiler	6.9	0.3	7.0	0.2
Electric Water Heater (Geyser type)	17.1	0.5	16.4	0.4
Non-manufactured Electric Immersion Heater	21.8	12.0	25.1	12.0
Furnace	4.0	2.3	5.4	2.5
Individual Heating Boiler	4.7	0.0	3.6	0.0
Local-collective Heating Boiler	0.0	0.0	0.0	0.0
Centralized Heating	0.1	0.0	0.1	0.0
Gas stove	19.4	11.2	16.7	9.8
Other Devices/Options	0.5	0.2	0.5	0.3
Hot Water Users	99.5	27.0	97.3	25.6
Hot Water Non-users	0.5	73.0	2.7	74.4
Total HHs	100.0	100.0	100.0	100.0

Table 1.23: Options for Getting Hot Water (including for shower) per Major Heating Options, %

	Gas Water Heater	Electric Water Tank, Boiler	Electric Water Heater (Geyser type)	Non-manufactured Electric Immersion Heater	Furnace	Individual Heating Boiler	Gas Stove	Other	Hot Water Non-users
Electricity	8.3	10.5	28.5	44.2	0.1	0.0	7.2	0.7	0.4
Natural Gas	40.7	5.0	10.4	3.9	0.7	8.8	30.0	0.5	0.0
Wood	4.5	5.5	17.6	32.2	33.2	0.0	7.0	0.0	0.0
Other	3.8	3.8	0.0	47.2	15.1	0.0	13.2	3.8	13.2
Not heated	4.8	0.0	0.0	47.6	0.0	0.0	14.3	0.0	33.3
Total	25.0	6.9	17.1	21.8	4.1	4.7	19.4	0.6	0.5

## Section 2: Duration of Heating Season

Table 2.1: Duration of Heating Season by Marzes, %

	Up to 2 Months	3 Months	4 Months	5 Months	6 Months	More than 6 Months	Not heated
Aragatsotn	-	2.5	5.0	30.0	50.0	10.0	2.5
Ararat	-	6.0	40.0	33.0	20.0	-	1.0
Armavir	0.9	6.4	41.8	40.0	9.1	1.8	-
Gegharquniq	-	-	2.5	17.5	23.8	56.3	-
Lory	0.4	1.1	11.1	33.9	42.5	9.6	1.4
Kotayq	1.1	4.3	19.6	22.5	45.0	6.4	1.1
Shirak	-	1.1	6.1	8.9	34.4	47.2	2.2
Syuniq	0.7	1.3	16.0	26.0	54.0	0.7	1.3
Vayots Dzor	-	13.3	26.7	40.0	20.0	-	-
Tavush	-	-	21.7	33.3	30.0	15.0	-
Yerevan	1.9	27.1	37.3	24.6	7.0	1.0	1.1
Armenia	1.2	16.0	28.4	25.5	20.5	7.2	1.1

Table 2.2: Duration of Heating Season per Major Heating Options Used, %

	Up to 2 Months	3 Months	4 Months	5 Months	6 Months	More than 6 Months	Not heated
Armenia	1.2	16.0	28.4	25.5	20.5	7.2	1.1
Yerevan	1.9	27.1	37.3	24.6	7.0	1.0	1.1
Marzes	0.4	2.8	17.8	26.6	36.6	14.6	1.1
Electricity	1.3	25.7	36.6	23.9	10.2	2.3	-
Natural Gas	1.4	12.3	22.1	27.3	26.5	10.3	0.1
Wood	0.5	5.5	35.7	24.1	26.6	7.5	-
Other	-	6.7	33.3	30.0	16.7	10.0	3.3

Table 2.3: Duration of Heating Season per Type of Building, %

	Up to 2 Months	3 Months	4 Months	5 Months	6 Months	More than 6 Months	Not heated
Stone Building, Stalin Design	5.4	17.2	37.6	18.3	15.1	4.3	2.2
Stone Building, Khrushchev Design	1.8	21.9	33.7	20.4	15.4	6.1	0.7
Stone Building, Other Design	0.9	9.2	22.7	30.5	25.9	9.8	1.1
Bearing-wall Building, Khrushchev Design	2.6	21.8	41.0	29.5	3.8	1.3	-
Bearing-wall Building, Other Design	1.0	19.5	30.6	24.1	18.7	4.8	1.3
Monolith	-	2.1	6.3	12.5	45.8	31.3	2.1
Other Design	-	17.6	11.8	35.3	11.8	23.5	-

Table 2.4: Duration of Heating Season per Overall Condition of Windows in Apartment, %

	Up to 2 Months	3 Months	4 Months	5 Months	6 Months	More than 6 Months	Not heated
Good Condition	1.0	21.7	29.6	28.1	16.7	3.0	-
Average Condition	1.5	16.1	27.9	26.2	20.3	7.0	1.1
Bad Condition	0.5	13.1	29.8	21.6	23.1	10.0	1.8

**Table 2.5: Duration of Heating Season per HH Average Monthly Income Assessment, %**

	Up to 2 Months	3 Months	4 Months	5 Months	6 Months	More than 6 Months	Not heated
1001 USD and more	-	11.1	33.3	22.2	16.7	16.7	-
601-1000 USD	4.5	14.4	30.6	25.2	21.6	3.6	-
301-600 USD	1.4	21.6	30.2	24.4	16.8	5.1	0.5
101-300 USD	0.2	13.3	28.0	27.2	22.4	8.4	0.6
Up to 100 USD	2.5	14.4	26.2	23.7	21.4	8.1	3.8

**Table 2.6: Duration of Heating Season per Presence of Children and Elderly in HH, %**

	Up to 2 Months	3 Months	4 Months	5 Months	6 Months	More than 6 Months	Not heated
No Children	1.4	17.8	29.8	24.9	18.6	6.0	1.5
HHs with Children	1.1	13.3	25.9	26.5	23.7	9.2	0.4
1 Child	1.3	15.1	27.9	26.5	20.2	8.5	0.5
2 Children	0.6	11.1	24.8	27.3	25.4	10.5	0.3
3 and more Children	1.7	13.3	20.0	21.7	36.7	6.7	-
No Elderly	1.7	15.3	28.7	24.8	21.4	7.3	0.8
HHs with Elderly	0.4	17.5	27.9	26.9	18.8	6.9	1.7
1 Elderly	0.6	15.9	30.5	25.4	18.7	6.7	2.2
2 and more Elderly	-	21.2	22.1	30.2	18.9	7.2	0.5

**Table 2.7: Duration of Heating Season per Subjective Assessment of HH Welfare, %**

	Up to 2 Months	3 Months	4 Months	5 Months	6 Months	More than 6 Months	Not heated
<i>According to HH head Subjective Assessment</i>							
Extremely Poor	6.2	21.0	28.4	22.2	11.1	4.9	6.2
Poor	0.8	17.8	34.5	20.8	17.6	6.9	1.6
Non-poor	0.7	16.1	26.0	28.5	21.1	7.0	0.6
Wealthy	3.0	10.1	27.6	20.6	27.6	10.1	1.0
<i>According to Interviewer Subjective Assessment</i>							
Extremely Poor	1.9	25.9	25.9	24.1	9.3	5.6	7.4
Poor	1.8	18.6	32.1	21.2	17.0	7.2	2.0
Non-poor	0.7	16.2	26.9	27.5	21.4	6.6	0.7
Wealthy	2.2	9.3	28.0	24.6	25.0	10.4	0.4

**Table 2.8: Duration of Heating Season per Welfare and Quintile Groups, %**

	Up to 2 Months	3 Months	4 Months	5 Months	6 Months	More than 6 Months	Not heated
Extremely Poor	1.1	12.4	22.0	28.2	24.3	9.6	2.3
Poor	3.1	18.3	19.0	24.4	24.4	10.5	0.3
Non-poor	0.8	15.7	30.5	26.0	19.8	6.4	0.7
Quintile 1	2.2	14.0	21.8	25.5	24.6	10.3	1.6
Quintile 2	1.2	18.0	22.7	24.4	23.0	9.9	0.9
Quintile 3	0.8	12.1	27.2	28.0	22.4	8.2	1.3
Quintile 4	0.7	19.8	30.0	25.6	17.5	6.0	0.5
Quintile 5	1.3	15.0	34.9	25.9	18.8	3.6	0.4

## Section 3: Heated Area

Table 3.1: The Share of Heated Area in Overall Area of Apartment by Marzes, %

	1-room Apartments	2-room Apartments	3-room Apartments	4 and more room Apartments	Total Heated Apartments
Aragatsotn	0.6	0.51	0.49	0.59	0.53
Ararat	0.51	0.49	0.78	0.8	0.77
Armavir	0.77	0.68	0.63	0.62	0.66
Gegharquniq	0.81	0.8	0.77	0.65	0.75
Lory	0.56	0.49	0.52	0.52	0.51
Kotayq	0.64	0.62	0.62	0.64	0.63
Shirak	0.55	0.59	0.62	0.43	0.58
Syuniq	0.66	0.7	0.63	0.52	0.63
Vayots Dzor	0.72	0.58	0.73	0.47	0.65
Tavush	0.79	0.77	0.8	0.71	0.76
Yerevan	0.63	0.61	0.57	0.61	0.6
Armenia	0.63	0.61	0.59	0.63	0.61

Table 3.2: Entirety of Apartment Heating per Number of Rooms, %

	1-room Apartments	2-room Apartments	3-room Apartments	4 and more room Apartments	Total Heated Apartments
Heated					
1 Room	100	57.9	37.4	24.5	33.6
2 Rooms	-	29.5	24.8	17.1	21.5
3 Rooms	-	-	33.9	18.6	21.8
4 Rooms and more	-	-	-	35.5	17.9
Not Heated	-	12.6	3.9	4.2	5.2

Table 3.3: Heated Rooms per Types in 2006/2007 and 2005/2006, as % in each room type

	Heated in 2005/2006	Heated in 2006/2007	Not heated in 2005/2006, nor in 2006/2007
Living Room	82.5	85.2	13.8
Bedroom	54.2	57.5	41.7
Corridor/ Hall	43.9	46.9	52.5
Cabinet	51.4	51.4	48.0
Kitchen	51.2	64.4	35.2
Bathroom/Toilette	14.8	16.1	83.5

Table 3.4: Entirety of Apartment Heating per Major Heating Options Used, %

	Heated Entirely	Heated Partially	Not Heated	Kitchen Heated	Kitchen Not Heated	Bathroom/Toilette Heated	Bathroom/Toilette Not Heated
Armenia	32.7	62.1	5.2	64.4	35.6	16.1	83.9
Yerevan	27.1	68.9	4.0	59.4	40.6	9.3	90.7
Marzes	39.4	54.1	6.5	70.2	29.8	24.2	75.8
Electricity	12.1	86.9	1.0	40.2	59.8	3.6	96.4
Natural Gas	47.2	47.6	5.2	79.8	20.2	25.2	74.8
Wood	29.8	63.1	7.1	71.7	28.3	12.1	87.9
Other	40.0	40.0	20.0	53.3	46.7	22.6	77.4
Not Heated	-	-	100.0	23.8	76.2	-	100.0

**Table 3.5: Entirety of Apartment Heating per Type of Building, %**

	Heated Entirely	Heated Partially	Not Heated	Kitchen Heated	Kitchen Not Heated	Bathroom/Toilet Heated	Bathroom/Toilet Not Heated
Stone Building, Stalin Design	45.7	50.0	4.3	72.8	27.2	33.0	67.0
Stone Building, Khrushchev Design	27.7	65.1	7.2	62.0	38.0	15.1	84.9
Stone Building, Other Design	38.1	56.6	5.3	71.4	28.6	20.0	80.0
Bearing-wall Building, Khrushchev Design	34.6	59.0	6.4	74.4	25.6	10.3	89.7
Bearing-wall Building, Other Design	27.9	68.3	3.8	56.9	43.1	11.3	88.7
Monolith	32.6	50.0	17.4	80.4	19.6	28.3	71.7
Other Design	58.8	35.3	5.9	66.7	33.3	28.6	71.4

**Table 3.6: Entirety of Apartment Heating per HH Size, %**

	Heated Entirely	Heated Partially	Not Heated	Kitchen Heated	Kitchen Not Heated	Bathroom/Toilet Heated	Bathroom/Toilet Not Heated
All HHs	32.7	62.1	5.2	64.4	35.6	16.1	83.9
1 Member HH	23.5	59.6	16.9	45.5	54.5	12.8	87.2
2 Members HH	30.4	63.7	5.9	62.9	37.1	19.3	80.7
3 Members HH	26.2	70.4	3.3	63.3	36.7	11.3	88.7
4 Members HH	34.8	60.6	4.6	66.5	33.5	13.8	86.2
5 and more Members HH	39.4	58.4	2.2	70.7	29.3	20.5	79.5

**Table 3.7: Entirety of Apartment Heating per Presence of Children and Elderly in HH, %**

	Heated Entirely	Heated Partially	Not Heated	Kitchen Heated	Kitchen Not Heated	Bathroom/Toilet Heated	Bathroom/Toilet Not Heated
No Children	29.7	63.8	6.5	61.4	38.6	14.7	85.3
HHs with Children	37.8	59.3	2.9	69.3	30.7	18.5	81.5
1 Child	34.2	62.9	2.9	66.2	33.8	17.5	82.5
2 Children	40.6	57.5	1.9	72.6	27.4	18.8	81.2
3 and more Children	46.7	45.0	8.3	71.7	28.3	23.3	76.7
No Elderly	32.9	62.9	4.2	63.9	36.1	16.5	83.5
HHs with Elderly	32.4	60.7	6.9	65.2	34.8	15.6	84.4
1 Elderly	32.7	59.8	7.5	62.7	37.3	15.9	84.1
2 and more Elderly	31.5	63.1	5.4	70.7	29.3	14.4	85.6

**Table 3.8: Entirety of Apartment Heating per Assessment of HH Monthly Income. %**

	Heated Entirely	Heated Partially	Not Heated	Kitchen Heated	Kitchen Not Heated	Bathroom/Toilet Heated	Bathroom/Toilet Not Heated
1001 USD and more	29.4	70.6	-	77.8	22.2	23.5	76.5
601-1000 USD	39.1	60.9	-	67.3	32.7	19.8	80.2
301-600 USD	37.5	60.8	1.7	67.2	32.8	19.5	80.5
101-300 USD	33.6	62.2	4.2	65.6	34.4	14.7	85.3
Up to 100 USD	22.5	63.3	14.2	56.1	43.9	12.9	87.1

**Table 3.9: Entirety of Apartment Heating per Assessment of HH Welfare, %**

	Heated Entirely	Heated Partially	Not Heated	Kitchen Heated	Kitchen Not Heated	Bathroom/Toilette Heated	Bathroom/Toilette Not Heated
	<i>According to HH Head Subjective Assessment</i>						
Extremely Poor	10.0	68.8	21.3	42.5	57.5	6.3	93.8
Poor	21.3	68.8	9.9	57.5	42.5	8.7	91.3
Non-poor	36.8	60.5	2.7	66.4	33.6	17.2	82.8
Wealthy	45.5	52.5	2.0	77.8	22.2	31.8	68.2
	<i>According to Interviewer Subjective Assessment</i>						
Extremely Poor	11.1	66.7	22.2	37.7	62.3	5.6	94.4
Poor	20.5	70.1	9.4	57.7	42.3	8.3	91.7
Non-poor	35.3	61.5	3.2	65.2	34.8	17.1	82.9
Wealthy	47.8	50.0	2.2	78.4	21.6	28.0	72.0

**Table 3.10: Entirety of Apartment Heating per Welfare and Quintile Groups, %**

	Heated Entirely	Heated Partially	Not Heated	Kitchen Heated	Kitchen Not Heated	Bathroom/Toilette Heated	Bathroom/Toilette Not Heated
Extremely Poor	18.6	69.5	11.9	62.9	37.1	9.0	91.0
Poor	29.9	63.9	6.1	65.4	34.6	19.3	80.7
Non-poor	35.4	60.9	3.7	65.5	34.5	16.8	83.2
Quintile 1	23.9	65.5	10.6	65.2	34.8	13.4	86.6
Quintile 2	30.0	65.6	4.4	65.8	34.2	17.5	82.5
Quintile 3	33.4	60.7	5.9	64.8	35.2	16.0	84.0
Quintile 4	36.6	60.6	2.8	59.9	40.1	13.2	86.8
Quintile 5	38.0	59.8	2.1	70.4	29.6	21.5	78.5

## Section 4: Temperature Analysis

Table 4.1: Share of Rooms in Apartment per Average Temperature Groups during Day and Night Times, %

	Heated Rooms %	Very Cold Up to 7C	Cold 8-14C	Not Warm, Mostly Cold 15-18C	Warm 19-21C	Very Warm Above 22C
Living Room	86.4	3.7	16.2	43.6	34.7	1.8
Bedroom 1	62.3	3.4	15.4	43.2	36.2	1.8
Bedroom 2	52.3	3.6	13.6	43.9	37.3	1.6
Bedroom 3	45.6	2.3	9.9	42.7	43.9	1.2
Corridor/Hall	47.2	3.7	16.2	43.7	34.8	1.7
Closed Habitable Balcony	28.5	3.3	15.3	43.8	36.1	1.6
Cabinet	52.0	-	12.0	52.0	36.0	-
Kitchen	64.9	3.6	16.2	43.7	34.8	1.7
Bathroom/Toilette	16.4	3.7	16.2	43.7	34.7	1.7

Table 4.2: Share of Rooms in Apartment per Average Temperature Groups during Nighttimes, %

	Heated Rooms %	Very Cold Up to 7C	Cold 8-14C	Not Warm, Mostly Cold 15-18C	Warm 19-21C	Very Warm Above 22C
Living Room	86.4	8.2	29.4	36.0	25.1	1.2
Bedroom 1	62.4	8.1	28.1	36.3	26.4	1.2
Bedroom 2	52.2	8.8	27.6	34.1	28.3	1.3
Bedroom 3	45.6	4.7	27.5	34.5	31.6	1.8
Corridor/ Hall	47.2	8.3	29.5	36.0	25.2	1.1
Closed, Habitable Balcony	28.6	7.4	27.6	36.5	27.4	1.1
Cabinet	50.0	7.7	26.9	30.8	26.9	7.7
Kitchen	64.9	8.3	29.5	36.0	25.2	1.1
Bathroom/Toilette	16.4	8.2	29.5	36.0	25.1	1.1

Table 4.3: Average Temperature in Apartments in January, 2007 by Marzes, %

	Very Cold Up to 7C	Cold 8-14C	Not Warm, Mostly Cold 15-18C	Warm 19-21C	Very Warm Above 22C	Average Temperature, C°
Aragatsotn	2.5	2.5	47.5	45.0	2.5	18.2
Ararat	2.0	7.0	71.0	20.0	-	16.9
Armavir	51.8	3.6	16.4	27.3	0.9	10.9
Gegharquniq	-	6.3	55.0	38.8	-	17.6
Lory	2.1	13.2	48.2	32.5	3.9	17.2
Kotayq	5.4	18.6	47.9	27.1	1.1	16.1
Shirak	5.0	13.3	46.7	34.4	0.6	16.6
Syuniq	-	2.0	53.3	42.7	2.0	18.4
Vayots Dzor	-	33.3	56.7	6.7	3.3	15.7
Tavush	-	3.3	43.3	48.3	5.0	18.5
Yerevan	3.9	32.3	38.9	23.4	1.6	15.4
Armenia	5.2	22.7	43.0	27.4	1.7	15.9

**Table 4.4: Average Temperature in Apartments in January, 2007 per Duration of Heating Season, %**

	Very Cold Up to 7C	Cold 8-14C	Not Warm, Mostly Cold 15-18C	Warm 19-21C	Very Warm Above 22C	Average Temperature, C°
Up to 2 Months	12.0	24.0	32.0	32.0	-	14.9
3 Months	4.3	41.0	37.0	16.7	0.9	14.6
4 Months	5.6	21.8	48.4	23.3	0.9	15.7
5 Months	5.5	24.0	39.4	28.1	3.1	16.0
6 Months	3.2	12.9	44.9	36.7	2.4	17.1
More than 6 Months	0.7	7.6	49.0	42.1	0.7	17.7
Not Heated	69.6	17.4	13.0	-	-	6.9

**Table 4.5: Average Temperature in Apartments in January, 2007 per Major Heating Option Used, %**

	Very Cold Up to 7C	Cold 8-14C	Not Warm, Mostly Cold 15-18C	Warm 19-21C	Very Warm Above 22C	Average Temperature, C°
Armenia	5.2	22.7	43.0	27.4	1.7	15.9
Yerevan	3.9	32.3	38.9	23.4	1.6	15.4
Marzes	7.0	11.1	48.0	32.1	1.9	16.5
Electricity	4.9	43.0	40.9	10.9	0.3	14.2
Natural Gas	3.9	10.3	44.7	38.4	2.6	17.2
Wood	5.5	17.6	45.2	29.6	2.0	16.3
Other	13.3	30.0	36.7	20.0	-	14.2
Not Heated	71.4	14.3	14.3	-	-	6.7

**Table 4.6: Average Temperature in Apartments in January, 2007 per Type of Building, %**

	Very Cold Up to 7C	Cold 8-14C	Not Warm, Mostly Cold 15-18C	Warm 19-21C	Very Warm Above 22C	Average Temperature, C°
Stone Building, Stalin Design	2.2	13.2	53.8	27.5	3.3	16.9
Stone Building, Khrushchev Design	3.2	14.3	44.4	36.9	1.1	16.8
Stone Building, Other Design	4.7	16.3	46.8	29.6	2.7	16.5
Bearing-wall Building, Khrushchev Design	6.4	21.8	43.6	25.6	2.6	15.5
Bearing-wall Building, Other Design	6.7	32.0	38.4	22.2	0.7	15.0
Monolith	2.2	8.7	47.8	37.0	4.3	17.2
Other Design	-	37.5	31.3	31.3	-	15.9

**Table 4.7: Average Temperature in Apartments in January, 2007 per Overall Condition of Windows, %**

	Very Cold Up to 7C	Cold 8-14C	Not Warm, Mostly Cold 15-18C	Warm 19-21C	Very Warm Above 22C	Average Temperature, C°
Good Condition	2.0	18.6	29.9	46.6	2.9	17.4
Average Condition	4.3	21.7	45.6	26.7	1.7	16.1
Bad Condition	10.5	28.3	40.4	19.8	1.0	14.5

**Table 4.8: Average Temperature in Apartments in January, 2007 per HH Size, %**

	Very Cold Up to 7C	Cold 8-14C	Not Warm, Mostly Cold 15-18C	Warm 19-21C	Very Warm Above 22C	Average Temperature, C°
All HHs	5.3	22.7	43.0	27.4	1.7	15.9
1 Member HHs	8.5	33.8	42.3	15.0	0.5	14.2
2 Member HHs	7.2	19.9	46.1	24.9	1.9	15.8
3 Member HHs	5.8	22.4	41.6	28.8	1.4	15.8
4 Member HHs	4.2	21.0	42.8	30.2	1.7	16.3
5 and more Member HHs	3.7	21.6	42.6	29.9	2.2	16.3

**Table 4.9: Average Temperature in Apartments in January, 2007 per Presence of Children and Elderly in HH, %**

	Very Cold Up to 7C	Cold 8-14C	Not Warm, Mostly Cold 15-18C	Warm 19-21C	Very Warm Above 22C	Average Temperature, C°
No Children	5.9	25.8	43.7	23.4	1.3	15.5
HHs with Children	4.3	17.4	41.9	34.2	2.3	16.6
1 Child	4.0	16.7	43.0	34.7	1.6	16.7
2 Children	4.1	19.0	40.3	33.3	3.2	16.6
3 and more Children	6.7	13.3	43.3	35.0	1.7	16.5
No Elderly	5.0	21.1	43.4	28.8	1.8	16.1
HHs with Elderly	5.7	25.5	42.3	24.8	1.7	15.5
1 Elderly	6.9	26.2	41.8	23.5	1.6	15.3
2 and more Elderly	3.1	24.1	43.3	27.7	1.8	16.1

**Table 4.10: Average Temperature in Apartments in January, 2007 per Assessment of HH Average Monthly Income, %**

	Very Cold Up to 7C	Cold 8-14C	Not Warm, Mostly Cold 15-18C	Warm 19-21C	Very Warm Above 22C	Average Temperature, C°
1001 USD and more	-	5.6	27.8	55.6	11.1	19.4
601-1000 USD	2.7	12.7	31.8	50.0	2.7	17.7
301-600 USD	4.0	22.2	43.1	28.8	1.9	16.2
101-300 USD	4.6	21.7	44.3	27.6	1.8	16.0
Up to 100 USD	9.4	28.9	44.1	17.5	0.3	14.5

**Table 4.11: Average Temperature in Apartments in January, 2007 per Assessment of HH Welfare, %**

	Very Cold Up to 7C	Cold 8-14C	Not Warm, Mostly Cold 15-18C	Warm 19-21C	Very Warm Above 22C	Average Temperature, C°
	<i>According to HH Head Subjective Assessment</i>					
Extremely Poor	11.4	40.5	39.2	7.6	1.3	13.2
Poor	7.5	29.3	48.3	14.3	0.6	14.6
Non-poor	3.2	21.3	42.2	31.6	1.7	16.4
Wealthy	9.6	7.1	35.9	42.9	4.5	17.0
	<i>According to Interviewer Subjective Assessment</i>					
Extremely Poor	7.4	46.3	38.9	5.6	1.9	13.7
Poor	8.2	31.1	44.4	16.1	0.2	14.4
Non-poor	3.6	21.0	44.5	29.2	1.7	16.3
Wealthy	6.3	9.3	35.1	44.8	4.5	17.4

**Table 4.12: Average Temperature in Apartments in January, 2007 per Welfare and Quintile Group, %**

	Very Cold Up to 7C	Cold 8-14C	Not Warm, Mostly Cold 15-18C	Warm 19-21C	Very Warm Above 22C	Average Temperature, C°
Extremely Poor	6.7	30.3	34.8	27.5	0.6	15.1
Poor	3.1	26.4	47.5	22.0	1.0	15.7
Non-poor	5.1	21.3	43.3	28.3	2.0	16.1
Quintile 1	5.0	28.6	40.7	24.8	0.9	15.5
Quintile 2	4.7	25.4	45.5	23.9	0.6	15.6
Quintile 3	5.1	23.4	42.9	27.0	1.5	15.8
Quintile 4	3.9	24.5	46.0	23.3	2.3	16.0
Quintile 5	6.0	15.2	40.8	35.0	3.0	16.5

**Table 4.13: Average Temperature in Apartments in January, 2007 per Heating Device Used, %**

	Very Cold Up to 7C	Cold 8-14C	Not Warm, Mostly Cold 15-18C	Warm 19-21C	Very Warm Above 22C
Non-manufactured Gas heater	5.4	5.4	51.4	37.8	-
Manufactured Gas Heater	4.3	7.9	45.9	40.1	1.9
Individual Heating Boiler	1.0	1.0	27.7	59.4	10.9
Gas Stove	4.3	33.6	47.1	13.6	1.4
Non-manufactured Electric Appliance	5.3	54.5	34.0	5.9	0.3
Manufactured Electric Appliance	4.4	30.7	48.4	15.9	0.6
Wood Stove	5.6	17.8	45.7	28.9	2.0
Other	10.0	23.3	36.7	30.0	-

## Section 5: Analysis of Expenditures on Heating and Hot Water

Table 5.1: Average Monthly Expenditures on Heating and Hot Water in 2006/2007 Winter, AMD

	Mean	Median	Mode	Std. Deviation	Range	Minimum	Maximum
Armenia	15,150	15,000	15,000	9,057	99,400	600	100,000
Yerevan	17,582	15,000	20,000	10,255	99,000	1,000	100,000
Marzes	12,244	12,000	10,000	6,247	49,400	600	50,000
Electricity	16,878	15,000	20,000	11,563	99,400	600	100,000
Natural Gas	14,635	15,000	15,000	6,646	49,000	1,000	50,000
Wood	13,148	10,499	10,000	9,183	71,000	1,000	72,000
Other	8,346	5,000	2,000	8,336	38,800	1,200	40,000

Table 5.2: Distribution of HHs per Average Monthly Expenditures on Heating and Heating Options Used, %

	Average Expenditures, AMD	Up to 5000 AMD	5001-10000 AMD	10001-15000 AMD	15001-20000 AMD	20001-25000 AMD	25001 AMD and more
Armenia	15,150	8.6	28.0	25.4	21.2	8.8	8.1
Yerevan	17,582	5.9	21.4	23.4	23.2	12.9	13.2
Marzes	12,244	11.7	35.9	27.8	18.8	3.8	2.0
Electricity	16,878	10.0	26.0	20.9	17.6	11.3	14.2
Natural Gas	14,635	4.7	28.4	30.0	24.0	8.3	4.6
Wood	13,148	15.2	34.8	21.7	18.7	3.0	6.6
Other	8,346	55.3	15.8	2.6	18.4	5.3	2.6

Table 5.3: Distribution of HHs per Average Monthly Expenditures on Heating and Heating Device Used, %

	Average Expenditures, AMD	Up to 5000 AMD	5001-10000 AMD	10001-15000 AMD	15001-20000 AMD	20001-25000 AMD	25001 AMD and more
Non-manufactured Gas heater	11,889	2.8	38.9	41.7	11.1	5.6	0.0
Manufactured Gas Heater	14,611	2.7	29.8	30.7	25.6	7.8	3.6
Individual Heating Boiler	19,903	2.0	8.0	25.0	31.0	17.0	17.0
Gas Stove	11,419	19.7	35.0	25.5	11.7	5.1	2.9
Non-manufactured Electric Appliance	16,534	12.5	27.6	16.8	17.4	11.7	14.0
Manufactured Electric Appliance	17,168	7.2	24.3	25.1	18.0	11.1	14.4
Wood Stove	13,069	15.2	35.0	21.8	18.8	2.5	6.6

Table 5.4: Distribution of HHs per Average Monthly Expenditures on Heating by Marzes, %

	Average Expenditures, AMD	Up to 5000 AMD	5001-10000 AMD	10001-15000 AMD	15001-20000 AMD	20001-25000 AMD	25001 AMD and more
Aragatsotn	14,342	5.3	15.8	34.2	44.7	0.0	0.0
Ararat	13,297	11.0	26.0	24.0	34.0	5.0	0.0
Armavir	13,413	7.3	30.3	37.6	19.3	2.8	2.8
Gegharquniq	14,138	5.0	35.0	21.3	25.0	11.3	2.5
Lory	10,366	13.5	48.9	25.5	7.7	3.6	0.7
Kotayq	12,908	11.6	30.8	30.8	19.6	3.6	3.6
Shirak	13,434	8.6	30.5	29.3	24.1	4.0	3.4
Syuniq	11,103	14.7	39.3	30.0	13.3	0.7	2.0
Vayots Dzor	12,750	13.3	36.7	10.0	33.3	6.7	0.0
Tavush	9,133	26.7	45.0	18.3	6.7	3.3	0.0
Yerevan	17,582	5.9	21.4	23.4	23.2	12.9	13.2
Armenia	15,150	8.6	28.0	25.4	21.2	8.8	8.1

Table 5.5: Distribution of HHs per Average Monthly Expenditures on Heating and Type of Building, %

	Average Expenditures, AMD	Up to 5000 AMD	5001-10000 AMD	10001-15000 AMD	15001-20000 AMD	20001-25000 AMD	25001 AMD and more
Stone Building, Stalin Design	15,642	5.5	31.9	15.4	33.0	5.5	8.8
Stone Building, Khrushchev Design	12,480	12.5	36.3	24.2	17.2	6.2	3.7
Stone Building, Other Design	13,548	8.9	32.3	28.3	20.6	6.7	3.2
Bearing-wall Building, Khrushchev Design	12,312	19.0	25.3	31.6	10.1	11.4	2.5
Bearing-wall Building, Other Design	17,719	5.6	21.2	24.7	22.8	11.6	14.2
Monolith	13,672	15.6	31.1	17.8	22.2	6.7	6.7
Other Design	9,037	31.3	43.8	12.5	12.5	0.0	0.0

Table 5.6: Distribution of HHs per Average Monthly Expenditures on Heating and Average Temperature in Apartment in January, 2007, %

	Average Expenditures, AMD	Up to 5000 AMD	5001-10000 AMD	10001-15000 AMD	15001-20000 AMD	20001-25000 AMD	25001 AMD and more
Very Cold	13,710	11.7	27.7	25.5	20.2	9.6	5.3
Cold	13,957	15.1	29.7	21.7	17.5	8.2	7.8
Not Warm, Mostly Cold	15,088	7.8	29.1	25.1	20.8	8.8	8.3
Warm	16,238	4.2	25.9	28.8	25.1	7.7	8.3
Very Warm	19,082	2.9	11.8	26.5	17.6	26.5	14.7
Total	15,150	8.6	28.0	25.4	21.2	8.7	8.1

**Table 5.7: Distribution of HHs per Average Monthly Expenditures on Heating and Entirety of Apartment, %**

	Average Expenditures, AMD	Up to 5000 AMD	5001-10000 AMD	10001-15000 AMD	15001-20000 AMD	20001-25000 AMD	25001 AMD and more
Apartment Heated							
- Entirely	16,619	4.7	22.8	26.9	26.0	10.7	8.9
- Partially	14,848	8.5	30.2	25.6	19.4	8.2	8.2
- Not Heated	8,578	36.7	35.6	13.3	11.1	2.2	1.1
Kitchen							
- Heated	15,524	6.7	27.2	27.4	20.8	9.1	8.8
- Not Heated	14,517	11.7	29.2	22.1	22.1	8.0	6.9
Bathroom/Toilette							
- Heated	16,483	4.0	22.0	26.1	27.3	12.4	8.1
- Not Heated	14,912	9.4	29.0	25.3	20.0	8.1	8.1

**Table 5.8: Distribution of HHs per Average Monthly Expenditures on Heating and Number of Rooms Heated, %**

	Average Expenditures, AMD	Up to 5000 AMD	5001-10000 AMD	10001-15000 AMD	15001-20000 AMD	20001-25000 AMD	25001 AMD and more
1 Room Heated	13,001	11.3	37.6	24.2	16.0	5.5	5.4
2 Rooms Heated	14,899	8.6	28.0	26.4	20.6	9.6	6.8
3 Rooms Heated	17,208	3.2	21.0	30.4	23.7	10.4	11.3
4 and more Rooms Heated	18,671	2.2	16.7	23.9	30.8	13.6	12.8

**Table 5.9: Distribution of HHs per Average Monthly Expenditures on Heating and HH Size, %**

<i>HHs</i>	Average Expenditures, AMD	Up to 5000 AMD	5001-10000 AMD	10001-15000 AMD	15001-20000 AMD	20001-25000 AMD	25001 AMD and more
1 Member HHs	8,953	36.0	38.4	12.8	9.4	1.0	2.5
2 Member HHs	12,215	11.4	41.3	22.5	15.2	7.3	2.2
3 Member HHs	15,145	5.6	30.4	29.9	19.0	6.4	8.7
4 Member HHs	16,444	4.6	22.8	28.6	25.1	9.5	9.3
5 and more Member HHs	17,726	2.9	20.4	25.5	26.5	13.0	11.8

**Table 5.10: Distribution of HHs per Average Monthly Expenditures on Heating and Presence of Children and Elderly in HH, %**

	Average Expenditures, AMD	Up to 5000 AMD	5001-10000 AMD	10001-15000 AMD	15001-20000 AMD	20001-25000 AMD	25001 AMD and more
No Children	13,916	11.6	31.1	24.7	18.4	7.9	6.3
HHs with Children	17,189	3.6	22.7	26.7	25.8	10.2	11.0
1 Child	16,535	4.0	24.3	26.7	25.3	8.8	10.9
2 Children	18,293	3.2	19.8	28.4	24.0	11.8	12.8
3 and more Children	15,516	3.3	28.3	18.3	36.7	10.0	3.3
No Elderly	15,813	6.3	25.7	28.2	21.5	9.1	9.2
HHs With Elderly	13,955	12.6	32.1	20.4	20.7	8.2	6.1
1 Elderly	13,591	14.4	32.9	19.9	19.1	7.8	6.0
2 and more Elderly	14,756	8.6	30.3	21.3	24.0	9.0	6.8

**Table 5.11: Distribution of HHs per Average Monthly Expenditures on Heating and Assessment of HH Average Monthly Income, %**

	Average Expenditures, AMD	Up to 5000 AMD	5001-10000 AMD	10001-15000 AMD	15001-20000 AMD	20001-25000 AMD	25001 AMD and more
1001 USD and more	25,897	11.1	0.0	11.1	11.1	33.3	33.3
601-1000 USD	25,240	0.0	2.7	21.8	28.2	18.2	29.1
301-600 USD	19,170	0.2	14.1	24.8	30.8	14.8	15.5
101-300 USD	13,765	6.4	32.7	31.6	19.2	6.9	3.1
Up to 100 USD	9,052	28.5	46.5	13.1	9.9	0.5	1.6

**Table 5.12: Distribution of HHs per Average Monthly Expenditures on Heating and Assessment of HH Welfare, %**

	Average Expenditures, AMD	Up to 5000 AMD	5001-10000 AMD	10001-15000 AMD	15001-20000 AMD	20001-25000 AMD	25001 AMD and more
<i>According to HH Head Subjective Assessment</i>							
Extremely Poor	7,803	48.7	29.5	11.5	7.7	0.0	2.6
Poor	11,590	17.8	38.4	22.2	14.7	4.2	2.6
Non-poor	16,135	3.1	26.4	27.5	24.2	9.6	9.3
Wealthy	20,989	2.6	11.8	26.7	24.1	18.5	16.4
<i>According to Interviewer Subjective Assessment</i>							
Extremely Poor	6,497	56.6	28.3	5.7	7.5	0.0	1.9
Poor	11,631	18.2	37.2	22.9	13.7	5.9	2.0
Non-poor	15,719	3.8	27.5	27.2	24.3	8.2	9.0
Wealthy	20,356	2.2	13.4	26.5	23.5	17.9	16.4

**Table 5.13: Distribution of HHs per Average Monthly Expenditures on Heating and Welfare and Quintile Groups, %**

	Average Expenditures, AMD	Up to 5000 AMD	5001-10000 AMD	10001-15000 AMD	15001-20000 AMD	20001-25000 AMD	25001 AMD and more
Extremely Poor	8,777	27.2	43.9	22.5	6.4	0.0	0.0
Poor	12,248	13.0	37.0	25.7	17.8	3.4	3.1
Non-poor	16,496	5.5	24.0	26.0	23.5	10.8	10.1
Quintile 1	9,720	21.8	43.7	22.8	9.8	1.3	0.6
Quintile 2	13,393	9.7	32.4	27.4	21.5	6.8	2.4
Quintile 3	14,331	8.5	27.2	28.2	23.8	6.7	5.4
Quintile 4	16,133	4.5	27.8	24.7	22.6	11.1	9.4
Quintile 5	19,990	2.6	14.2	24.8	25.2	14.7	18.5

**Table 5.14: Average Monthly Expenditures on Heating per Average Temperature in Apartment in January, 2007 and Heating Options Used, AMD**

	Total Average Expenditures	Very Cold (Up to 7C)	Cold (8-14C)	Not Warm, Mostly Cold (15-18C)	Warm (19-21C)	Very Warm (Above 22C)
Armenia	15,150	13,710	13,957	15,088	16,238	19,082
Yerevan	17,582	14,750	15,340	18,045	20,093	21,273
Marzes	12,244	13,014	9,197	12,213	12,937	16,833
Electricity	16,878	16,055	14,580	17,414	24,373	26,933
Natural Gas	14,635	13,877	12,019	14,332	15,469	18,786
Wood	13,148	12,166	17,782	12,514	11,369	16,409

**Table 5.15: Average Monthly Expenditures on Heating per Average Temperature in Apartment in January, 2007 and Heating Devices Used, AMD**

	Total Average Expenditures	Very Cold (Up to 7C)	Cold (8-14C)	Not Warm, Mostly Cold (15-18C)	Warm (19-21C)	Very Warm (Above 22C)
Non-manufactured Gas Heater	11,889	7,940	12,705	11,894	12,413	-
Manufactured Gas Heater	14,611	14,785	12,343	14,590	15,053	14,521
Individual Heating Boiler	19,903	10,000	12,000	19,329	19,228	26,449
Gas Stove	11,419	9,871	11,291	11,287	12,548	11,867
Non-manufactured Electric Appliance	16,534	15,895	14,784	17,287	29,096	38,000
Manufactured Electric Appliance	17,168	16,258	14,285	17,507	22,084	22,000
Wood Stove	13,069	12,166	17,782	12,514	11,052	16,409
Other	11,771	3,000	4,666	11,787	19,886	-

## Section 6: Analysis of Cases of Illnesses Due to Heating Conditions

Table 6.1: Share of HHs with Cases of Illnesses due to Heating Conditions in 2006/2007 Winter, % in total HHs

	Rhinitis	Flu	Pneumonia	Tonsillitis	Pharyngitis	Radiculitis	Sciatica	Other	HHs with Illness Cases	No Illness Cases	Total HHs
Armenia	17.9	37.1	5.9	12.1	2.2	4.3	2.1	0.7	44.1	55.9	100.0
Yerevan	13.9	33.4	4.7	9.9	1.4	2.9	1.1	1.1	41.1	58.9	100.0
Marzes	22.6	41.4	7.3	14.8	3.2	6.0	3.3	0.1	47.7	52.3	100.0
Aragatsotn	12.5	60.0	-	47.5	-	-	-	2.5	60.0	40.0	100.0
Ararat	13.0	44.0	8.0	17.0	3.0	3.0	1.0	-	55.0	45.0	100.0
Armavir	20.0	30.9	2.7	9.1	1.8	2.7	0.9	-	32.7	67.3	100.0
Gegharquniq	18.8	21.3	2.5	1.3	-	1.3	1.3	-	27.5	72.5	100.0
Lory	37.1	46.8	5.4	9.3	2.5	6.4	5.7	0.4	50.7	49.3	100.0
Kotayq	17.9	45.7	5.4	12.9	0.7	1.8	1.1	-	50.4	49.6	100.0
Shirak	19.4	42.8	25.0	31.7	12.8	15.0	6.1	-	48.3	51.7	100.0
Syuniq	15.3	29.3	1.3	10.7	-	6.7	2.7	-	40.0	60.0	100.0
Vayots Dzor	23.3	40.0	10.0	10.0	6.7	16.7	6.7	-	60.0	40.0	100.0
Tavush	36.7	58.3	3.3	21.7	5.0	11.7	6.7	-	68.3	31.7	100.0
Electricity	17.3	40.2	4.7	13.0	1.3	4.1	1.8	1.3	48.6	51.4	100.0
Natural Gas	16.6	32.2	6.2	10.7	2.4	3.5	2.0	0.1	38.4	61.6	100.0
Wood	27.4	49.6	6.7	17.2	4.8	9.1	3.5	1.1	56.1	43.9	100.0
Other	19.2	64.3	16.2	10.9	4.6	9.2	6.9	-	70.0	30.0	100.0

Table 6.2: Cases of Illnesses due to Heating Conditions by Marzes in 2006/2007 Winter, % in total population

	Rhinitis	Flu	Pneumonia	Tonsillitis	Pharyngitis	Radiculitis	Sciatica	Other	HHs with Illness Cases	No Illness Cases	Total Population
Armenia	8.6	20.8	1.8	4.6	0.6	1.2	0.6	0.2	28.2	71.8	100.0
Yerevan	6.9	19.3	1.4	4.0	0.4	0.8	0.3	0.3	26.5	73.5	100.0
Marzes	10.6	22.6	2.3	5.3	0.9	1.7	0.9	0.0	30.3	69.7	100.0
Aragatsotn	3.3	33.8	-	21.2	-	-	-	0.7	39.7	60.3	100.0
Ararat	4.4	19.1	2.2	5.2	0.8	0.8	0.3	-	27.3	72.7	100.0
Armavir	9.7	17.9	1.0	3.2	0.5	0.7	0.2	-	18.9	81.1	100.0
Gegharquniq	9.3	10.7	0.6	0.3	-	0.3	0.3	-	18.0	82.0	100.0
Lory	19.6	25.2	2.0	3.2	0.8	2.1	1.7	0.1	32.4	67.6	100.0
Kotayq	7.3	27.3	1.6	4.7	0.2	0.4	0.3	-	34.4	65.6	100.0
Shirak	6.8	20.8	8.0	11.1	3.8	4.1	1.7	-	29.2	70.8	100.0
Syuniq	12.8	16.8	0.4	4.0	-	2.0	0.7	-	26.7	73.3	100.0
Vayots Dzor	8.9	25.0	3.6	2.7	1.8	4.5	2.7	-	39.3	60.7	100.0
Tavush	14.8	34.1	0.9	7.4	1.3	3.5	1.7	-	47.6	52.4	100.0
Electricity	9.1	23.5	1.5	5.4	0.4	1.3	0.5	0.4	32.5	67.5	100.0
Natural Gas	7.5	17.4	1.9	3.7	0.6	0.9	0.5	0.0	23.4	76.6	100.0
Wood	12.7	28.0	1.9	6.0	1.3	2.4	0.9	0.5	37.1	62.9	100.0
Other	6.9	40.8	7.4	6.3	1.3	2.7	2.0	-	47.7	52.3	100.0

Table 6.3: Per Person Average Frequency of Illness in HH, times

	Rhinitis	Flu	Pneumonia	Tonsillitis	Pharyngitis	Radiculitis	Sciatica	Other	Total
Armenia	1.6	1.7	1.2	1.5	1.9	1.5	1.3	1.1	1.615
Yerevan	1.7	1.6	1.3	1.4	2.4	1.4	1.1	1.1	1.610
Marzes	1.6	1.8	1.1	1.5	1.6	1.5	1.3	1.0	1.620
Aragatsotn	1.2	1.4	-	1.3	-	-	-	1.0	1.317
Ararat	1.3	1.2	1.3	1.1	1.0	1.3	2.0	-	1.195
Armavir	1.2	1.7	1.0	1.4	2.0	1.0	1.0	-	1.470
Gegharquniq	1.5	1.9	1.0	1.0	-	1.0	3.0	-	1.729
Lory	1.4	1.5	1.1	1.0	1.1	1.2	1.1	1.0	1.352
Kotayq	1.5	1.6	1.2	1.4	1.0	1.4	1.3	-	1.429
Shirak	2.2	2.4	1.1	2.0	1.7	1.2	1.1	-	1.957
Syuniq	1.0	1.5	1.0	1.1	-	1.0	1.3	-	1.348
Vayots Dzor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	-	1.000
Tavush	3.3	4.5	3.0	2.8	3.0	5.1	2.8	-	4.141

Table 6.4: Share of HHs with Cases of Illnesses due to Heating Conditions per Presence of Children and Elderly in HH, % in total HHs

	Rhinitis	Flu	Pneumonia	Tonsillitis	Pharyngitis	Radiculitis	Sciatica	Other	HHs with Illness Cases	No Illness Cases	Total HHs
Armenia	17.9	37.1	5.9	12.1	2.2	4.3	2.1	0.7	44.1	55.9	100.0
Yerevan	13.9	33.4	4.7	9.9	1.4	2.9	1.1	1.1	41.1	58.9	100.0
Marzes	22.6	41.4	7.3	14.8	3.2	6.0	3.3	0.1	47.7	52.3	100.0
No Children	17.4	37.4	5.5	11.2	2.4	4.7	2.2	1.0	45.0	55.0	100.0
HHs with Children	18.5	36.6	6.6	13.7	1.9	3.6	2.0	0.2	42.7	57.3	100.0
1 Child	17.4	34.7	6.6	11.2	1.3	3.1	1.9	-	41.0	59.0	100.0
2 Children	20.6	37.3	6.0	16.7	2.7	3.9	2.5	0.5	43.7	56.3	100.0
3 and more Children	15.3	44.4	9.5	13.6	2.3	6.0	-	-	48.3	51.7	100.0
No Elderly	16.7	33.9	5.1	11.1	1.7	3.2	1.7	0.8	40.9	59.1	100.0
HHs with Elderly	19.9	42.9	7.2	13.9	3.3	6.4	2.8	0.5	49.9	50.1	100.0
1 Elderly	20.9	45.7	7.6	13.6	3.6	6.4	2.7	0.3	52.4	47.6	100.0
2 and more Elderly	17.8	36.9	6.4	14.7	2.6	6.3	3.2	1.0	44.6	55.4	100.0

Table 6.5: Cases of Illnesses due to Heating Conditions per Heating Options Used and by Marzes, % in total HHs

	No Illness Cases	HHs with Illness Cases	HHs with 1 Illness Case	HHs with 2 Illness Cases	HHs with 3 and more Illness Cases
Armenia	55.9	44.1	34.8	28.1	37.0
Yerevan	58.9	41.1	33.0	29.2	37.8
Marzes	52.3	47.7	36.6	27.0	36.4
Aragatsotn	40.0	60.0	25.0	33.3	41.7
Ararat	45.0	55.0	50.9	25.5	23.6
Armavir	67.3	32.7	33.3	41.7	25.0
Gegharquniq	72.5	27.5	27.3	22.7	50.0
Lory	49.3	50.7	42.3	30.3	27.5
Kotayq	49.6	50.4	29.8	21.3	48.9
Shirak	51.7	48.3	34.5	33.3	32.2
Syuniq	60.0	40.0	36.7	25.0	38.3
Vayots Dzor	40.0	60.0	44.4	16.7	38.9
Tavush	31.7	68.3	36.6	17.1	46.3
Electricity	51.4	48.6	37.6	23.7	38.8
Natural Gas	61.6	38.4	34.5	32.0	33.5
Wood	43.9	56.1	27.0	28.8	44.1
Other	30.0	70.0	38.1	14.3	47.6

Table 6.6: Cases of Illnesses due to Heating Conditions per Type of Building and Entirety of Apartment Heating, % in total HHs

	No Illness Cases	HHs with Illness Cases	HHs with 1 Illness Case	HHs with 2 Illness Cases	HHs with 3 and more Illness Cases
Stone Building, Stalin Design	54.3	45.7	38.1	31.0	31.0
Stone Building, Khrushchev Design	55.2	44.8	46.4	26.4	27.2
Stone Building, Other Design	57.1	42.9	34.4	33.3	31.9
Bearing-wall Building, Khrushchev Design	41.0	59.0	45.7	19.6	34.8
Bearing-wall Building, Other Design	56.7	43.3	28.3	24.4	47.4
Monolith	54.3	45.7	33.3	47.6	14.3
Other Design	58.8	41.2	85.7	14.3	0.0
Entirely Heated	66.0	34.0	30.4	29.9	39.7
Partially Heated	52.2	47.8	34.7	28.1	37.2
Not Heated	36.5	63.5	50.0	22.7	27.3
Kitchen Heated	58.8	41.2	34.0	28.4	37.6
Kitchen Not Heated	50.8	49.2	35.3	27.9	36.8
Bathroom/Toilette Heated	66.3	33.7	34.9	26.6	39.4
Bathroom/Toilette Not Heated	53.9	46.1	34.7	28.4	36.9

**Table 6.7: Cases of Illnesses due to Heating Conditions per Average Temperature in Apartment in January, 2007, %**

	No Illness Cases	HHs with Illness Cases	HHs with 1 Illness Case	HHs with 2 Illness Cases	HHs with 3 and more Illness Cases
Average Temperature in Apartment, C	16.3	15.4	15.2	15.6	15.4
Very Cold	55.7	44.3	38.3	36.2	25.5
Cold	47.8	52.2	36.6	24.8	38.2
Not Warm, Mostly Cold	52.1	47.9	34.3	27.1	38.4
Warm	67.2	32.8	33.7	32.6	33.7
Very Warm	76.5	23.5	12.5	12.5	62.5

**Table 6.8: Cases of Illnesses due to Heating Conditions per Temperature in Bedrooms during Nighttimes, %**

	No Illness Cases	HHs with Illness Cases	HHs with 1 Illness Case	HHs with 2 Illness Cases	HHs with 3 and more Illness Cases
Average Temperature in Apartment, C	16.3	15.4	15.2	15.6	15.4
Very Cold in Bedroom	42.8	57.2	43.7	33.3	23.0
Cold in Bedroom	44.1	55.9	27.6	29.2	43.2
Not Warm, Mostly Cold in Bedroom	62.5	37.5	28.5	29.0	42.2
Warm in Bedroom	78.6	21.4	26.7	24.2	48.3
Very Warm in Bedroom	92.9	7.1	0.0	50.0	50.0

**Table 6.9: Cases of Illnesses due to Heating Conditions per Expenditures on Heating, %**

	No Illness Cases	HHs with Illness Cases	HHs with 1 Illness Case	HHs with 2 Illness Cases	HHs with 3 and more Illness Cases
Up to 5000 AMD	36.7	63.3	64.5	21.5	15.0
5001-10000 AMD	49.9	50.1	39.6	27.3	33.1
10001-15000 AMD	56.0	44.0	27.0	33.3	39.6
15001-20000 AMD	61.4	38.6	27.2	27.8	45.1
20001 AMD and more	67.4	32.6	21.1	28.4	51.4

**Table 6.10: Cases of Illnesses due to Heating Conditions per HH Size, %**

	No Illness Cases	HHs with Illness Cases	HHs with 1 Illness Case	HHs with 2 Illness Cases	HHs with 3 and more Illness Cases
All HHs	55.9	44.1	34.8	28.2	37.1
1 Member HHs	43.4	56.6	100.0	-	-
2 Member HHs	57.3	42.7	30.7	70.1	-
3 Member HHs	58.1	41.9	28.3	25.7	46.1
4 Member HHs	59.8	40.2	26.7	28.1	45.2
5 and more Member HHs	54.8	45.2	17.6	21.0	61.4

Table 6.11: Cases of Illnesses due to Heating Conditions per Presence of Children and Elderly in HHs, %

	No Illness Cases	HHs with Illness Cases	HHs with 1 Illness Case	HHs with 2 Illness Cases	HHs with 3 and more Illness Cases
No Children	55.0	45.0	42.4	30.7	27.0
HHs With Children	57.3	42.7	21.5	23.4	54.8
1 Child	59.0	41.0	26.6	25.3	48.7
2 Children	56.3	43.7	17.4	24.6	57.2
3 and more Children	51.7	48.3	13.8	6.9	75.9
No Elderly	59.1	40.9	32.8	27.5	39.6
HHs with Elderly	50.1	49.9	37.5	28.9	33.3
1 Elderly	47.6	52.4	44.6	23.6	32.2
2 and more Elderly	55.4	44.6	20.2	43.4	37.4

Table 6.12: Cases of Illnesses due to Heating Conditions per Assessment of HH Average Monthly Income, %

	No Illness Cases	HHs with Illness Cases	HHs with 1 Illness Case	HHs with 2 Illness Cases	HHs with 3 and more Illness Cases
1001 USD and more	64.7	35.3	33.3	33.3	33.3
601-1000 USD	67.6	32.4	25.0	41.7	33.3
301-600 USD	69.9	30.1	25.4	26.6	48.0
101-300 USD	51.8	48.2	30.1	26.9	42.9
Up to 100 USD	41.2	58.8	52.8	28.8	18.5

Table 6.13: Cases of Illnesses due to Heating Conditions per Assessment of HH Welfare, %

	No Illness Cases	HHs with Illness Cases	HHs with 1 Illness Case	HHs with 2 Illness Cases	HHs with 3 and more Illness Cases
<i>According to HH Head Subjective Assessment</i>					
Extremely Poor	21.5	78.5	62.9	17.7	21.0
Poor	36.2	63.8	34.4	26.9	38.7
Non-poor	62.9	37.1	31.9	29.2	38.7
Wealthy	76.3	23.7	27.7	38.3	34.0
<i>According to Interviewer Subjective Assessment</i>					
Extremely Poor	16.7	83.3	64.4	17.8	17.8
Poor	34.3	65.7	34.9	27.5	37.6
Non-poor	63.0	37.0	32.7	29.7	37.8
Wealthy	73.1	26.9	27.8	29.2	43.1

Table 6.14: Cases of Illnesses due to Heating Conditions per Welfare and Quintile Groups, %

	No Illness Cases	HHs with Illness Cases	HHs with 1 Illness Case	HHs with 2 Illness Cases	HHs with 3 and more Illness Cases
Extremely Poor	36.7	63.3	25.0	35.7	39.3
Poor	45.1	54.9	33.3	20.4	45.7
Non-poor	59.3	40.7	36.8	28.9	34.3
Quintile 1	37.0	63.0	29.6	29.6	40.9
Quintile 2	51.6	48.4	36.1	21.1	42.8
Quintile 3	52.6	47.4	32.1	28.3	39.7
Quintile 4	60.7	39.3	33.5	30.6	35.9
Quintile 5	67.0	33.0	43.5	31.8	24.7

## Section 7: Satisfaction with and Preferences in Heating Conditions

Table 7.1: Satisfaction with Heating Conditions per Heating Devices Used, %

	Totally Satisfied	Partially Satisfied	Completely Dissatisfied
Armenia	14.4	42.9	42.7
Yerevan	15.0	36.0	49.0
Marzes	13.6	51.2	35.2
Non-manufactured Gas heater	16.2	51.4	32.4
Manufactured Gas Heater	21.6	58.9	19.5
Individual Heating Boiler	74.0	25.0	1.0
Gas Stove	4.3	38.6	57.1
Non-manufactured Electric Appliance	0.8	25.6	73.5
Manufactured Electric Appliance	4.2	33.8	62.0
Wood Stove	3.6	44.4	52.0

Table 7.2: Assessment of Disadvantages of Heating Options Used, %

	No Disadvantages	Dry Air	Insufficient Heat	Unequal Heat Distribution	Apartment Gets Dirty (or Full of Smoke)	Unpleasant Smell	Uncomfortable Device Placement	Unsafe	Expensive	Other
Armenia	18.0	10.0	28.6	19.2	4.7	1.2	0.5	3.1	13.2	1.4
Yerevan	16.0	6.3	28.1	20.3	3.0	0.9	0.7	3.1	20.4	1.1
Marzes	20.4	14.4	29.3	17.9	6.7	1.6	0.3	3.1	4.6	1.8
Non-manufactured Gas heater	16.2	5.4	37.8	16.2	0.0	0.0	2.7	16.2	2.7	2.7
Manufactured Gas Heater	28.8	10.4	22.0	25.5	0.3	1.6	1.0	5.1	4.6	0.8
Individual Heating Boiler	88.1	1.0	1.0	0.0	0.0	0.0	0.0	2.0	7.9	0.0
Gas Stove	3.6	14.3	43.6	17.9	2.1	6.4	0.0	5.0	6.4	0.7
Non-manufactured Electric Appliance	1.7	11.0	37.7	17.5	0.0	0.0	0.0	1.1	30.7	0.3
Manufactured Electric Appliance	4.7	14.2	34.8	18.0	0.0	0.0	0.6	0.6	25.7	1.5
Wood Stove	1.0	4.1	31.1	14.8	43.9	1.0	0.5	1.0	2.6	0.0

Table 7.3: Preference in Heating Options per Currently Used One, %

	Current Option is Sufficient	Electric Heating Appliances	Wood Stove	Gas Heater	Individual Heating Boiler	Local-collective Heating Boiler	Centralized Heating	Air Conditioner	Other
Armenia	17.2	0.6	0.2	12.5	31.2	18.3	17.4	0.7	2.0
Yerevan	16.0	0.7	0.3	10.3	28.6	26.9	14.1	0.9	2.3
Marzes	18.7	0.4	0.2	15.2	34.1	8.1	21.3	0.5	1.6
Non-manufactured Gas heater	10.5	0.0	0.0	26.3	50.0	2.6	7.9	0.0	2.6
Manufactured Gas Heater	26.4	0.3	0.3	0.5	35.6	18.4	17.2	0.5	0.9
Individual Heating Boiler	93.2	0.0	0.0	1.0	0.0	1.9	1.0	1.9	1.0
Gas Stove	3.6	2.1	0.7	25.0	29.3	14.3	21.4	0.7	2.9
Non-manufactured Electric Appliance	0.8	0.3	0.0	17.2	31.8	22.0	24.2	1.4	2.3
Manufactured Electric Appliance	5.6	0.9	0.0	18.1	28.8	27.3	16.0	0.0	3.3
Wood Stove	1.0	1.0	1.0	34.3	32.8	11.1	17.2	1.0	0.5

Table 7.4: Preference in Heating Options per HH Welfare and Assessment of Average Possible Expenditures on Heating in Case of Heating Improvement, %

	Current Option is Sufficient	Electric Heating Appliances	Wood Stove	Gas Heater	Individual Heating Boiler	Local-collective Heating Boiler	Centralized Heating	Air Conditioner	Other
Extremely Poor	9.6	0.6	0.0	25.3	26.4	14.6	20.8	1.1	1.7
Poor	15.6	0.3	0.7	18.0	31.5	11.5	21.0	1.0	0.3
Non-poor	17.5	0.7	0.2	9.5	32.5	20.4	16.7	0.5	2.0
<i>Average Possible Expenditures, AMD</i>	15,280	15,280	10,729	12,148	15,359	13,608	14,636	10,913	8,349
Up to 5000 AMD	14.4	1.9	0.0	21.3	21.3	17.5	14.4	2.3	6.8
5001-10000 AMD	13.8	0.5	0.5	15.6	29.2	20.0	19.0	0.0	1.3
10001-15000 AMD	18.0	0.6	0.4	10.0	30.5	21.1	17.3	0.4	1.7
15001-20000 AMD	20.1	0.3	0.0	6.5	38.0	16.9	16.1	1.3	0.8
20001-25000 AMD	21.6	0.0	0.0	9.3	39.5	12.3	16.7	0.0	0.6
25001 AMD and more	22.5	0.0	0.0	11.7	31.5	11.7	22.5	0.0	0.0

**Table 7.5: Reasons for Heating Device Preference**

	Safe	Clean	Affordable	Sufficient Heat
Armenia	32.0	14.2	12.3	41.5
Yerevan	26.4	10.4	16.9	46.3
Marzes	38.6	18.8	6.8	35.8
<i>Preferred Heating Device</i>				
Electric Heating Appliances	33.3	15.2	9.1	42.4
Wood Stove	44.7	13.6	7.3	34.4
Gas Heater	42.9	0.0	57.1	0.0
Individual Heating Boiler	30.0	10.8	14.6	44.6
Local-collective Heating Boiler	22.9	12.8	15.7	48.7
Centralized Heating	25.7	9.5	14.5	50.3
Air Conditioner	24.1	28.8	12.0	35.1
Other	25.0	20.0	20.0	35.0

**Table 7.6: Reasons for Not Using Preferred Heating Device**

	Lack of Money	Difficulty in Technical Solutions	Absence of Suppliers	Other
Armenia	66.0	10.0	19.3	4.7
Yerevan	53.9	12.2	28.8	5.1
Marzes	80.9	7.4	7.5	4.2
<i>Preferred Heating Device</i>				
Electric Heating Appliances	87.9	9.1	3.0	0.0
Wood Stove	72.8	9.2	15.3	2.8
Gas Heater	37.5	25.0	12.5	25.0
Individual Heating Boiler	84.7	7.6	6.1	1.5
Local-collective Heating Boiler	54.0	7.1	32.9	6.0
Centralized Heating	52.7	15.9	24.1	7.3
Air Conditioner	73.6	7.8	15.5	3.1
Other	72.7	18.2	4.5	4.5

## Section 8: Awareness on Loans and Preparedness to Borrow for Heating Improvement

Table 8.1: Awareness on Loans and Preparedness to Borrow by Marzes, %

	Unaware of Loans	Aware of Loans	Willing to Borrow	Unwilling to Borrow
Armenia	76.5	23.5	28.2	71.8
Yerevan	77.6	22.4	30.3	69.7
Marzes	75.2	24.8	25.6	74.4
Aragatsotn	92.5	7.5	10.0	90.0
Ararat	74.0	26.0	49.0	51.0
Armavir	95.5	4.5	14.5	85.5
Gegharquniq	63.8	36.3	45.0	55.0
Lory	83.9	16.1	35.4	64.6
Kotayq	66.1	33.9	20.4	79.6
Shirak	68.3	31.7	16.1	83.9
Syuniq	72.0	28.0	10.0	90.0
Vayots Dzor	66.7	33.3	13.3	86.7
Tavush	81.7	18.3	43.3	56.7

Table 8.2: Awareness on Loans and Preparedness to Borrow per Heating Devices Used, %

	Unaware of Loans	Aware of Loans	Willing to Borrow	Unwilling to Borrow
Non-manufactured Gas heater	94.6	5.4	23.7	76.3
Manufactured Gas Heater	73.5	26.5	31.6	68.4
Individual Heating Boiler	67.0	33.0	2.0	98.0
Gas Stove	82.9	17.1	18.6	81.4
Non-manufactured Electric Appliance	82.3	17.7	30.1	69.9
Manufactured Electric Appliance	73.6	26.4	30.0	70.0
Wood Stove	75.5	24.5	34.7	65.3

Table 8.3: Awareness on Loans and Preparedness to Borrow per Heating Devices Preferred, %

	Unaware of Loans	Aware of Loans	Willing to Borrow	Unwilling to Borrow
Electric Heating Appliances	81.8	18.2	9.1	90.9
Wood Stove	80.0	20.0	0.0	100.0
Gas Heater	82.9	17.1	9.6	90.4
Individual Heating Boiler	72.1	27.9	36.3	63.7
Local-collective Heating Boiler	74.8	25.2	59.6	40.4
Centralized Heating	79.4	20.6	20.9	79.1
Air Conditioner	100.0	0.0	57.1	42.9
Other	89.7	10.3	7.9	92.1

**Table 8.4: Awareness on Loans and Preparedness to Borrow per Quintile Groups and Actual Expenditures on Heating, %**

	Unaware of Loans	Aware of Loans	Willing to Borrow	Unwilling to Borrow
Quintile 1	82.9	17.1	16.1	83.9
Quintile 2	79.1	20.9	28.9	71.1
Quintile 3	73.2	26.8	24.5	75.5
Quintile 4	75.5	24.5	31.2	68.8
Quintile 5	73.2	26.8	38.0	62.0
Up to 5000 AMD	85.2	14.8	12.4	87.6
5001-10000 AMD	80.7	19.3	21.4	78.6
10001-15000 AMD	71.5	28.5	34.5	65.5
15001-20000 AMD	75.5	24.5	32.4	67.6
20001-25000 AMD	74.1	25.9	33.5	66.5
25001 AMD and more	70.0	30.0	33.8	66.3

**Table 8.5: Expenditures on Heating and Assessment of Average Monthly Loan Repayments, AMD**

	Average Monthly Expenditure on Heating in 2007	Maximum Expenditure in Case of Improved Heating, Monthly Average	Average Monthly Loan Repayments, 3-year loan	Average Monthly Loan Repayments, 7-year loan
Armenia	16,873.6	15,486.2	7,765.8	4,764.8
Yerevan	19,378.1	15,217.0	8,080.2	4,405.7
Marzes	13,367.5	15,866.6	7,322.9	5,270.8
<i>Preferred Heating Device</i>				
Electric Heating Appliances	9,521.5	12,535.9	8,468.9	4,976.1
Wood Stove	-	-	-	-
Gas Heater	12,828.4	16,380.7	7,479.1	4,694.4
Individual Heating Boiler	16,628.9	16,195.6	7,851.8	5,215.0
Local-collective Heating Boiler	18,504.7	14,545.9	7,782.9	4,444.3
Centralized Heating	15,412.7	16,761.1	7,585.3	4,815.8
Air Conditioner	12,336.1	13,497.4	8,080.0	3,773.3
Other	15,000.0	9,000.0	7,500.0	5,500.0

## Section 9: Opportunities of Energy Saving

**Table 9.1: Assessment of Overall Condition of Windows per Type of Building, %**

	Good Condition	Average Condition	Bad Condition
Armenia	10.1	70.5	19.4
Yerevan	14.6	71.9	13.6
Marzes	4.8	68.9	26.3
Stone Building, Stalin Design	17.6	70.3	12.1
Stone Building, Khrushchev Design	12.2	65.2	22.6
Stone Building, Other Design	9.3	70.6	20.0
Bearing-wall Building, Khrushchev Design	11.4	73.4	15.2
Bearing-wall Building, Other Design	9.6	73.0	17.4
Monolith	6.5	45.7	47.8
Other Design	0.0	82.4	17.6

**Table 9.2: Assessment of Overall Condition of Windows per Heating Options and Heating Device Used, %**

	Good Condition	Average Condition	Bad Condition
Electricity	11.1	73.1	15.8
Natural Gas	11.6	70.1	18.3
Wood	2.0	64.1	33.8
Other	0.0	67.3	32.7
Non-manufactured Gas heater	0.0	68.4	31.6
Manufactured Gas Heater	9.8	73.9	16.3
Individual Heating Boiler	32.0	57.0	11.0
Gas Stove	8.6	59.3	32.1
Non-manufactured Electric Appliance	8.1	72.8	19.1
Manufactured Electric Appliance	14.2	73.3	12.5
Wood Stove	2.0	63.8	34.2
Other	6.7	56.7	36.7

**Table 9.3: Assessment of Overall Condition of Windows per HH Welfare, %**

	Good Condition	Average Condition	Bad Condition
Extremely Poor	1.7	61.2	37.1
Poor	4.1	67.5	28.5
Non-poor	12.1	72.1	15.9
Quintile 1	2.8	60.9	36.3
Quintile 2	5.2	69.2	25.6
Quintile 3	4.1	77.6	18.3
Quintile 4	10.6	75.3	14.1
Quintile 5	22.4	67.3	10.3

Table 9.4: HHs that will Save on Heating Expenditures in Case of Window Replacement, %

	HHs who will save	HHs who will shave, but don't want to replace	HHs who need to replace 1-2 windows	HHs who need to replace 3-4 windows	HHs who need to replace more than 4 windows
Armenia	72.4	14.1	19.0	36.2	30.7
Yerevan	71.0	15.8	16.4	35.7	32.2
Marzes	74.0	12.2	22.0	36.8	29.0
Electricity	71.2	17.7	18.3	34.7	29.4
Natural Gas	70.6	12.3	19.2	37.0	31.6
Wood	84.8	9.6	16.8	41.9	31.7
Extremely Poor	83.6	8.8	22.3	37.2	31.8
Poor	75.6	9.5	21.8	40.5	28.2
Non-poor	71.1	15.3	18.3	35.4	31.0
Quintile 1	83.6	8.6	22.2	37.2	32.0
Quintile 2	73.2	11.6	19.5	38.6	30.3
Quintile 3	76.3	11.4	19.9	35.7	33.0
Quintile 4	72.0	18.8	18.2	36.4	26.6
Quintile 5	63.5	17.5	16.8	34.0	31.6
Average Actual Expenditures, AMD	14,781.2	15,478.2	13,300.6	15,041.7	15,069.7
Up to 5000 AMD	80.5	19.9	28.7	27.2	24.3
5001-10000 AMD	74.0	13.3	18.7	37.1	31.0
10001-15000 AMD	72.5	12.5	19.9	35.7	31.9
15001-20000 AMD	69.0	12.0	17.3	37.5	33.2
20001-25000 AMD	68.8	8.5	16.2	42.7	32.5
25001 AMD and More	69.4	23.9	11.9	34.9	29.4

Table 9.5: Expenditures on Heating and Assessments of Monthly Loan Repayments of HHs that will Save in Case of Window Replacement, AMD

	Average Monthly Expenditure on Heating in 2007	Maximum Expenditure in Case of Improved Heating, Monthly Average	Average Monthly Loan Repayments, 1-year loan	Average Monthly Loan Repayments, 3-year loan
<i>Armenia</i>				
1-2 Windows	13,300.6	13,106.8	4,832.8	3,474.2
3-4 Windows	15,041.7	14,765.3	5,463.6	4,028.3
5 and More Windows	15,069.7	13,868.1	8,284.3	5,320.8
<i>Yerevan</i>				
1-2 Windows	16,714.7	14,351.3	4,730.6	3,090.9
3-4 Windows	17,994.2	15,942.1	6,025.4	4,057.4
5 and More Windows	16,640.1	13,673.1	7,745.1	4,382.4
<i>Marzes</i>				
1-2 Windows	10,442.9	12,077.9	4,937.5	3,800.4
3-4 Windows	11,804.2	13,478.5	4,912.3	4,004.1
5 and More Windows	13,079.7	14,113.7	9,026.1	6,155.0