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Economic Development and Research Center (EDRC)

Assessment of Heat Supply and Heating Options in Multi-Apartment Blocks in Armenia

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Armenia Renewable Resources and Energy Efficiency Fund

“Assessment of Heat Supply and Heating Options in Multi-Apartment Blocks in Armenia”

(For 2010-2011 heating season)

Analytic Report on the Sample Household Survey

Yerevan 2011

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The survey was carried out in the framework of World Bank Urban Heating Project.

“Assessment of Heat Supply and Heating Options in Multi-Apartment Blocks in Armenia”

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Economic Development and Research Center (EDRC), Yerevan 2009

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List of Acronyms

AHS (2005)	Assessment of the Heating Situation (Survey), 2005
AHS (2007)	Assessment of the Heating Situation (Survey), 2007
AHS (2009)	Assessment of the Heating Situation (Survey), 2009
AHS (2010)	Assessment of the Heating Situation (Survey), 2010
AHS (2011)	Assessment of the Heating Situation (Survey), 2011
AMD	Armenian Dram(s)
EDRC	Economic Development and Research Center
HH	A Household living in a multi-apartment block in urban areas of Armenia
MAB	Multi-apartment block (building)
MFE	Ministry of Finance and Economy
NSS	National Statistical Service of the Republic of Armenia
PSU	Primary Sample Unit
R2E2	Renewable Resource and Energy Efficiency
ISLS	Integrated (HH) Survey on Living Standards

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Introduction

Improvement of heating and heat supply is largely determined by the pace of connecting the HHs to the gas supply system in the country, by increased requirements on environmental and security issues, as well as by more accessible loans.

Nevertheless, a big portion of population still have problems with effective heating, and from security, economic, environmental and health view moving towards effective and clean heating will remain a problem for long years in our country. Apart from all these, world economic crisis had its influence on the population of Armenia, and it negatively affected their living conditions, and heating conditions and heat supply as well. Those issues were supplemented with a gas tariff increase in spring 2010, which increased HH-s' expenses on heating, and, as a result, the rising number of HH-s shifting to safer heating options, began de decline.

Taking into consideration occurred changes, regular situation survey and evaluation is getting higher importance, which will enable taking steps and developing effective policies towards ensuring higher life quality and social security for the whole population and especially for socially unsecured and vulnerable groups of population. For that matter, this can be achieved only through productive cooperation of public and private sectors.

The survey, initiated by Armenia Renewable Resources and Energy Efficiency Fund, which can already be considered as a periodical one, was directed to this goal.

Armenia Renewable Resources and Energy Efficiency Fund has been acting since 2006. It was established by the RA Government as an independent NGO in accordance with RA Law on energy efficiency and renewable energy. The Fund aims to facilitate investments in energy efficiency and renewable energy sectors, as well as, to contribute to development of energy efficiency and renewable energy markets. During a short period of time, the Fund achieved significant authority and had a big role in sustainable development of energetics in Armenia. The Fund supports bodies drafting energy efficiency and renewable energy projects, investors, banks, condominiums, researchers and others. The Fund continuously implements researches revealig obstacles and suggesting solutions to appropriate governmental agencies.

The Fund, with financing of the World Bank, implements a number of projects, particularly, Urban Heating Project. The Project aims at enhancing usage of clean, efficient, secure and affordable heating technologies in multi-apartment blocks in Armenia.

The "Assessment of Heating Situation in Multi-apartment Blocks in Armenia" report, published as a result of a statistical survey annually implemented in the framework of the Project, has become a main source of data for the specialists in this sector and policy makers. Year by year, the interest of stakeholders of the sector towards the Report is increasing.

It is worth mentioning, that before those surveys, in Armenia, there were insufficient surveys and data related to heating situation and heat supply. Some information on heating options is contained in Census conducted in 2001, and this data, however, is out of time. Very limited information on heating options can also be found in ILCS-s of RA NSS. However, those surveys are not directed to them and can not get large application. The study carried out for the Thermo-supply Project Implementation Unit of the Ministry of Finance and Economy by the EDRC¹ – "Assessment of Heating Situation" (sample survey of urban HHs) in 2005 can be cosidered as a starting point of getting comprehensive data on heating situation, which was followed by "Assessment of Heat Supply and Heating Options in Multi-Apartment Blocks in Armenia" surveys in 2007, 2009 and 2011, conducted for Armenia Renewable Resources and Energy Efficiency Fund (after its establishment, majority of functions of the Thermo-supply Project Implementation Unit were transferred to it).

In 2010, UN Development Program/ Global Environment Facility "Armenia: Improving Energy Efficiency of the Municipal Heating and Hot Water Supply" project, taking into account possible impacts of the crisis, gave an importance to a study of situation in the sector, and, as a result, an "Assessment of heating options" survey was conducted with their initiatives.

In 2011, in order to study heating options applied by HH-s, another survey of heating situation assessment was projected and conducted (hereinafter, AHS(2011)), and based on its results the following "Assessment of Heat Supply and

¹ For more information on Economic Development and Research Center, please, visit www.EDRC.am

Heating Options in Multi-Apartment Blocks in Armenia” report was developed and published. This report aims to introduce current heating conditions in multi-apartment buildings of urban areas in Armenia, assess their improvement and affordable and high-quality heating opportunities, etc. The survey is initiated by the Armenia Renewable Resources and Energy Efficiency Fund.

It is worth mentioning, that the methodology used in all the aforementioned surveys enables ensuring compatibility of data for different years, building dynamic data series, and analysing situation change and strength. As a result, we possess data series for previous 8 years: heating seasons of 2003-04, 2004-05, 2005-06, 2007-08, 2008-09, 2009-2010 and 2010-2011.

In appropriate chapters of this report, main energy sources, heating and hot water devices, heating season duration, heated area and average temperature, expenditures on heating and hot water, illness due to heating conditions, trends of shifting to safer and cleaner heating options are analysed. The last two chapters discuss HH-s’ satisfaction from heating conditions and their preferences, readiness of borrowing for heating conditions improvement, energy efficiency, development of condominiums and cooperation among neighbours.

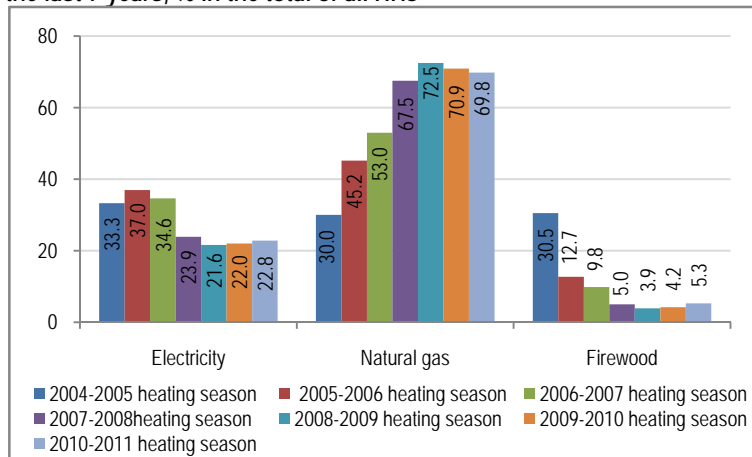
General and some particular results of the survey, and analytical tables, as well as, summarised description of the methodology, are attached as an annex to the report.

The summary of main findings

- During the 2010-2011 heating season, like in recent years, the natural gas remained the dominant heating option, though during last two years the level of its usage slightly decreased making 69.8% this year against the 72.5% of the 2008-2009 heating season. Along with this decrease, usage of electricity and firewood increased.
- In Armenia, the population continues to apply two heating sources simultaneously. 26.1% of HH-s, that heated their apartments during heating season, used electricity as a secondary heating option along with a primary one, 11% used natural gas, and 1.7% used firewood. About 45.7% of HH-s, using an electricity as a primary energy source, also applied natural gas, and 2.6% used firewood as a secondary energy source. 33.9% of HH-s, mainly heated their apartments with natural gas, applied electricity, and 1.5% also heated with firewood.
- Year by year, the number of HH-s using safe heating option increases: the trend of shifting from non-manufactured and self-made devices to more secure and clean ones maintains. HH-s, heating their apartments with natural gas and electricity, replace self-made appliances with manufactured ones. In comparison with previous year, usage of manufactured gas and electric devices increased with accordingly 2.3 and 2.5 percentage points.
- The continuous study of recent years shows that the number of HH-s getting hot water (including water for bath) with individual heating boilers have increased, making 26.1% in 2010-2011 heating season. In parallel, there is a trend of decline in heating water with self-made electric immersion heater, gayser, firewood furnace and gas stove.
- There was a slight regress related to the number of HH-s that heated their apartments entirely: their number decreased, making 62.8% (decreased by 6.6 percentage points compared with previous year). In particular, 70% of HH heated with natural gas and 51% of HH-s heated with electricity could ensure complete heating.
- Among various heating options, the highest and stable temperature could be obtained with central heating (20.1° in average), though this option is used by only 0.5% of HHs. During heating season, average temperature in apartments was 17.7°, a little bit lower than in previous year (17.9°). In apartments, where children lived, average temperature was higher, 18°, than in those without children, 17.4°.
- Satisfaction from apartment heating this year decreased in comparison with previous year. 28.6% of HH-s were completely satisfied from heating, which was 2.1 percentage points less than in previous year
- Individual heating boiler continues to remain a desired heating option for most HHs (52.2%). Besides, the share of HH-s, who would like to have centralized heating and local-collective boiler also increased, making accordingly 11.3% and 10.3%. Main reasons for those preferences are safety and ability to give enough warmth. In general, a continuous study shows that, year by year, population seeks for more secure and clean heating options.
- In 2010-2011 heating season, average expenditures for apartment heating was 27,600 AMD, which increased by 39.5% from previous year.
- Slight rise was recorded in the cases of illness due to heating conditions (insufficient heat and pollution) during the heating season. 44.5% of HH-s had illness cases because of insufficient heat, and in 4.9% of HH-s there were illness cases caused by heating pollution. In comparison with previous year, level of overall illness due to heating conditions increased. In Yerevan, the level of illness increased by 1.3 percentage points, meanwhile in marzes the increase made 9.9 percentage points. In HH-s with children, level of illness was higher.
- The share of HH-s who positively assess the possibility of building a joint boiler is continuously increasing during years. This year, the share of those HH-s was 19.5%. 17.6% of HH-s thinks that it is possible in case of small expenses, and 14.3% considered this idea realistic only if people are sure that this heating option is more saving.

Chapter 1. Options Used for Heating and Hot Water Supply

Figure 1. Trends of using the main sources of energy for heating during the last 7 years, % in the total of all HHs



Source: AHS (2011), AHS (2010), AHS (2009), AHS (2007) and AHS (2005)

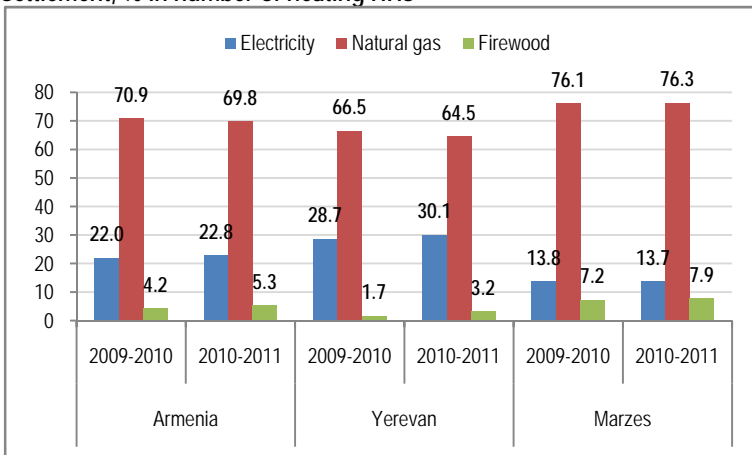
During recent years, the number of HH-s, heating their apartments with natural gas, has been continuously increased, making 72.5% in 2008-2009 heating season. However, during next two years, this indicator slightly decreased: natural gas was replaced with electricity and firewood.

In the Figure 1, a dynamics of main heating options for previous 7 years is presented. Though the share of HH-s, heating with natural gas, made 69.8% this year, decreasing by 1.1 percentage points from previous year, natural gas continues to dominate among other heating options. In 2004-2005 heating season, its usage was only 30%, about 2.3 times less than this year.

Along with natural gas usage decline, usage of electricity and firewood increased, making accordingly 22.8% (increased by 0.8 percentage points) and 5.3% (increased by 1.1 percentage points) in 2010-2011 heating season.

Substitution of natural gas with other energy source was mainly related to gas tariff increase, which in its turn gave rise to expenditures made by HH-s on heating.

Figure 2. Major heating sources in 2010-2011 and previous year per settlement, % in number of heating HHs

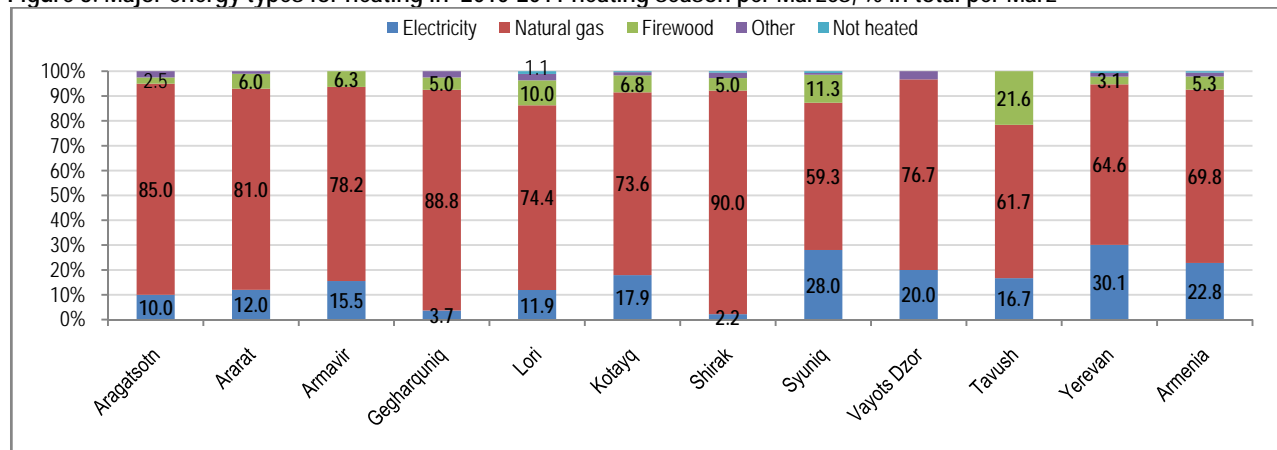


Source: AHS (2011) and AHS (2010)

In 2010-2011 heating season, in Yerevan, the usage of natural gas decreased by 2 percentage points and made 64.5%, and in marzes, it changed only by 0.2 percentage points, making 76.3% (Figure 2). In Yerevan, the share of HH-s heating with electricity is almost twice more than that in marzes (accordingly, 30.1% and 13.7%). The number of HH-s, heating with firewood, increased both in Yerevan and marzes, making accordingly 3.2% and 7.9%, against 1.7% and 7.2% of previous year.

Below, the Figure 3 illustrates main heating options in Marzes.

Figure 3. Major energy types for heating in 2010-2011 heating season per Marzes, % in total per Marz



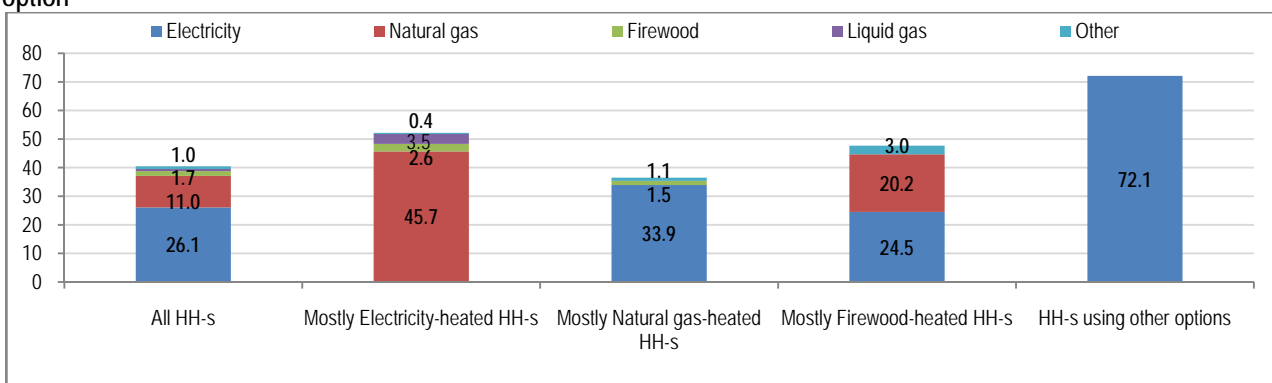
Source: AHS (2011)

Usage of natural gas was especially high in Shirak, Gegharquniq and Aragatsotn marzes, accordingly, 90%, 88.8% and 85%. In these marzes, usage of electricity was significantly lower than in others. In Shirak marz, only 2.2% of HH-s heated with electricity, meanwhile 28% in Syuniq marz. And with it, the portion of HH-s heated with natural gas was the lowest among other marzes, making 59.3%. In Tavush marz, usage of firewood as a primary energy source was 21.6%, meanwhile this option was not used at all in Vayots dzor marz.

Only 0.6% of HH-s did not heat their apartment. This indicator's value decreased by almost 3 times compared to previous year (2%). In Shirak marz, the portion of HH-s, that did not heat their apartments, made 1.1%, meanwhile in 6 other marzes such HH-s are missing. The main reason of not heating the apartment was the scarcity of financial resources, like previous year. Besides, some HH-s did not heat the apartment because of not living there during the heating season.

Similarly to previous years, in 2010-2011 heating season, HH-s applied a secondary heating option along with the primary one. In Figure 4, usage of secondary heating sources by primary ones is illustrated.

Figure 4. Secondary energy sources by main energy source in 2010-2011 heating season, % in HH-s heating with particular option



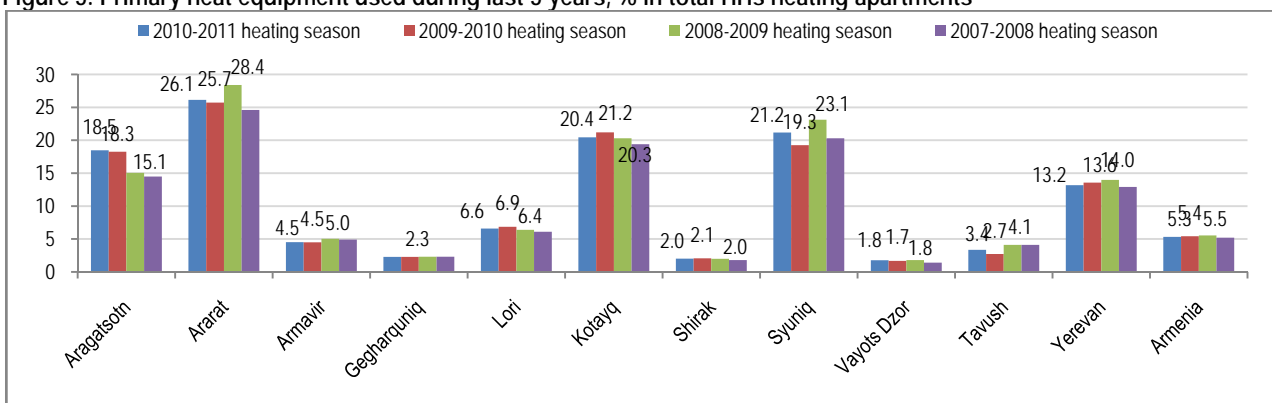
Source: AHS (2011)

26.1% of HH-s, that heated their apartments during the heating season (that is, applied some primary heating source), used also an electricity as a secondary heating option, 11% used natural gas and 1.7% used firewood with the same objective. 45.7% of HH-s, that applied electricity as a primary energy source, also used natural gas, and 2.6% used also firewood.

Almost one third of HH-s that heated their apartments mainly with gas, also used electricity, and 1.5% used firewood as a secondary heating option. It is worth mentioning, that electricity was the only secondary heating option for HH-s, that used other heating source (72.1% of those HH-s). The overall picture did not notably change compared to previous year.

During recent years, usage of self-made gas heaters has continuously decreased, making 0.9% in 2010-2011, and in 2006-2007 it made 1.9% (Figure 5). This was a progress, as self-made gas heaters are rather unsecure heating devices. However, this year, the usage of this device increased again, making 1.3%. The same picture is for firewood furnaces: in 2010-2011 heating season, 5.5% of HH-s heated their apartments with this device (4.1% in previous year).

Figure 5. Primary heat equipment used during last 5 years, % in total HHs heating apartments



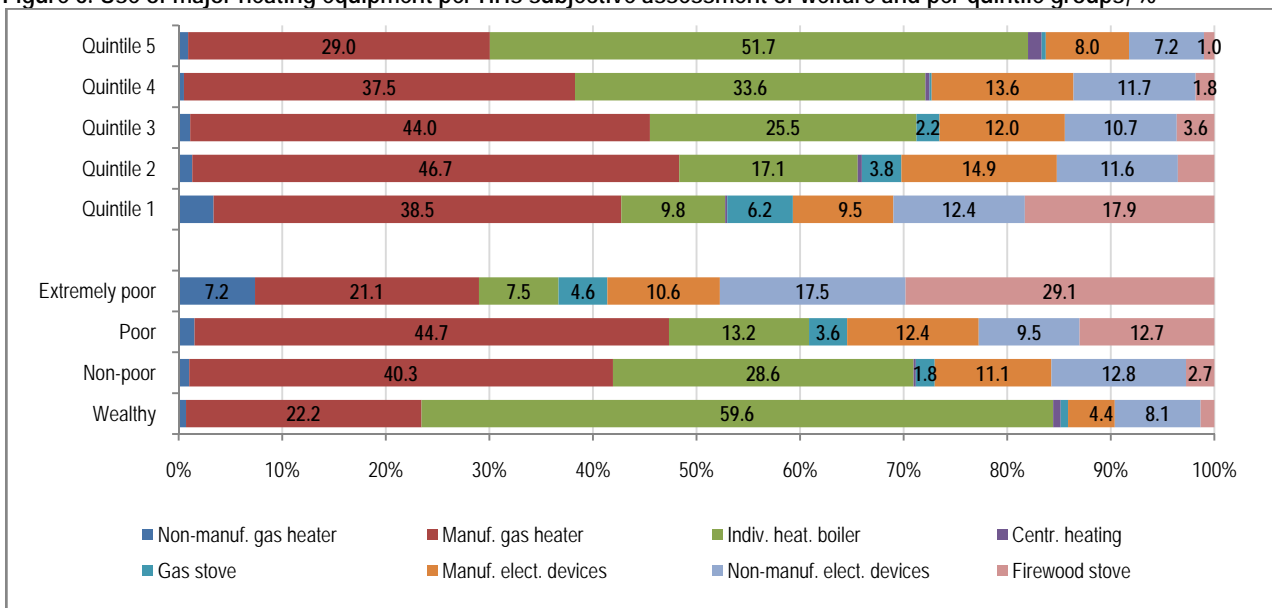
Source: AHS (2011), AHS (2010), AHS (2009) and AHS (2007)

During 2006-2009, usage of manufactured gas heaters has continuously increased. However, during last two years, the portion of HH-s, heating with those devices, slightly decreased, making 38.6% in 2010-2011 heating season. One can conclude, that those devices have been considered as ineffective ones by HH-s. The only device usage of which has continuously increased during last 5 years, was individual heating boiler. This year, it was used by 28.1% of HH-s, which was about 5.6 times more than in 2006-2007. This fact comes to prove that the mentioned heating appliance still remains effective and preferable.

In 2010-2011 heating season, usage of manufactured electric devices also increased, making 11.7% (10.5% in previous year).

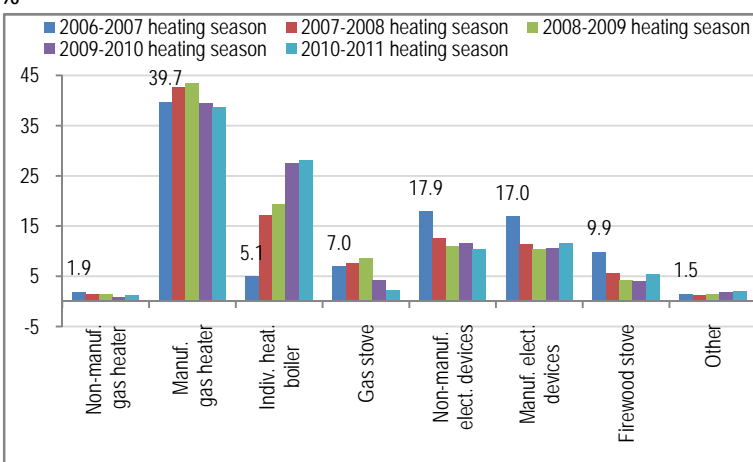
Usage of heating devices changes by different quintile groups and by subjective assessment of HH-s on their social conditions. Thus, individual heating boilers, which require more expenditures, are mostly used in the group of HH-s with highest revenues (consumption), 51.7%, and among wealthy HH-s, 59.6%. In parallel with revenue decline, this portion is decreasing, making 9.8% among HH-s in Quintile 1, and in 7.5% of HH-s that assessed themselves extremely poor.

Figure 6. Use of major heating equipment per HHs subjective assessment of welfare and per quintile groups, %



Source: AHS (2011)

Figure 7. Options used for hot water (including bathing) during last 5 years, %

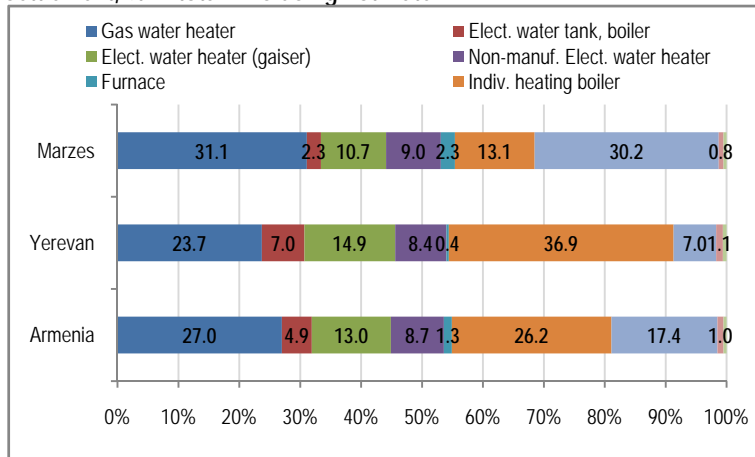


Source: AHS (2011), AHS (2010), AHS (2009), AHS (2007)

Figure 7 illustrates main devices of heating water for domestic usage (including bath) for previous 5 years. During recent years, the number of HH-s that heated water with individual heating boilers has increased and made 26.1% in 2010-2011 heating season. There is an obvious trend of decline in the number of HH-s heating water with self-made immersion heaters, firewood furnace and gas stove. All those devices have been substituted with individual heating boilers and gas water heaters, though the usage of the latter decreased in 2010-2011 heating season, making 27% against the 28.7% of 2007-2008 heating season. The

usage of devices for getting hot water is significantly different in Yerevan and marzes (Figure 8).

Figure 8. Major equipment for heating water (including bathing) per settlement, % in total HHs using hot water



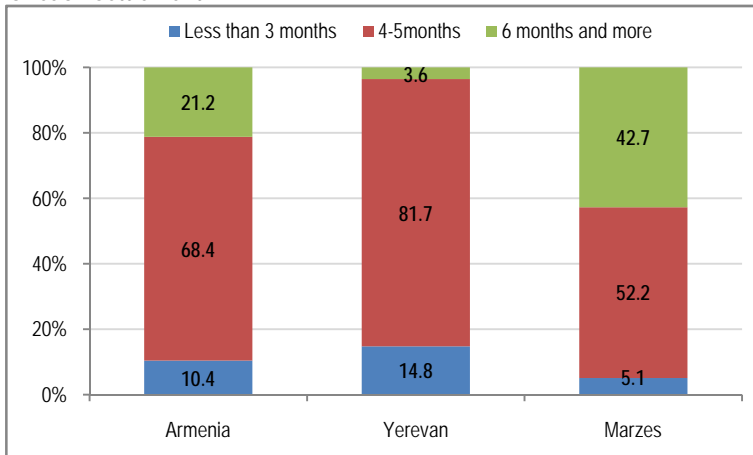
Source: AHS (2011)

In Yerevan, more advanced options (individual heating boilers, electric devices (gaysers) and gas water heaters) are mostly used. HH-s, heating water with individual heating boilers, made 36.9% in % in erevan, and 13.1% in marzes. In marzes, one third of HH-s got hot water with gas stove, and 2.3% with firewood furnace. Meanwhile in Yerevan, the mentioned two options are used by accordingly 7% and 0.4% of HH-s. The usage of self-made electric devices is did not varied much by residence.

Chapter 2. Duration of the Heating Season

Average duration of heating season remained almost the same. HH-s, that heated their apartments for 4-5 months, made 68.4%, against the 66.6% of previous year, and the share of HH-s, that heated less than 3 months, decreased by 1.9 percentage points, making 10.4% (Figure 9). In marzes, the share of HH-s, that heated more than 6 months, decreased compared to previous year. This can be explained by comparably mild winter and HH-s' saving behavior. Like previous year in Yerevan, the portion of HH-s that heated less than 3 months exceeded the same indicator in marzes, and the portion of HH-s, that heated more than 6 months, was less than in marzes.

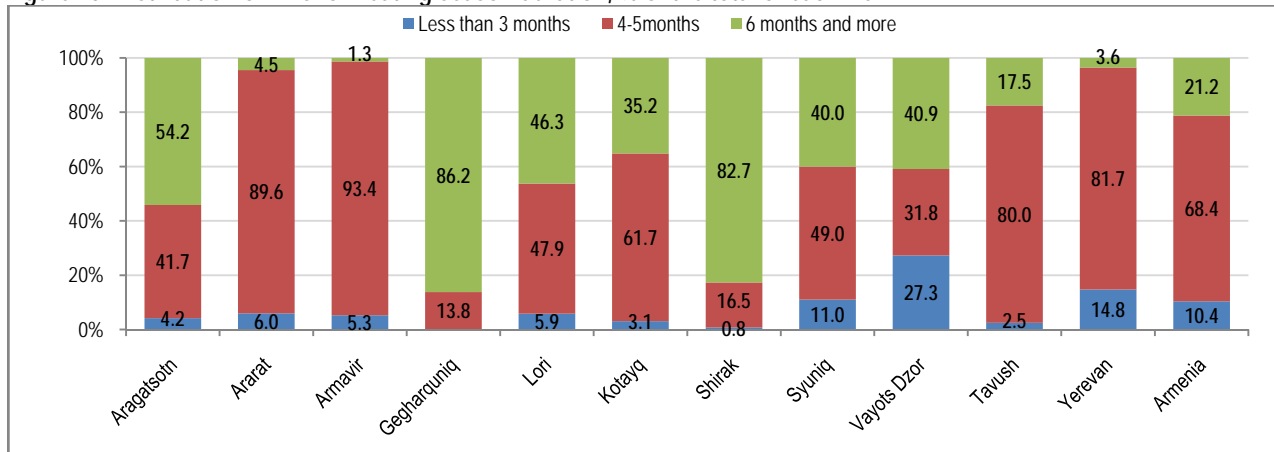
Figure 9. Distribution of HHs for heating season duration, % of the total for each settlement



Source: AHS (2011)

Heating season duration varied by marzes, which is logical taking into consideration climate differences. Similarly to previous year, HH-s that heated more than six months, were mostly in Gegharquniq and Shirak marzes, accordingly 86.2% and 82.7% of HH-s. In Yerevan, Ararat and Armavir marzes HH-s mainly heated for 4-5 months.

Figure 10. Distribution of HHs for heating season duration, % of the total of each Marz

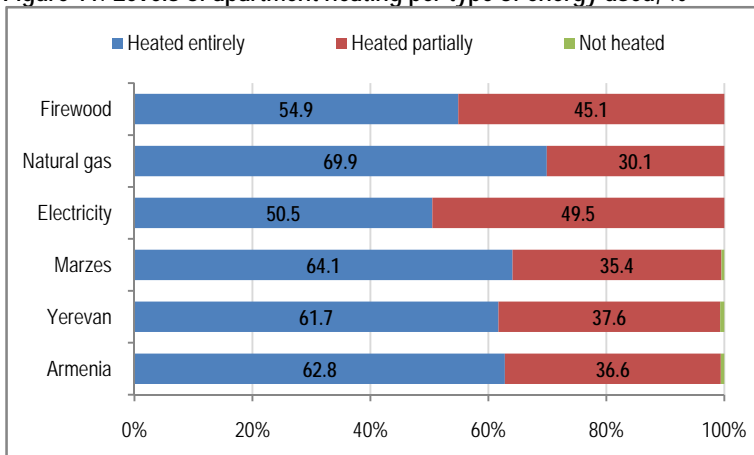


Source: AHS (2011)

27.3% of HH-s in Vayots dzor marz and 14.8% of HH-s in Yerevan heated less than 3 months. Like previous year, such HH-s were missing in Gegharquniq marz.

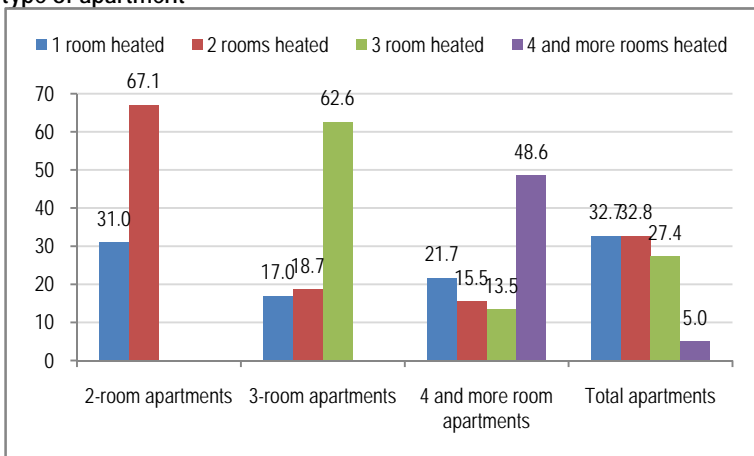
Chapter 3. Heated Area

Figure 11. Levels of apartment heating per type of energy used, %



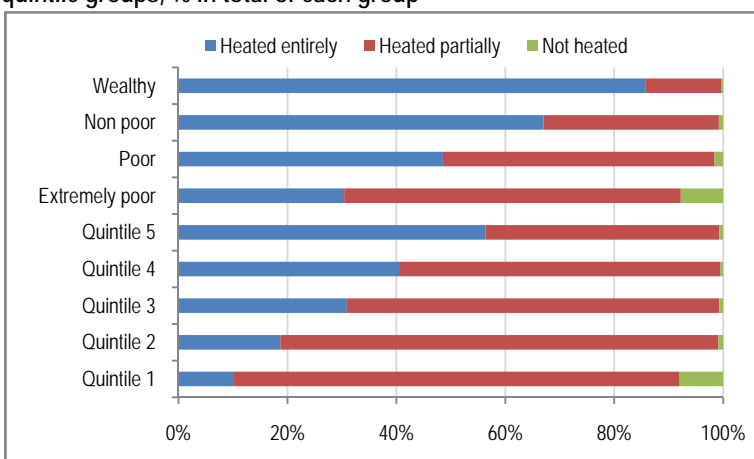
Source: AHS (2011)

Figure 12. Number of heated rooms per total number of rooms, % in each type of apartment



Source: AHS (2011)

Figure 13. Apartment heating entirety per self-assessment of poverty and quintile groups, % in total of each group



Source: AHS (2011)

In 2010-2011 heating season, HH-s that heated their apartment entirely, made 62.8%, decreasing by 6.6% from previous year (Figure 11). In 2010-2011, unlike previous year, in Yerevan, the portion of HH-s that heated their apartments entirely was less than in marzes, accordingly 61.7% and 64.1%.

Apartment heating entirely varied by applied heating option. In particular, 70% of HH-s that heated with natural gas, had entirely heated apartments. This is mainly due to the fact that 40% of HH-s heating with gas have individual heating boilers, and with this appliance all rooms in apartments are usually heated. The picture was the same in previous year.

Figure 12 represents entirety of apartment heating by the number of rooms. Thus, 67.1% of apartments, having two rooms, and 62.6% apartments, having three rooms, were heated entirely. And 48.6% of apartments having four and more rooms were heated entirely.

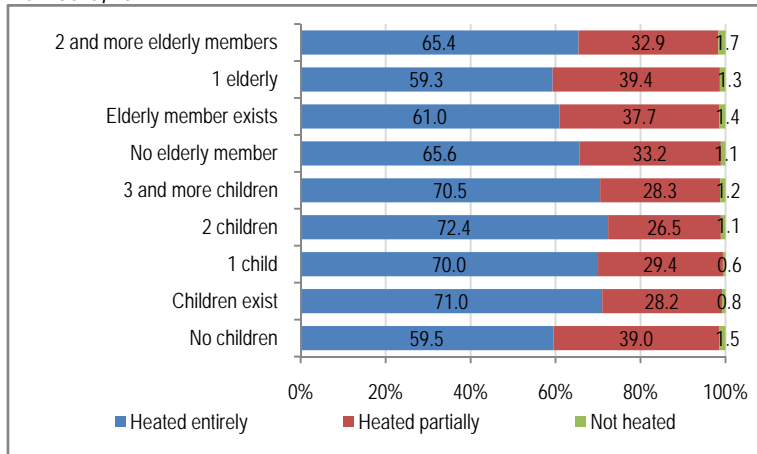
As one can see, it is harder to heat bigger apartments entirely due to financial and technical issues.

85.7% of HH-s, that considered themselves as wealthy, heated their apartments entirely, meanwhile only 30.4% of HH-s, that were extremely poor according to their own subjective assessment, could ensure entire heating. The same trend exists among different quintile groups: in Quintile 5, 56.4% of HH-s entirely heated their apartments, meanwhile only 10.2% in Quintile 1. Share of HH-s that could ensure entirety of apartment heating is rising along with revenue increase.

71% of HH-s, having children, heated apartments entirely, meanwhile the same indicator had a value of 59.5% among HH-s without children.

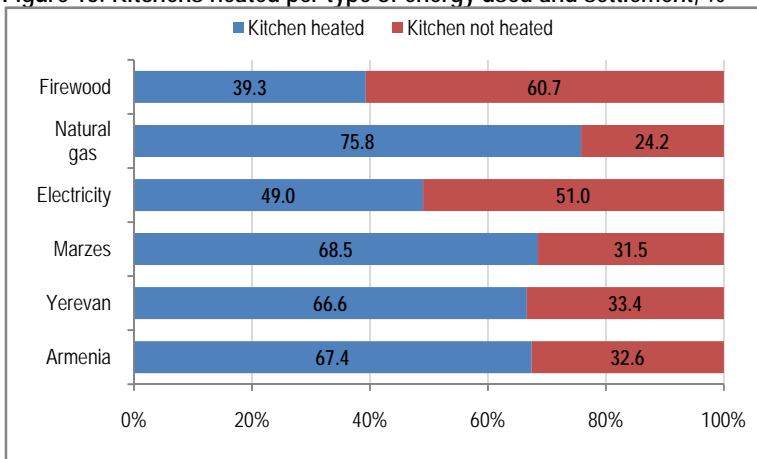
This can be conditioned with the fact that children are more sensitive to apartment temperature, and therefore their requirements for heating conditions is different. The level of apartment heating entirety was the same in apartments were

Figure 14. Heating entirety depending on having children and elderly HH members, %



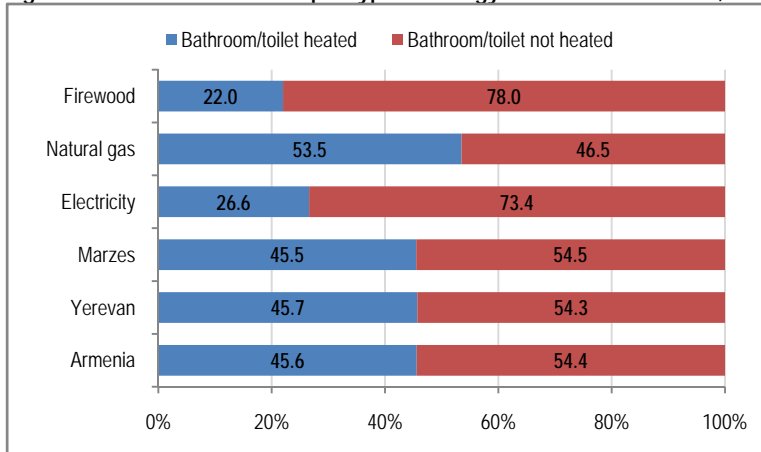
Source: AHS (2011)

Figure 15. Kitchens heated per type of energy used and settlement, %



Source: AHS (2011)

Figure 16. Bathrooms heated per type of energy used and settlement, %



Source: AHS (2011)

1 child and more than 3 children were living, with an exception that 1.2% of HH-s with more than 3 children did not heat the apartment at all, meanwhile with HH-s with one child this indicator had twice smaller value.

61% of HH-s with elderly members heated their apartments entirely. Unlike them, entirety of apartment heating was ensured by 65.6% of HH-s without elderly members.

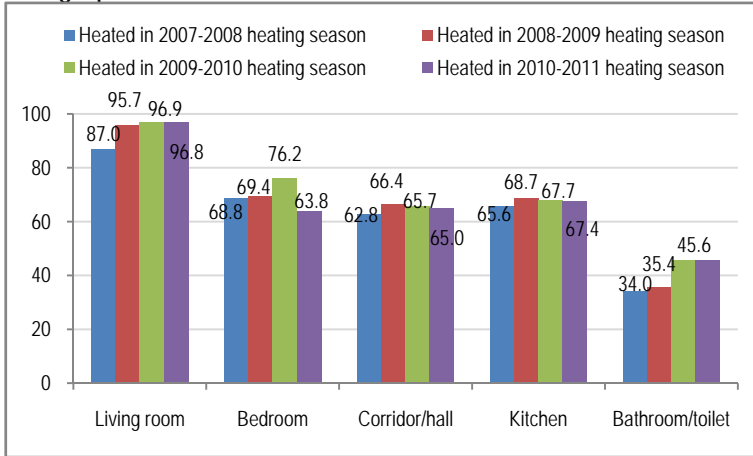
Heating of kitchen and bathroom (lavatory) can be considered as another characteristics describing heating conditions of apartments. In 2010-2011 heating season, 67.4% of HH-s heated kitchen. There was a small change compared to previous year (67.7%).

In Yerevan and marzes, the share of HH-s, that heated kitchen, varies by 2 percentage points, accordingly 66.6% in Yerevan and 68.5% in marzes. Unlike this, the value of this indicator varies by applied heating device. In particular, the kitchen was heated in 75.8% of apartments heated with natural gas, and in 39.3% of apartments heated with firewood.

This can be explained by the fact that with individual heating boilers the kitchen is usually heated, and with gas stove, as a main heating option, the kitchen is heated by default (and for both those devices natural gas is the energy source).

In 45.6% of HH-s, bathroom was heated, and like the case of kitchens, this indicators value does not vary by residence and varies by applied heating devices.

Figure 17. Apartment rooms heating during last 4 winters, % in apartments having a particular room

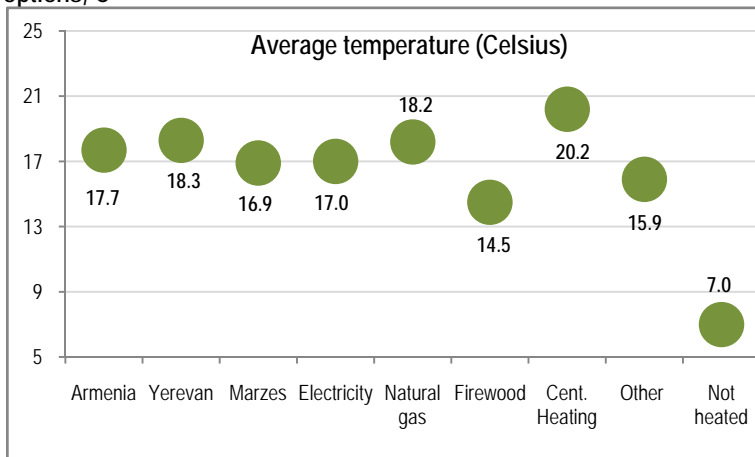


Source: AHS (2011), AHS (2010), AHS (2009) and AHS (2007)

53.5% of HH-s, that heated with natural gas, heated the bathroom, and this indicator had values of 22% and 26.6% in apartments heated with electricity and firewood accordingly. During last 3 years, the number of HH-s that heated living room, bedrooms and bathroom, has continuously increased. However, in 2010-2011 heating season, this portion slightly decreased: as it was mentioned above, the share of HH-s that heated their apartments entirely, decreased compared to previous year.

Chapter 4. Average Temperature

Figure 18. Average temperature in January per settlement and heating options, C°



Source: AHS (2011)

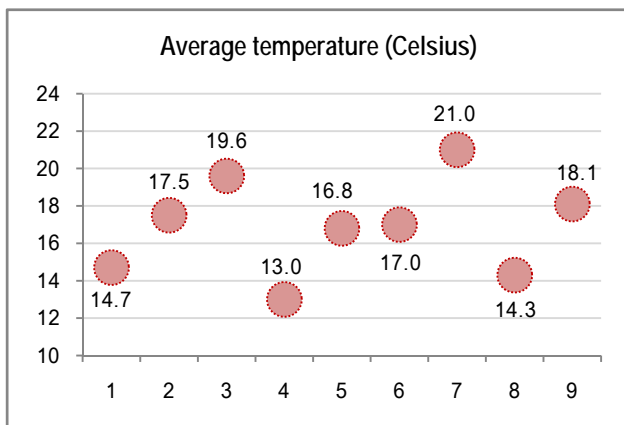
In this heating season, average temperature in apartments was 17.7°, a little bit lower than in previous year, 17.9°. In Yerevan, average temperature in apartments during heating season was lower than those of marzes and republic average, making 18.3°.

The highest temperature was ensured in apartments, that had central heating, 20.2°, though this heating option was used only by 0.5% of HH-s. The worst heating conditions, related to average temperature, were in apartments, heated with firewood: average temperature was 14.5°.

Average temperature in apartments, that were not heated at all, was 7°. Average

temperature in apartments depended on the heating devices (Figure 19).

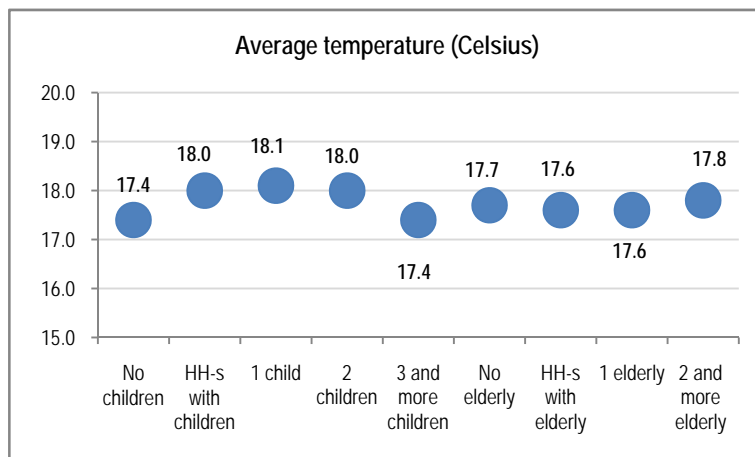
Figure 19. Average temperature per heating equipment type, C°



- | | |
|------------------------------|--|
| (1) Self-made gas heater | (6) Manuf. elec. devices |
| (2) Manufactured gas heater | (7) Cent. heating and local-coll. heating boiler |
| (3) Indiv. heating boiler | (8) Firewood furnace |
| (4) Gas stove | (9) Other |
| (5) Non-manuf. elec. devices | |

Source: AHS (2011)

Figure 20. Average temperatures depending on having children or elderly, C°



Source: AHS (2011)

Average temperature with centralized heating and local-collective heating boiler was 21°, and with individual heating boilers it was 19.6°. Gas stove and firewood furnaces were the most ineffective heating options (13° and 14.3° accordingly). Average temperature was low in apartments that were heated with self-made gas heaters, 14.7°. This is because of ineffectiveness of heating devices and low level of HH-s revenues (HH-s saved on heating).

Figure 20 illustrates average temperature in apartments of HH-s with/without children and elderly members.

Figure 21. Average temperatures per quintiles, C°

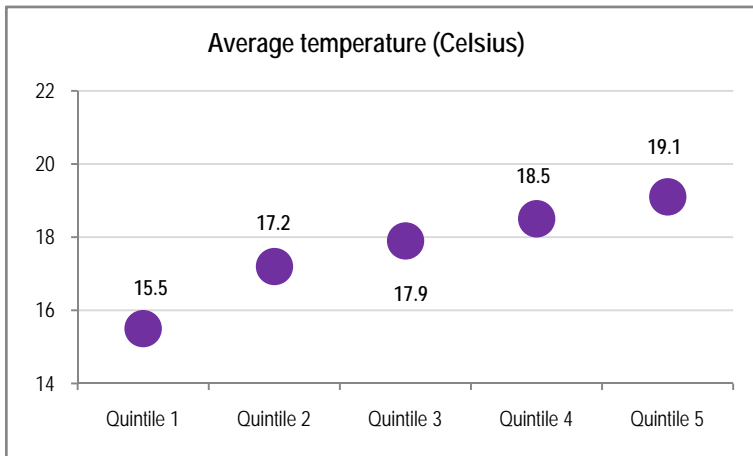
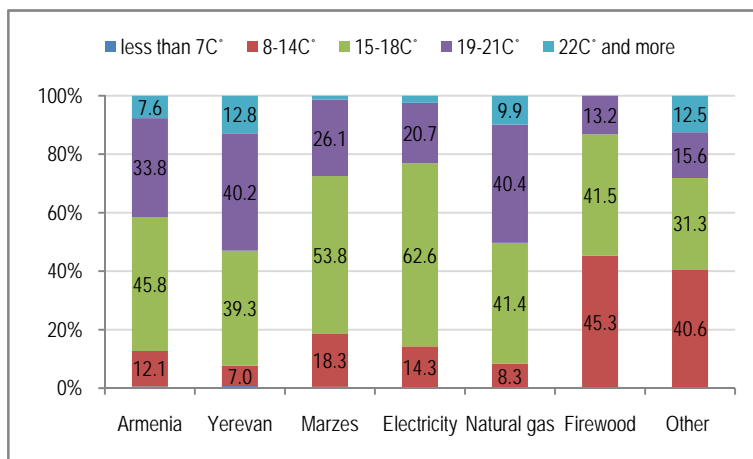


Figure 22. Apartment temperature groups distribution by localities and energy sources used, %



Source: AHS (2011)

In apartments, where children were living, an average temperature was higher than in those without children (18° and 17.4° accordingly). However, it is worth mentioning that the temperature in apartments, where 3 and more children lived, was the same as in those ones where no child lived.

Average temperature in apartments where no elderly people lived was 17.7°, almost the same as in those with elderly members.

As it was analysed in previous chapters, heating conditions in apartments mainly depended on HH-s revenue (consumption) level. In apartments of HH-s in the highest revenue group (Quintile 5), average temperature was 19.1° meanwhile in apartments of HH-s in Quintile 1 it was 15.5°.

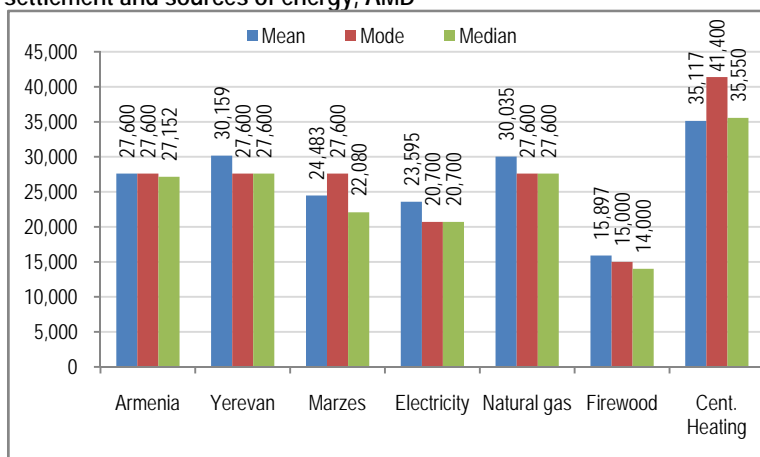
In 53% of apartments in Yerevan, and in 27.4% of apartments in marzes, average temperature was more than 19°.

At that, average temperature was more more than 19° in 50.3% of HH-s, heating with natural gas. In no apartment, heated with firewood, there was very warm.

It is worth mentioning that HH-s, with 22° and more temperature in their apartments, were mostly in a group that heated with some other appliance, as that group includes HH-s having central heating.

Chapter 5. Expenditures on Heating and Hot Water

Figure 23. Average monthly expenditures on heating and hot water per settlement and sources of energy, AMD



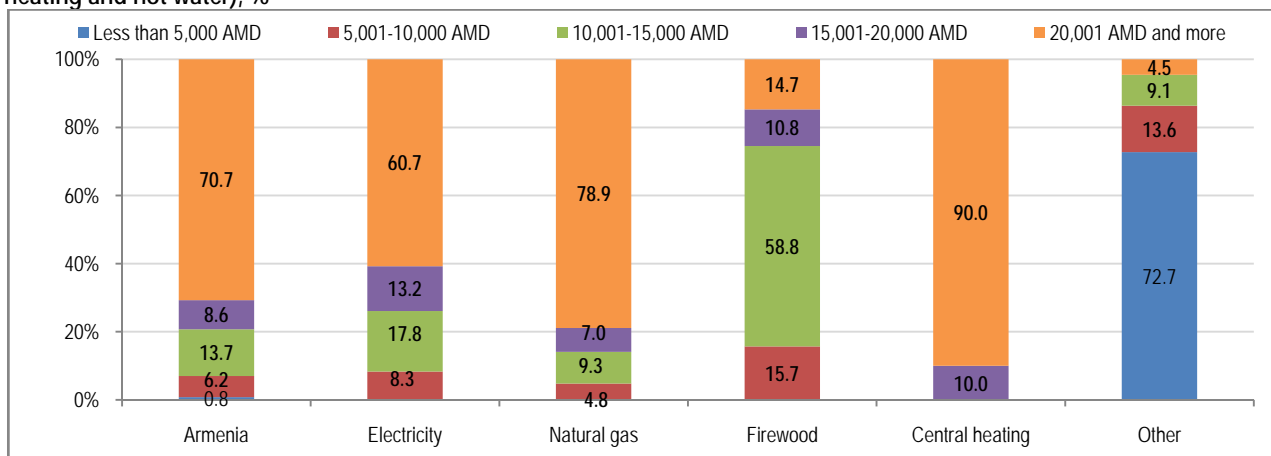
Source: AHS (2011)

making 15,897 AMD against 14.625 AMD of previous year.

In 2010-2011 heating season, average expenses on heating was 27,600 AMD, which increased by 39.5% compared with previous year. Expenses increased both in Yerevan and marzes (Figure 23).

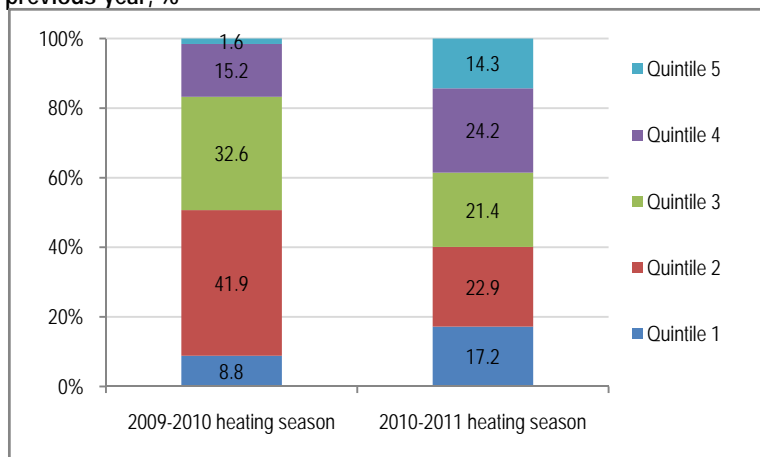
HH, that had centralized heating, paid in average 35,117 AMD monthly. Expenses of HH-s, that heated with natural gas, made about 30,000 AMD, which was 39% more than expenses in previous year, 21,539 AMD. Electricity was a comparably cheaper energy source. In comparison with previous year, expenses of HH-s, that heated with firewood, also increased,

Figure 24. Distribution of HHs in monthly expenditure groups per energy sources (average monthly expenditures on heating and hot water), %



Source: AHS (2011)

Figure 25. HH-s Heating with electricity by quintile groups in 2010-2011 and previous year, %

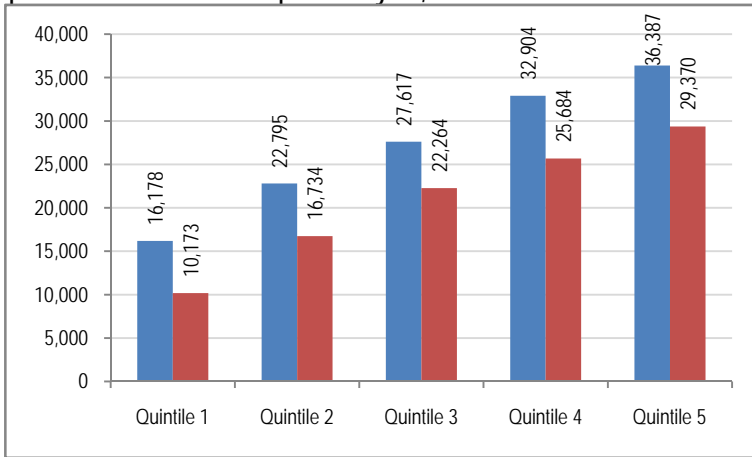


Source: AHS (2011) and AHS (2010)

In 2010-2011 heating season, about 70.7% of HH-s spent more than 20,000 AMD on heating, meanwhile in previous year, share of HH-s with similar expenses were 37.5%. Average expenses with centralised heating was not lower than 15,000 AMD: 10% of those HH-s spent in average 15,000-20,000 AMD, and the remaining 90% spent 20,000 AMD and more.

60.7% of HH-s, that heated with electricity, spend 20,000 AMD and more monthly, and 26.1% spent less than 10,000 AMD. Expenses of those HH-s on heating increased from previous year, and as there was no change in electricity tariffs during

Figure 26. Average monthly expenditures on heating and hot water per quintiles in 2010-2011 and previous year, AMD

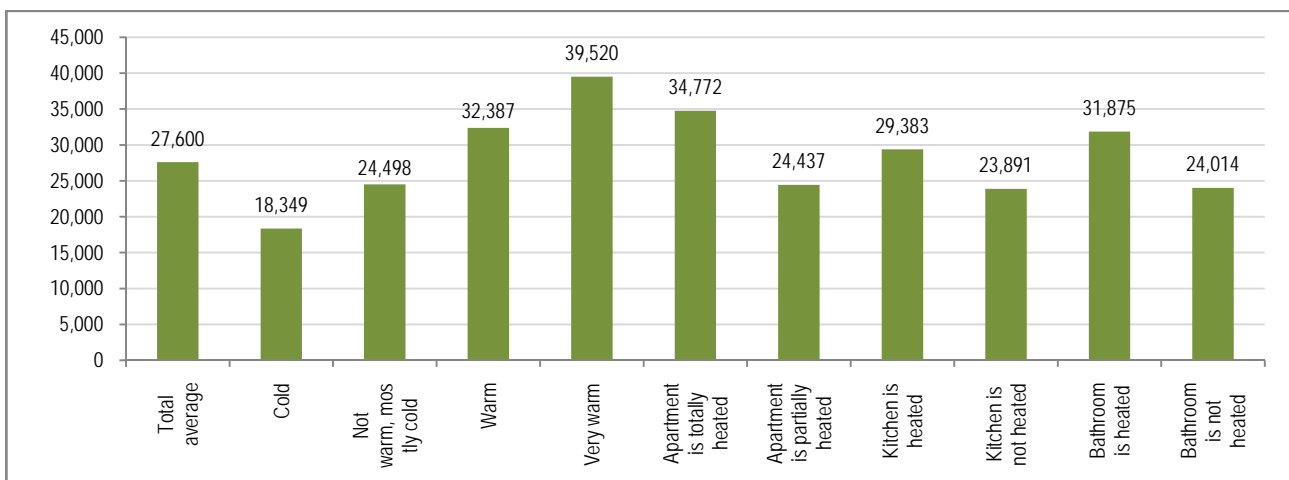


Source: AHS (2011)

Expenses on heating increased in all quintile groups as compared with previous year. HH-s in Quintile 5 monthly spent 36,387 AMD in average, meanwhile in Quintile 1 this amount was 16,178 AMD. Expenses in each quintile groups increased by 5,000-6,000 AMD in average.

HH-s, that had different temperature in apartment, spent different amount on heating. In particular, HH-s who could ensure high temperature (22° and more) in apartments, spent 39,520 AMD in average, meanwhile HH-s with cold apartments (8°-14°) spent 18,349 AMD.

Figure 27. Average monthly expenditures on heating and hot water per groups of HHs that heat partially or entirely, heat bathroom and kitchen, and temperature groups, AMD



Source: AHS (2011)

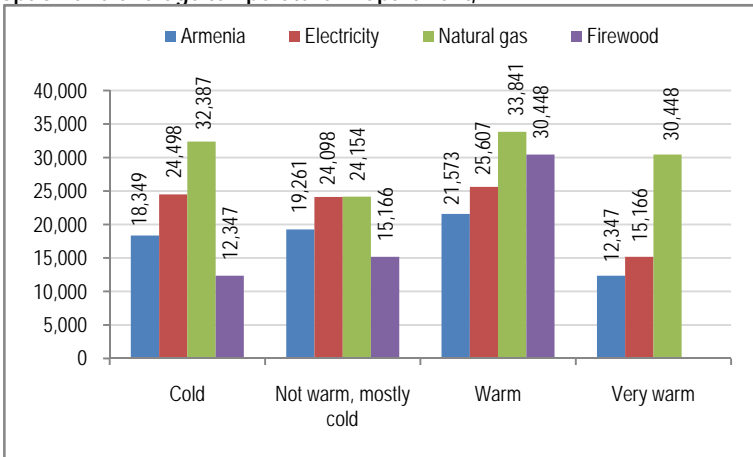
HH-s, that heated their apartments entirely, spent 34,772 AMD on heating in average. HH-s, that heated kitchen and bathroom, spent 29,383 AMD and 31,875 AMD accordingly, and those HH-s, that did not heat the mentioned parts of apartments, spent 23,891 AMD and 24,014 AMD accordingly.

Expenses of HH-s with different temperature in their apartments were different. In particular, HH-s, that heated with electricity and average temperature in their apartments was 22° and higher, spent 31,543 AMD in average monthly. To ensure the same warmth with natural gas, HH-s spent 40,101 AMD. It is worth mentioning that, as it was discussed above, 40% of HH-s, heating with electricity, are in Quintile 4 and Quintile 5. Those HH-s are wealthy, windows in their apartments are in good conditions (euro-windows), besides, those HH-s can afford to implement energy saving activities, such as thermo isolation of external walls. All this helps to keep high temperature in apartments with comparably low expenses.

2010, this increase can be explained differently. In particular, distribution of HH-s (that heated with electricity) in different quintile groups changed.

50.7% of HH-s, that heated with electricity, were in the two lowest revenue groups, and only 16.8% were in Quintile 4 and Quintile 5. This year, the picture changed. 38.5% of HH-s, that applied electricity, were in the two most wealthy quintiles, and 40.1% were in Quintile 1 and Quintile 2. As the continuous study of expenses on heating shows, HH-s in the higher quintile groups spent more money on heating.

Figure 28. Average monthly expenditures on heating and hot water per heat option and average temperature in apartment, AMD

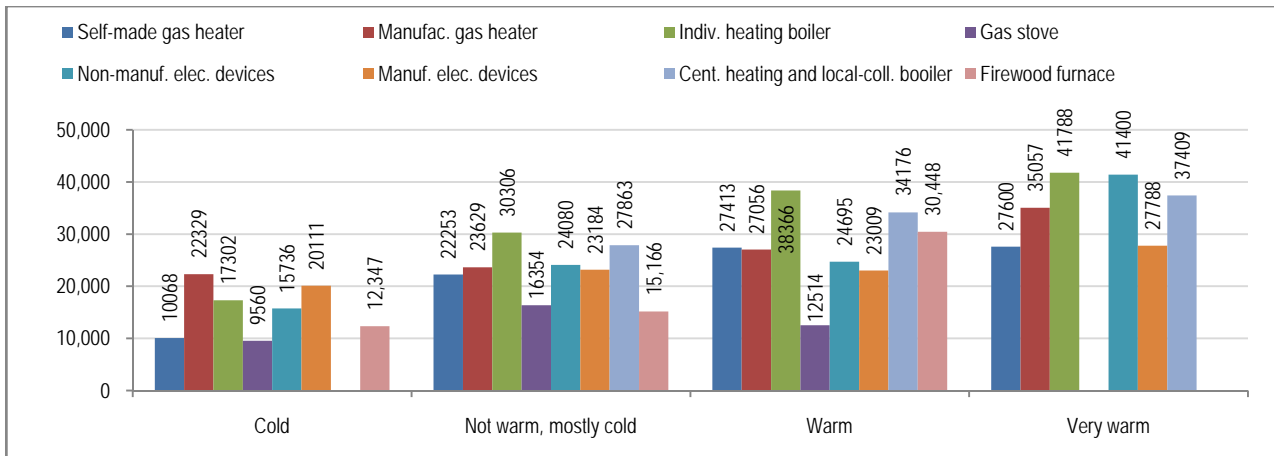


Source: AHS (2011)

In those apartments where the temperature did not exceed 15° and were heated with natural gas or electricity, HH-s spent 21,573 AMD and 19,261 AMD accordingly. HH-s that heated with firewood and the temperature in their apartments was 15°-19°, spent 30,448 AMD in average.

Figure 29 illustrates expenditures of HH-s by heating devices. Among HH-s with very warm apartments the highest expenses were made by HH-s that heated with individual heating boilers, 41,788 AMD, and by those HH-s that had centralised heating and local-collective boilers, 41,400 AMD for each. In apartments that were heated with firewood the temperature did not exceed 22°.

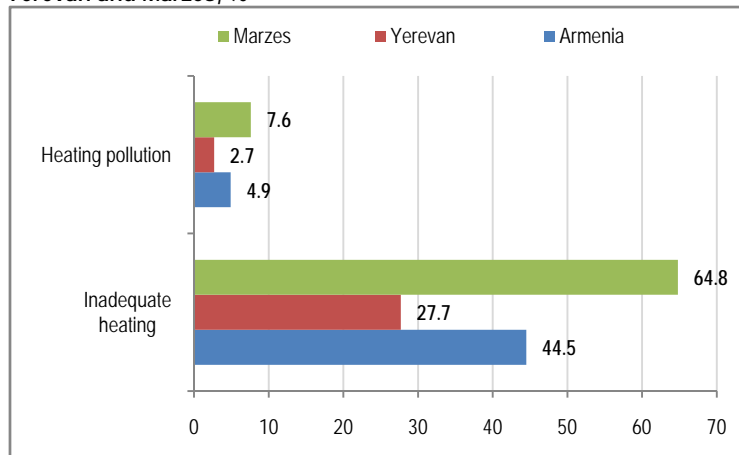
Figure 29. Average monthly expenditures on heating and hot water per heat appliance types and average temperature, AMD



Source: AHS (2011)

Chapter 6. Illness due to heating conditions

Figure 30. Illness due to insufficient heating and heating pollution in Yerevan and Marzes, %

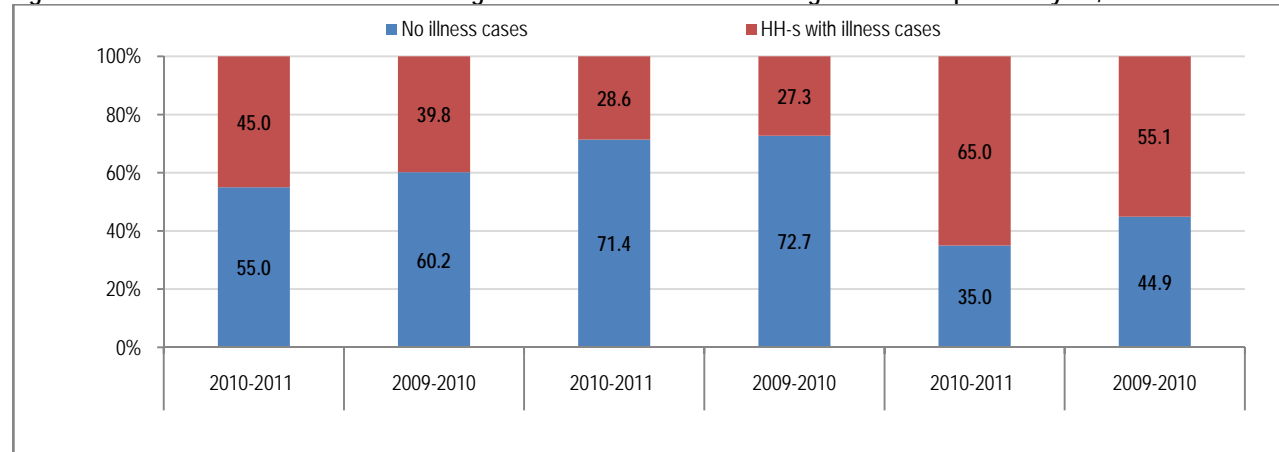


Source: AHS (2011)

In 44.5% of HH-s, there were illness cases due to insufficient heating, and in 4.9% there were illness cases caused by heating pollution. At that, illness cases in marzes were more frequent than in Yerevan.

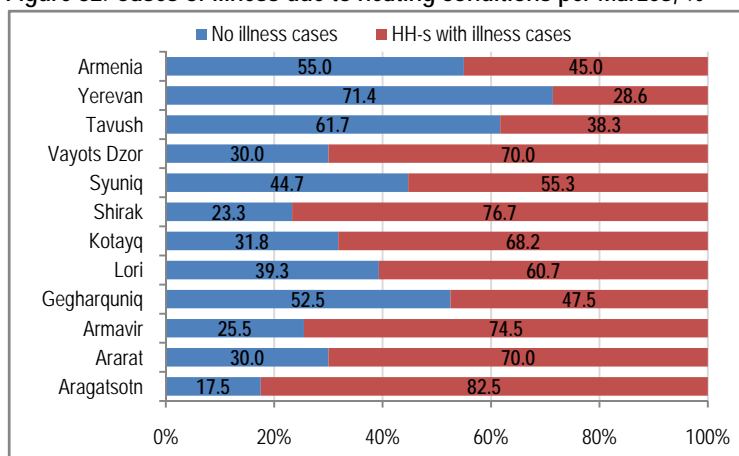
In comparison to previous year, illness cases in HH-s caused by heating conditions (insufficient heating and heating pollution) increased. This year, those HH-s made 45% against 39.8% of previous year.

Figure 31. Illness cases in HHs due to heating conditions in 2010-2011 heating season and previous year, %



Source: AHS (2011) and AHS (2010)

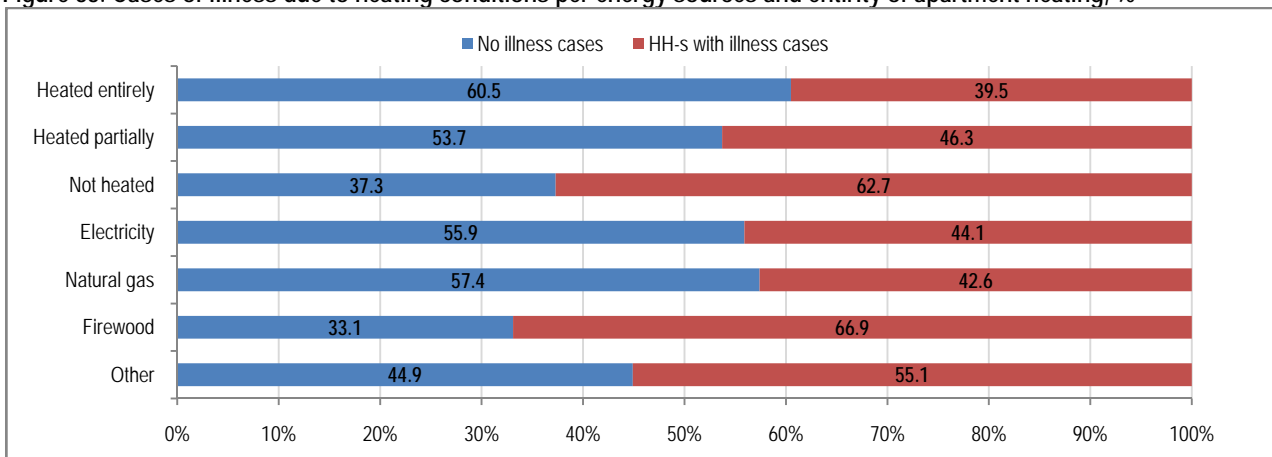
Figure 32. Cases of illness due to heating conditions per Marzes, %



Source: AHS (2011)

In Yerevan, level of illness increased by 1.3 percentage points, meanwhile in marzes it increased by 9.9 percentage points. Figure 32 presents illness cases caused by heating conditions by marzes. Level of illness was comparably high in Aragatsotn and Shirak marzes, in 82.5% and 76.7% of HH-s accordingly. In Tavush marz, at least one case of illness occurred in 38.3% of HH-s. 39.5% of HH-s, that heated the apartment entirely, recorded illness cases, meanwhile 62.7% of HH-s that did not heat the apartment had at least one illness case due to heating conditions.

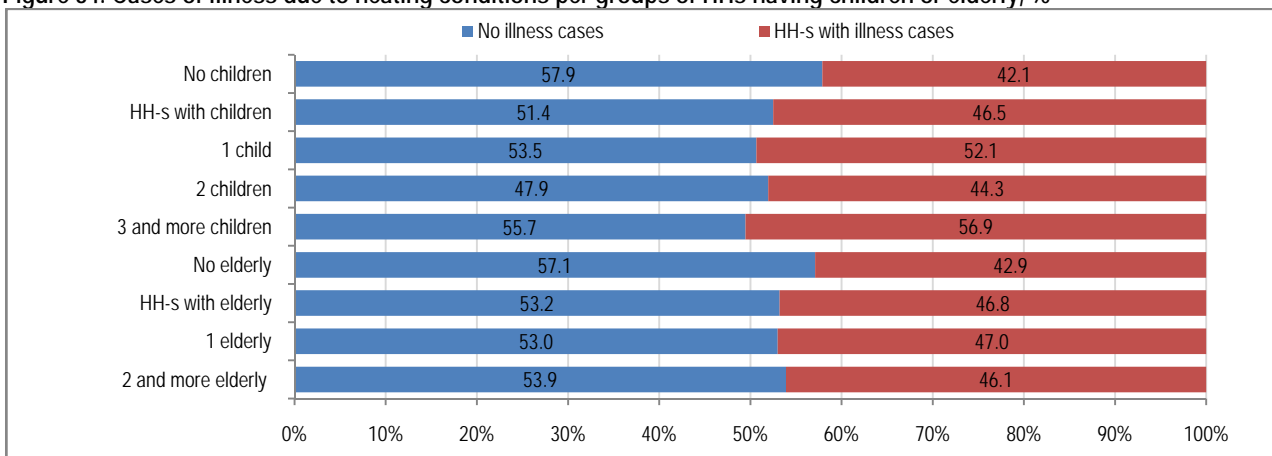
Figure 33. Cases of illness due to heating conditions per energy sources and entirety of apartment heating, %



Source: AHS (2011)

Illness cases were more frequent in HH-s that heated with firewood, and less frequent in HH-s, that applied natural gas as main energy source (66.9% and 42.6% accordingly). As children and elderly members are more sensitive to the heating conditions, in HH-s where they existed, level of illness was higher (Figure 34).

Figure 34. Cases of illness due to heating conditions per groups of HHs having children or elderly, %

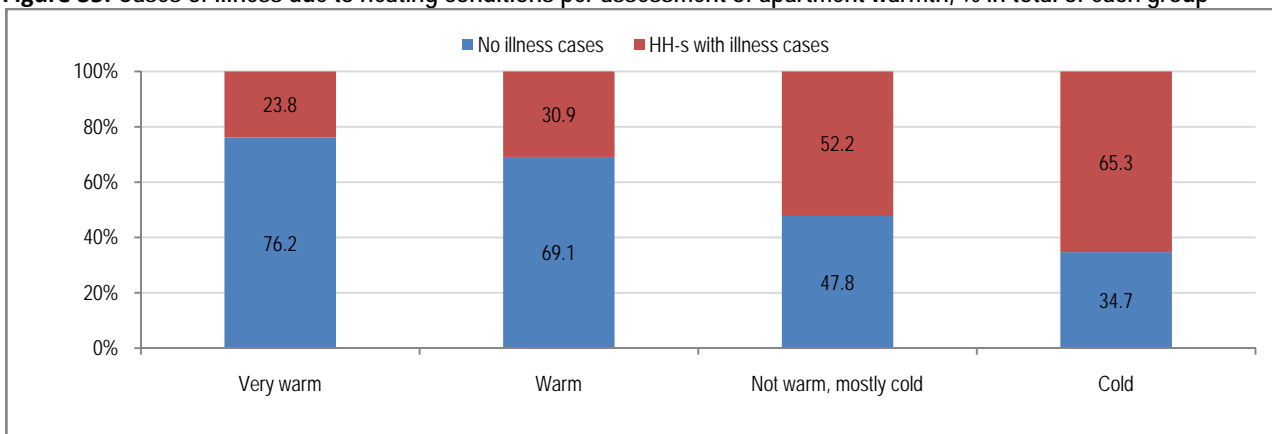


Source: AHS (2011)

46.5% of HH-s, having children, and 42.1% of HH-s without children recorded at least one illness case caused by heating conditions. 46.8% of families without elderly members had illness cases.

HH-s who could ensure 22° and more in their apartments and had illness cases made 23.8% (23.9% in previous year), and HH-s, that lived in cold apartments (up to 15°) and had illness cases made 65.3%.

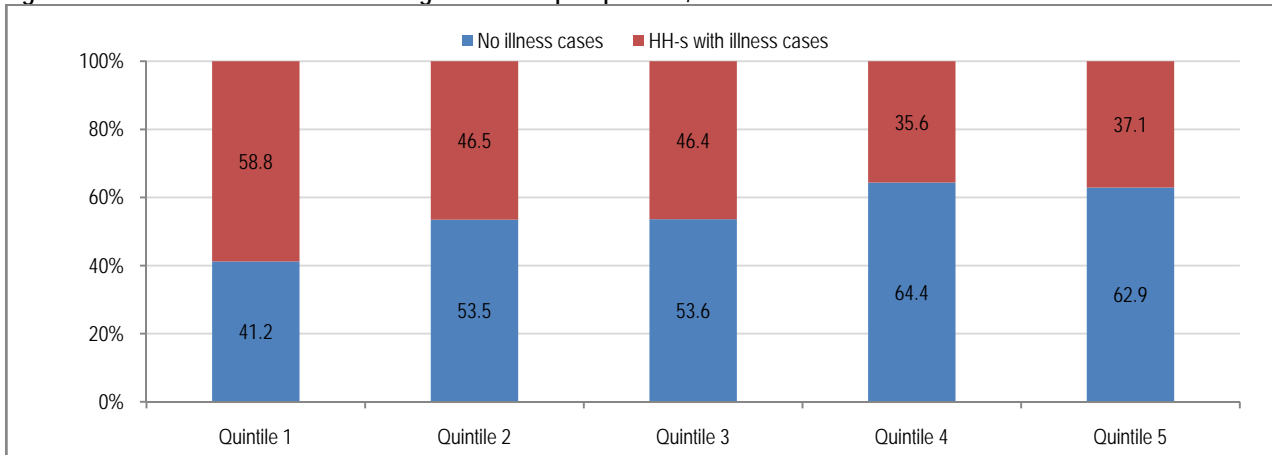
Figure 35. Cases of illness due to heating conditions per assessment of apartment warmth, % in total of each group



Source: AHS (2011)

Number of illness cases decreased along with apartment average temperature decline. The same trend exists in quintile groups (except for Quintile 5). 58.8% of HH-s in Quintile 1 had illness cases, meanwhile 37.1% of HH-s in Quintile 5 (Figure 36).

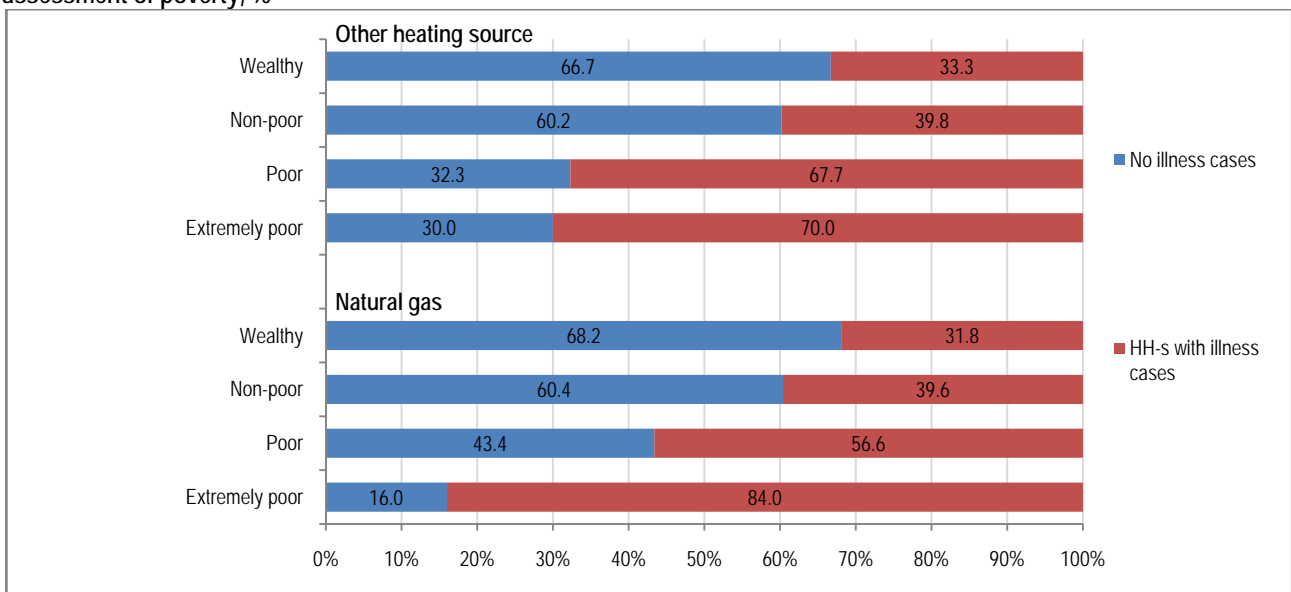
Figure 36. Cases of illness due to heating conditions per quintiles, %



Source: AHS (2011)

HH-s that considered themselves wealthy and heated with natural gas had lower illness level than those with other heating options, 31.8% and 33.3% accordingly.

Figure 37. Cases of illness due to heating conditions in HHs heating with natural gas and other options per self-assessment of poverty, %

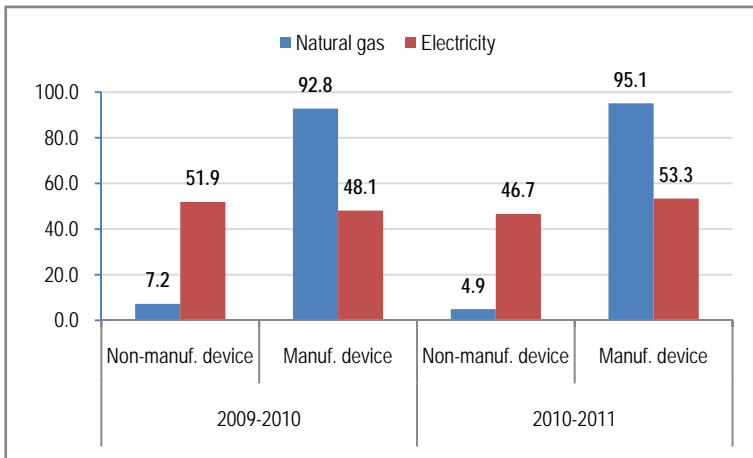


Source: AHS (2011)

84% of extremely poor HH-s (by subjective assessment of HH-s), that heated apartment with natural gas, and 70% that used other heating option, had illness cases. This situation can be explained in a way that mentioned HH-s, heating with natural gas, could not afford enough heating due to high gas tariffs, and thus could not ensure sufficient temperature.

Chapter 7. Moving Towards Safe and Clean Heating

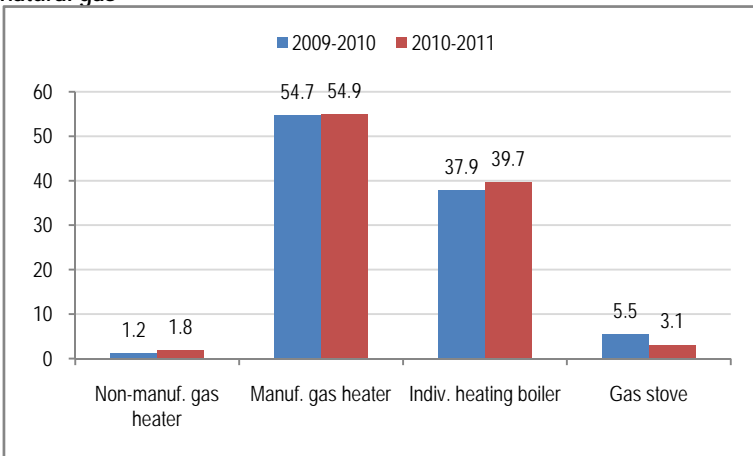
Figure 38. Usage of manufactured and non-manufactured devices by HH-s heating with electricity and natural gas in 2009-2010 and 2010-2011 heating seasons, %



Source: AHS (2011) and AHS (2010)

Among HH-s, heating their apartments with electricity or natural gas, the trend of shifting from non-manufactured and self-made heating devices to more secure and clean manufactured appliances maintains. In comparison with previous year, usage of manufactured gas and electric heating devices increased by 2.3 and 5.2 percentage points accordingly. In parallel, usage of non-manufactured devices decreased.

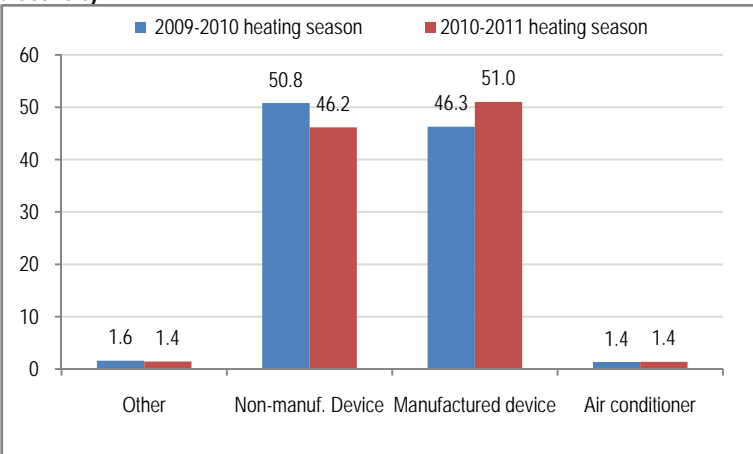
Figure 39. Usage of heating devices by HH-s, % in HH-s that heated with natural gas



Source: AHS (2011) and AHS (2010)

Level of heating with gas stove among HH-s, that use natural gas as a primary energy source, decreased, making 3.1% against 5.5% of previous year, and instead, usage of gas heaters and individual heating boilers increased by 0.2 and 1.8 percentage points accordingly.

Figure 40. Usage of heating devices by HH-s, % in HH-s that heated with electricity



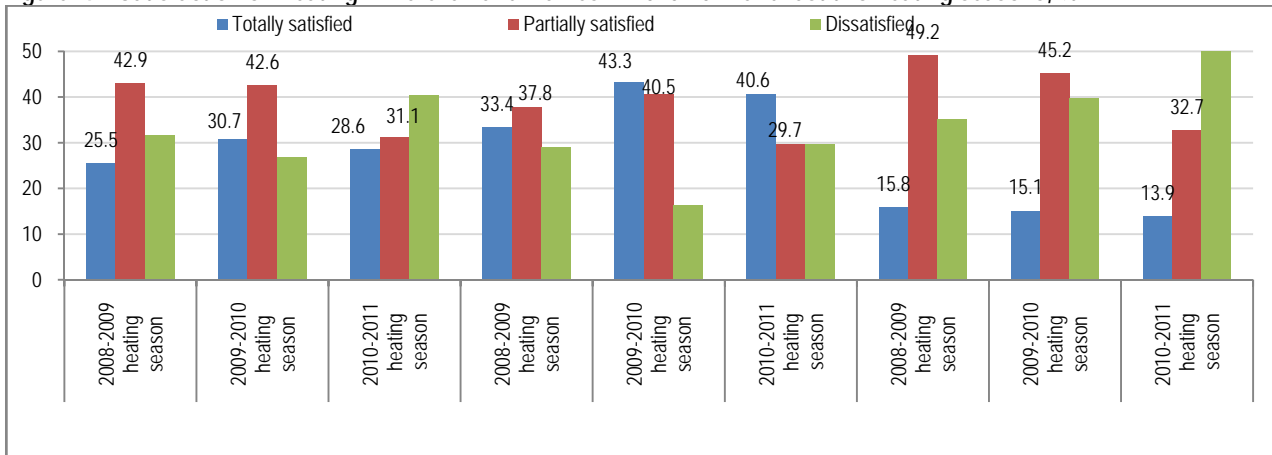
Source: AHS (2011) and AHS (2010)

This year, usage of manufactured devices by HH-s, that heated with electricity, decreased as compared to previous heating season, making 51%, thus exceeding usage of non-manufactured appliances, which was 46.2%.

Chapter 8. Satisfaction and Preferences

This year, satisfaction from heating conditions in apartments was lower as compared to previous year. 28.6% of HH-s were completely satisfied from heating conditions, which was less by 2.1 percentage points compared to previous year. The share of HH-s, partially satisfied from heating, has continuously declined, making 21.1% this year, meanwhile those HH-s made 42.6% in 2009-2010 (Figure 41).

Figure 41. Satisfaction on heating in Yerevan and Marzes in 2010-2011 and last two heating seasons, %



Source: AHS (2011), AHS (2010) and AHS (2009)

Figure 42. Satisfaction on heating conditions per heating devices, %

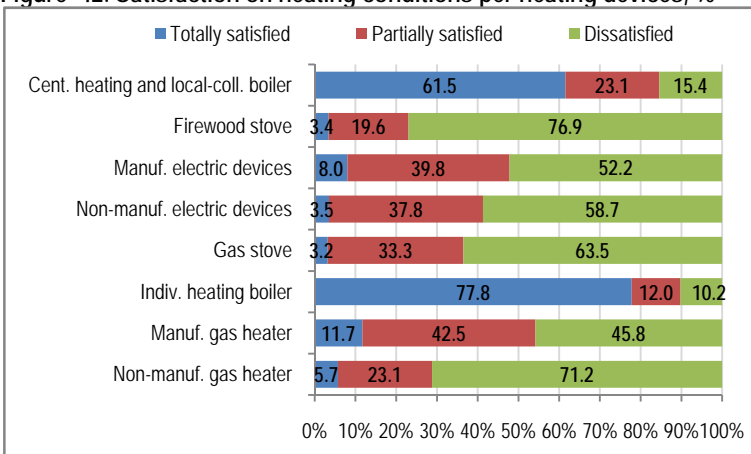
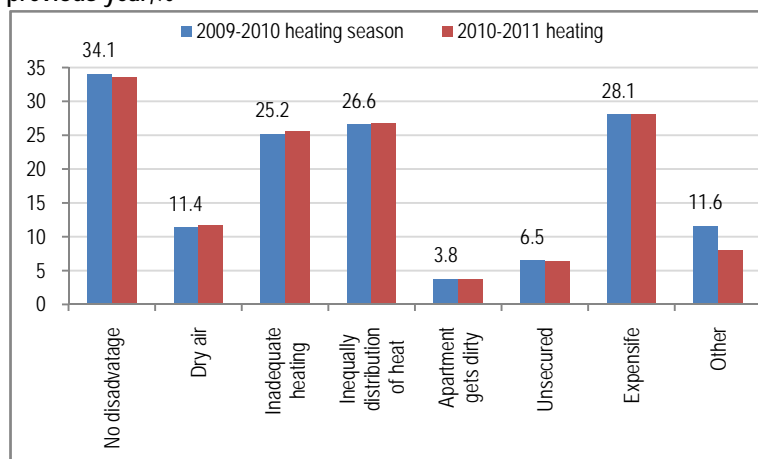


Figure 43. Estimates of disadvantages of heat options in 2010-2011 and previous year, %



Source: AHS (2011) and AHS (2010)

Similarly to previous years, satisfaction from heating conditions was especially low in marzes. Completely satisfied HH-s made 13.9%, meanwhile 53.3% of HH-s were completely dissatisfied. In Yerevan, level of satisfaction was higher of than in marzes. Besides, it was higher than the republic average. HH-s, that were completely satisfied from heating conditions, made 40.6%, decreasing by 2.7 percentage points from previous year.

Satisfaction on apartment heating conditions varied significantly by applied heating devices. HH-s, heated with central heating and individual heating boilers and being completely satisfied made 61.5% and 77.8% accordingly, meanwhile the same indicator had values of 3.4% and 3.2% in case of heating with firewood furnace and gas stove accordingly.

71.2% of HH-s, that heated with self-made gas heater, were completely dissatisfied from heating conditions.

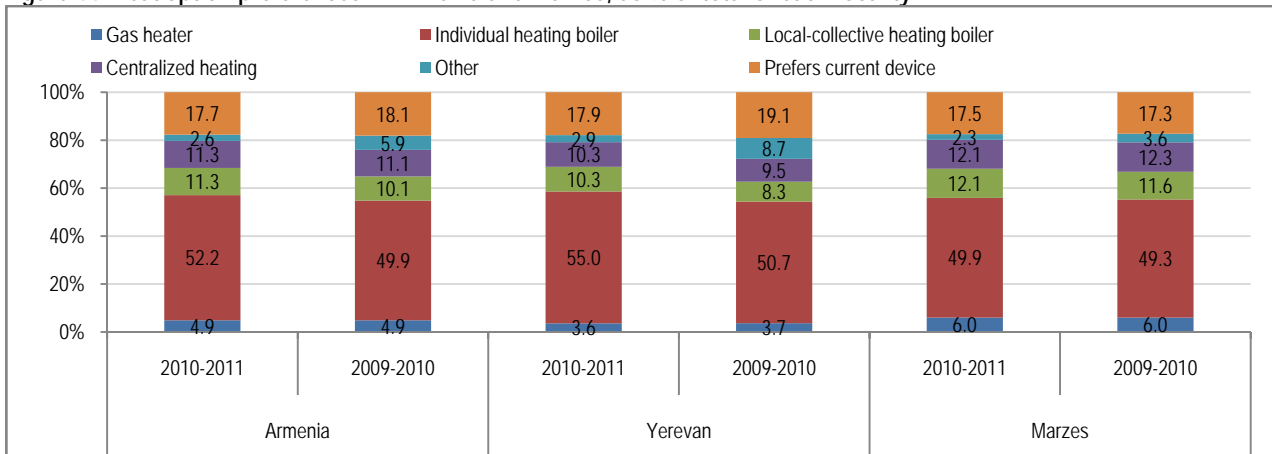
Like previous year, satisfaction from manufactured and non-manufactured electric devices was almost the same: completely satisfied HH-s made 8% and 3.5% accordingly, and dissatisfied HH-d

made 52.2% and 58.7% accordingly.

In comparison with previous year, HH-s distribution by disadvantages of heating ddevices applied by them remained almost unchanged. In particular, 33.6% of HH-s mentioned no disadvantages of the current heating device (34.1% in previous heating season). 28.1% of HH-s, as a disadvantage of the applied heating option, mentioned that it was expensive. And 26.8% mentioned that the heat was distributed inequally.

The Figure 44 illustrates some other heating device preferences of HH-s in 2010-2011 and previous heating seasons. 17.7% of HH-s would like to go on using the current device. Similarly to previous year, the most preferable heating option is the individual heating boiler, for 52.2% of HH-s. At that, this option was preferable for 55% of HH-s in Yerevan and 49.9% of HH-s in marzes.

Figure 44. Heat option preferences in Armenia and Marzes, as % of total of each locality

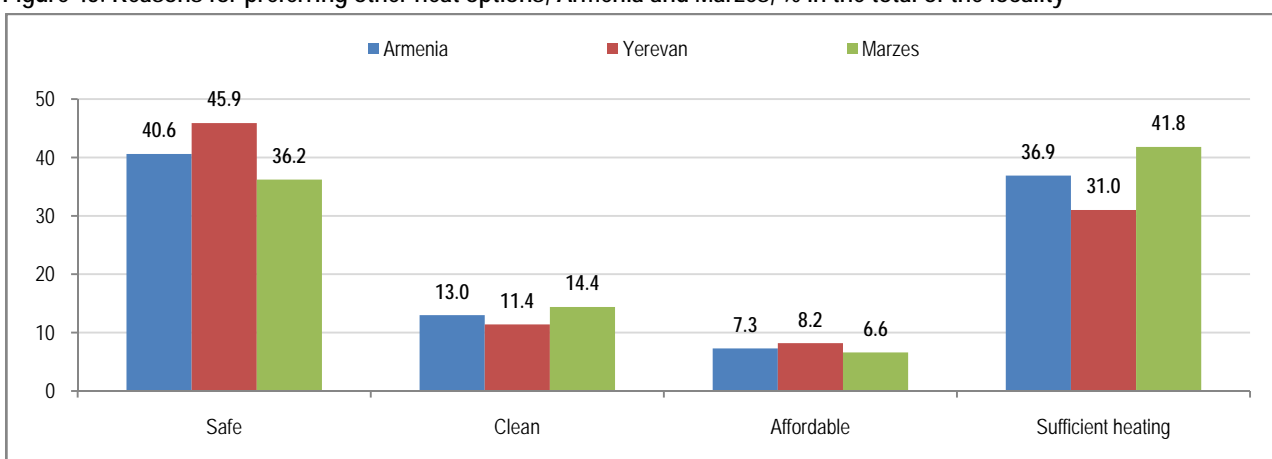


Source: AHS (2011) and AHS (2010)

This year, the number of HH-s, that would like to have a central heating and local-collective boilers, increased, making 11.3% and 10.3% accordingly. The share of HH-s, preferring manufactured gas heaters, was the same as in previous year, 4.9%. In general, the population in Armenia seeks for more advanced (secure and clean) heating options year by year.

Below, the main reasons of giving preference to this or that heating option are presented. The main features of preferred devices are safety (for 40.6% of HH-s) and ability to ensure sufficient warmth (for 36.9% of HH-s).

Figure 45. Reasons for preferring other heat options, Armenia and Marzes, % in the total of the locality

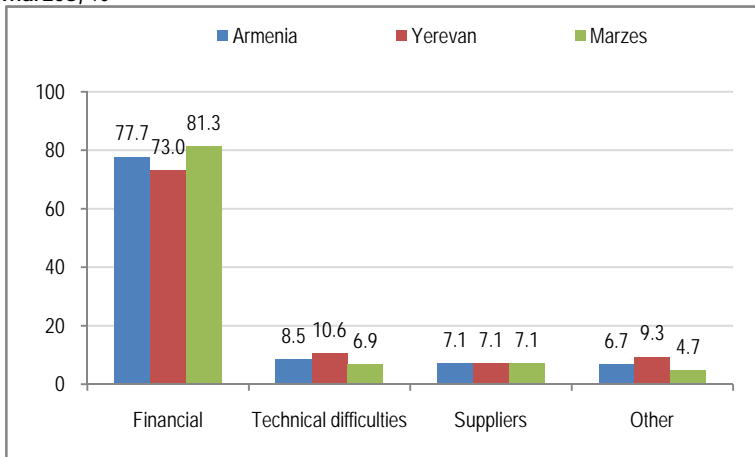


Source: AHS (2011)

According to 13% of HH-s, the heating device that was preferable for them, was cleaner, and 7.3% of HH-s thought that the preferable device was more affordable.

Safety of the heating device was of more importance in Yerevan than in marzes, and the picture is the opposite in case of the ability of the device to ensure sufficient warmth in apartments.

Figure 46. Main reasons of not using preferred heating options in Yerevan and marzes, %



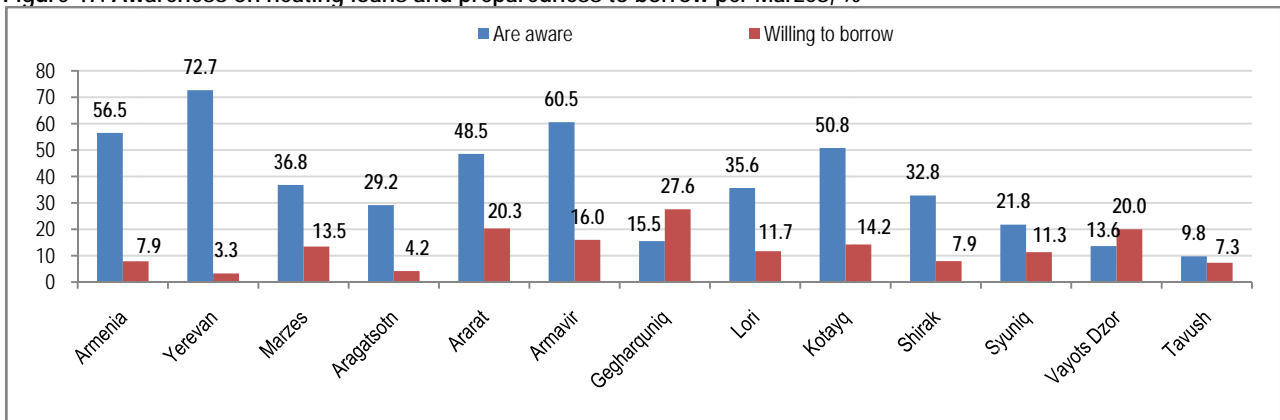
Source: AHS (2011)

The main obstacle for HH-s to obtain a desirable heating device was the scarcity of financial resources (for 77.7% of HH-s that gave preference to any other appliance). This issue is more complicated in marzes: for 81.3% of HH-s. Apart from financial issues, HH-s also mentioned technical barriers (8.5%) and lack of suppliers (7.1%). 6.7% of HH-s mentioned some other reasons.

Chapter 9. Possibilities for Improving Heating and Social Cooperation

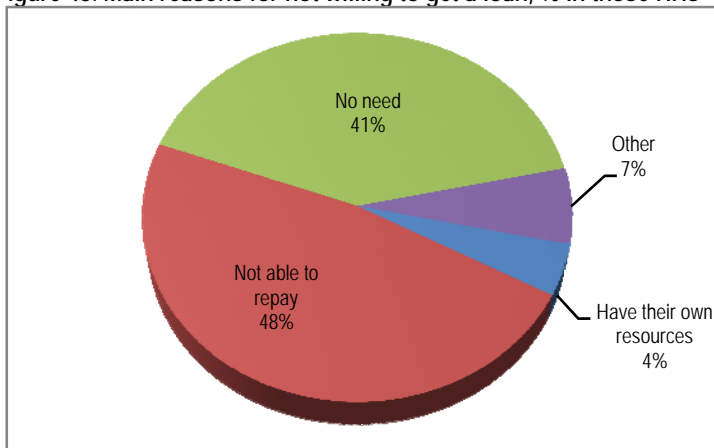
57% of HH-s in Armenia were aware that they could loan for improving apartment heating. However, only 7.9% of HH-s would like to borrow (Figure 47).

Figure 47. Awareness on heating loans and preparedness to borrow per Marzes, %



Source: AHS (2011)

Figure 48. Main reasons for not willing to get a loan, % in those HHs



Source: AHS (2011)

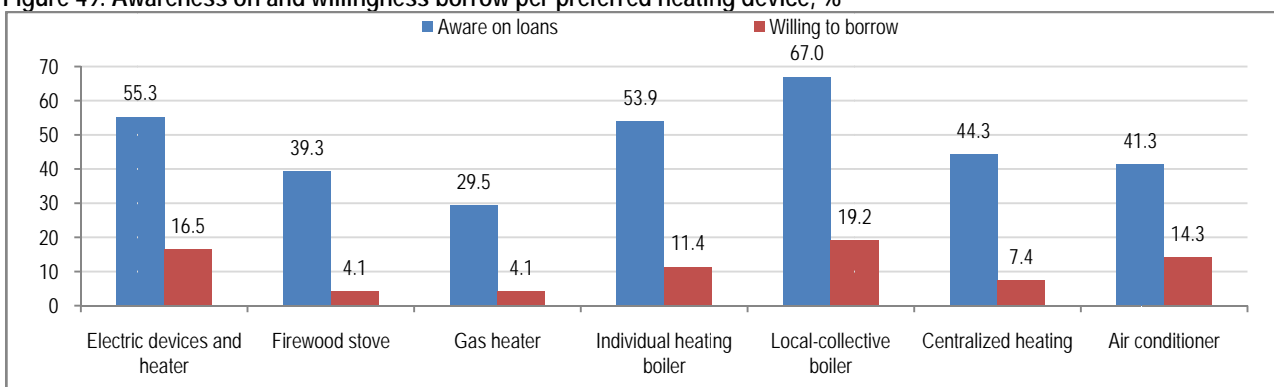
Awareness of loans was especially high in Yerevan (72.7% of HH-s) and it was rather low in Tavush and Vayots dzor marzes, 9.8% and 13.6% accordingly. Despite high level of awareness, readiness and willingness to borrow was the lowest in Yerevan, 3.3%, and the highest one was in Gegharkuniq marz, 27.6%.

The main reasons why HH-s did not want to borrow was inability to repay for the loan and lack of necessity. 41% of HH-s with no wish to borrow mentioned that they did not need a loan, and 48% emphasized the inability to repay. The picture was almost the same in

previous year.

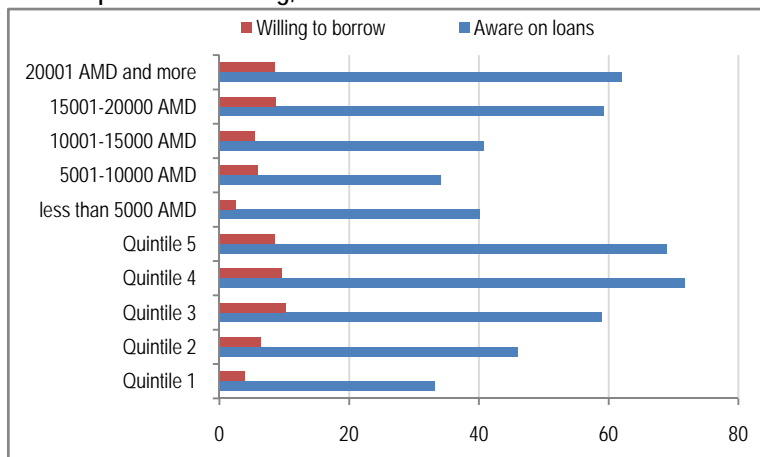
Below, in Figure 49, awareness of HH-s of loans and their willingness to borrow by the preferable heating devices are presented. HH-s that were preferred individual heating boiler and were aware of loans made 67%, and those with the same preferences, that would like to borrow, made 19.2%. 53.9% of HH-s that would like to heat the apartment with individual heating boiler were aware of loan possibilities, however, only 11.4% of the HH-s with the same preferences would like to borrow.

Figure 49. Awareness on and willingness borrow per preferred heating device, %



Source: AHS (2011)

Figure 50. Awareness on loans and readiness to borrow per quintiles and actual expenses on heating, %



Source: AHS (2011)

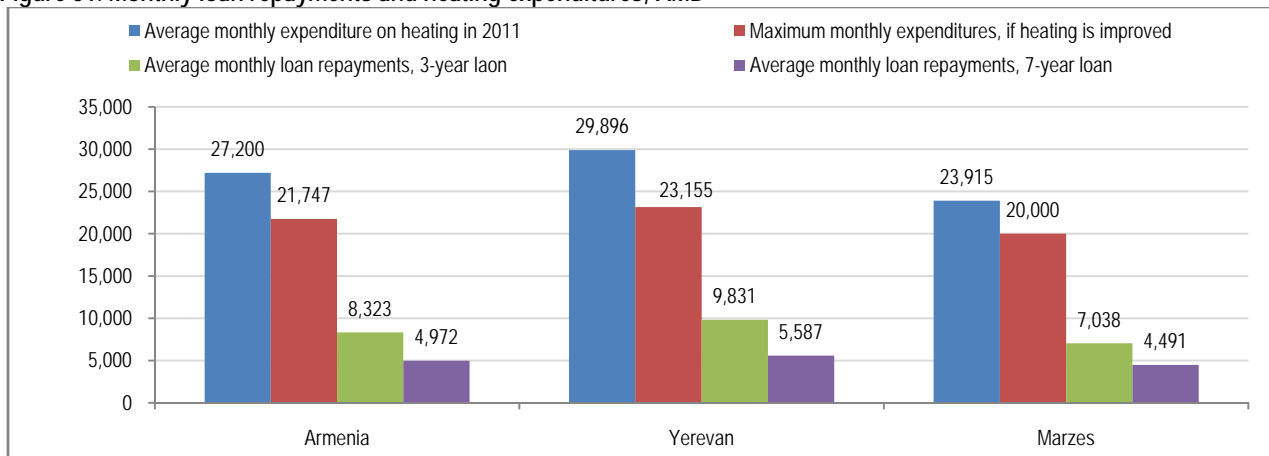
Awareness of loans and willingness to borrow were especially low among HH-s who preferred gas heater (29.5% and 4.1% of those HH-s accordingly). Awareness of loans and willingness to borrow did not change much as compared to previous year.

Level of awareness and willingness to borrow were high in two highest groups by expenses on heating. 59.3% of HH-s that spent 15,001-20,000 AMD and 62% of HH-s, that spent 20,000 AMD and more were aware of loans, and accordingly 8.7% and 8.6% of those HH-s expressed willingness to borrow.

Level of awareness was the lowest in 5,000-10,000 AMD expenditures group, 34.1%. Similarly, awareness was comparably higher in Quintile 4 and Quintile 5, however, willingness to borrow was the highest in average expenditures group (Quintile 3).

Figure 51 presents average monthly expenses of HH-s on heating and the amount of money that they would monthly pay if borrowed. In case of borrowing for 3 years, HH-s were ready to pay 8,323 AMD monthly, and for long-term loans (7 years) this amount was 4,972 AMD. In Yerevan, HH-s were ready to pay more than in marzes.

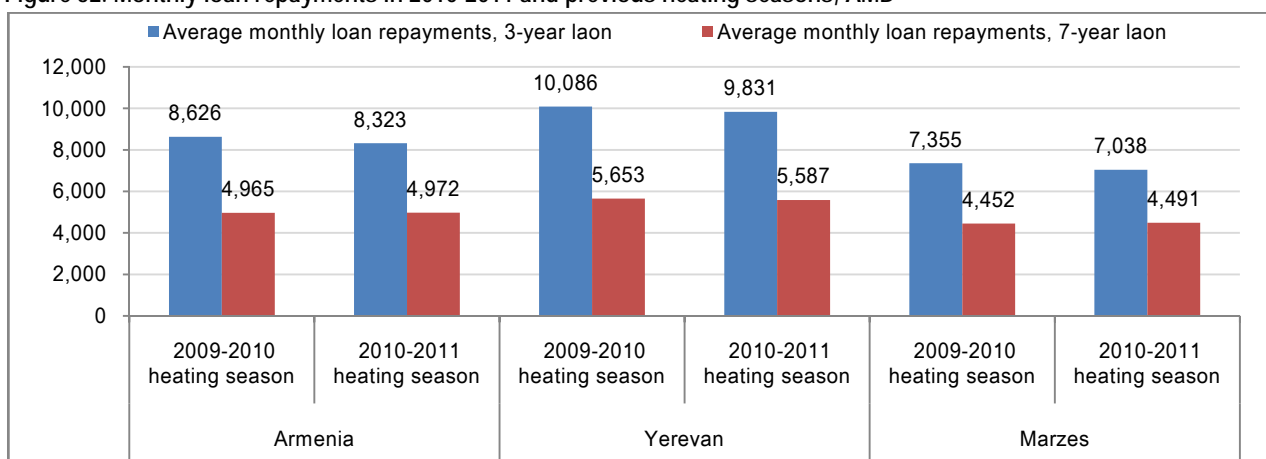
Figure 51. Monthly loan repayments and heating expenditures, AMD



Source: AHS (2011)

In comparison with previous year, HH-s were willing to pay smaller amount of money this year. In particular, HH-s would pay 8,323 AMD for 3-year loan against 8,626 AMD of the previous year. Dislike mid-term loans, in case of long-run ones, the amount of monthly payment that HH-s were ready to pay, slightly increased, making 4,972 AMD against 4,965 AMD of previous year.

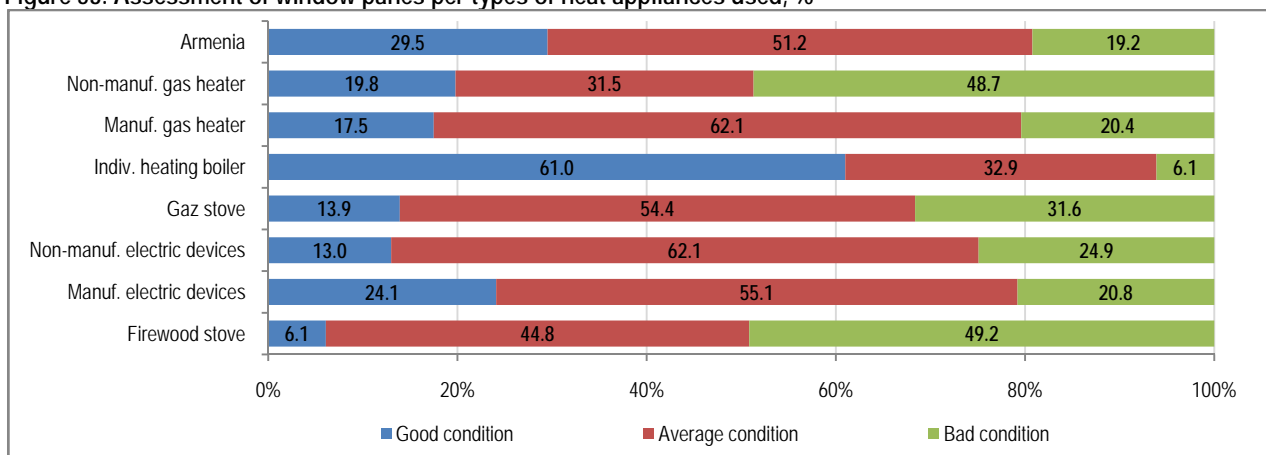
Figure 52. Monthly loan repayments in 2010-2011 and previous heating seasons, AMD



Source: AHS (2011) and AHS (2010)

Heating conditions in apartments depend not only on heating option, but also the conditions of windows, as in case of their bad condition the warmth in apartments would not be maintained for long, making the heating less effective. Below, the assessment of windows by applied heating devices is presented. In general, according to 51.2% of HH-s windows in their apartments were in good condition, 29.5% and 19.2% assessed their condition average and bad accordingly.

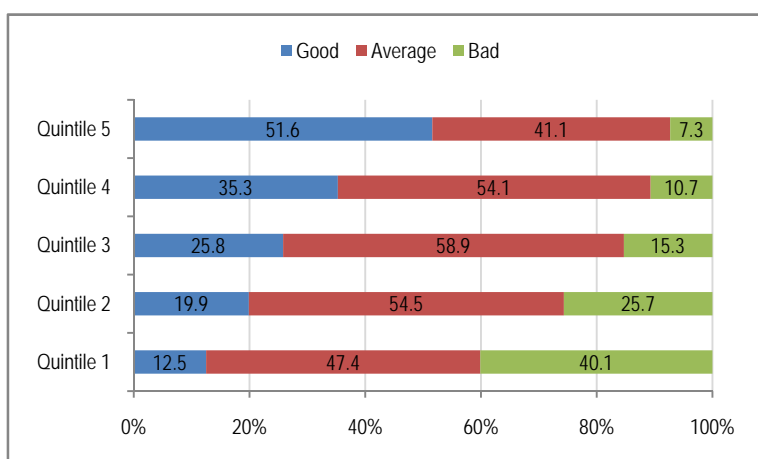
Figure 53. Assessment of window panes per types of heat appliances used, %



Source: AHS (2011)

It is worth mentioning that windows were in good condition in 61% of HH-s that heated with individual heating option, which can be explained with the fact that this heating option was mainly applied by wealthy HH-s.

Figure 54. Condition of window panes by quintile groups, %

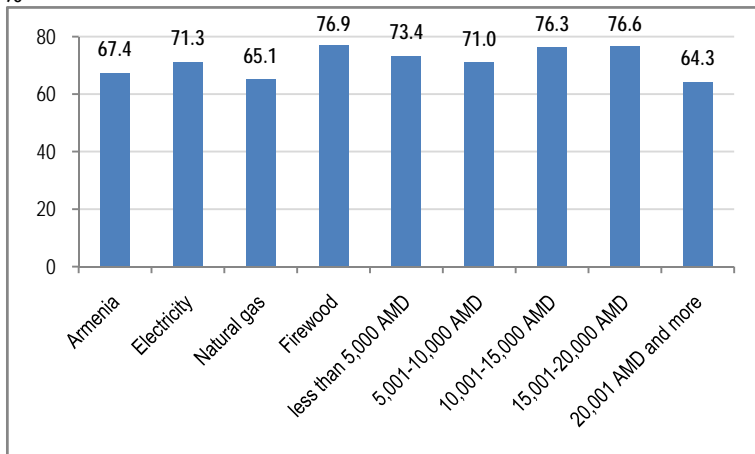


Source: AHS (2011)

was especially dissatisfactory in apartments heated with firewood furnace: in 49.2% of those apartments the windows were in bad condition (with partly broken glasses) and in 44.8% they were in average condition. Only 6.1% of those HH-s mentioned that windows in their apartments were in good condition.

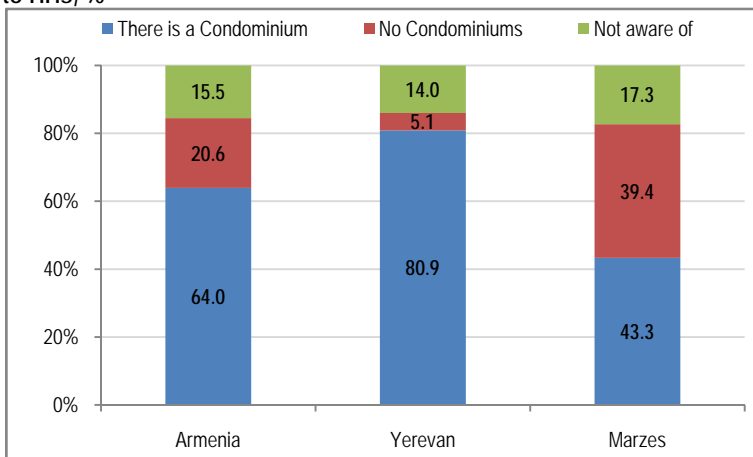
In Figure 54, condition of windows in apartments of HH-s in different quintile groups is presented. Thus, in 51.6% and 35.3% of apartments in Quintile 4 and Quintile 5 accordingly, windows were in good conditions (euro windows).

Figure 55. Shares of HHs, per heat option and settlements, which believe they would save heat and expenses on heating if windows were replaced, %



Source: AHS (2011)

Figure 56. Existence of Condominiums in Armenia and Marzes according to HHs, %

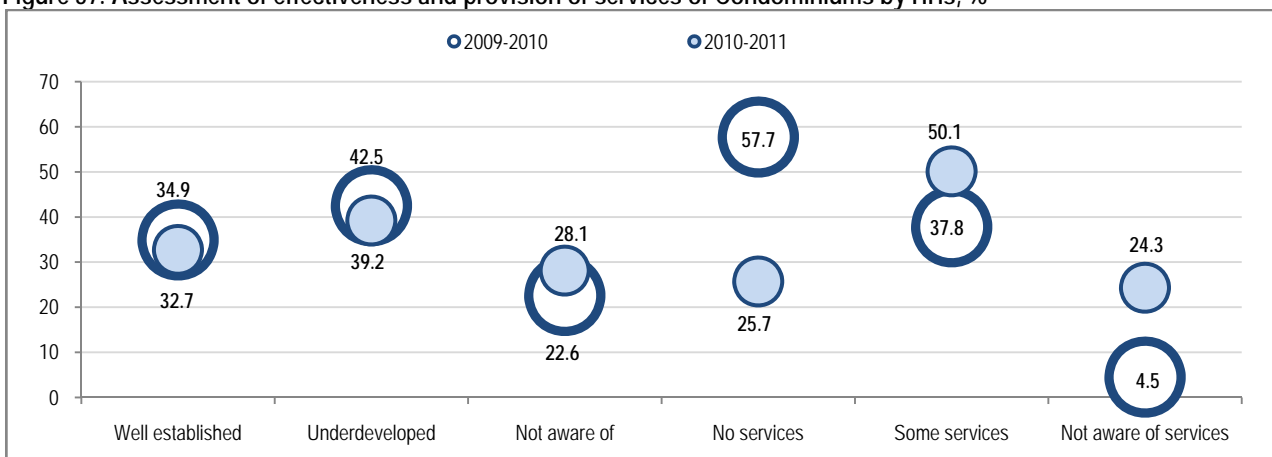


Source: AHS (2011)

this. If 64% of HH-s mentioned that the Condominium existed, only 32.7% of HH-s considered them as developed.

In comparison with previous year, the share of HH-s that considered the Condominiums as developed or underdeveloped, decreased.

Figure 57. Assessment of effectiveness and provision of services of Condominiums by HHs, %



Source: AHS (2011) and AHS (2010)

Meanwhile, in Quintile 1, in 40.1% of apartments, windows were in bad condition.

67.4% of HH-s thought that in case of apartment windows replacement heating and usage of heating devices would be more effective.

71.3% of HH-s, heating with electricity, and 76.9% of HH-s, heating with firewood, thought that way. In case of natural gas, share of those HH-s was smaller, 65.1%.

About 76% of HH-s, that spent 10,000-20,000 AMD on heating, thought that replacement of windows would give positive results. And HH-s, that spent 20,000 AMD and more, and had the same opinion, made 64.3%.

Figure 56, HH-s awareness of their Condominiums is presented. 64% of HH-s mentioned that they had a Condominium, 20.6% mentioned that it was missing, and 15.5% of HH-s were not aware at all.

Level of awareness is higher in Yerevan than in marzes. Besides, 80.9% of HH-s in Yerevan and 43.3% of HH-s in marzes mentioned about the existence of Condominiums.

Existence of Condominiums did not mean that they were developed and had big role and importance. The figure below proves

According to 25.7% of HH-s, the Condominium did not provide any services. This indicator notably increased as compared to previous year (57.7%). Half of HH-s mentioned that the Condominium provided some services: this indicator also improved, increasing by 12.3 percentage points from previous year. 24.2% of HH-s were not aware.

A number of activities towards maintaining and improving of entrance, yard and other public goods were jointly initiated by the residents. In particular, 22.6% of HH-s mentioned that they renovated the yard, 26.3% repaired the entrance. About replacement/repair of pipelines was mentioned by 22.2% of HH-s. For comparison, it is worth mentioning that more HH-s mentioned about those works this year, which comes to prove that readiness of HH-s of social cooperation increased.

Table 1. Activities or works carried out collectively with neighbors, % of HHs (multiple responses)

Services	2010-2011	2009-2010
Renovation, rehabilitation of the yard	22.6	19.5
Planting trees and plants	16.4	15.0
Construction of a playing ground	6.7	5.8
Renovation of the entrance	26.3	21.7
Renovation of pipes	22.2	21.8
Illumination of the yard	8.9	7.9

Source` AHS (2011) and AHS (2010)

Possibility of construction of a small boiler as a more effective heating option was assessed positively by 19.5% of HH-s, in case if someone initiates an organization of works. According to 17.6% of HH-s that idea was realistic if small expenses were required, and 14.3% thought that it would be possible if people believe that heating with boiler would be more affordable.

Table 2. Possibilities to collectively build a small boiler house, % (multiple responses possible)

1	Yes, if there is someone to organize and coordinate	19.5
2	Yes, if a small monthly payments is required	17.6
3	Yes, if a long-term loan is available	1.9
4	Yes, if all understand the advantages	5.5
5	Yes, if the heating as a result of investment is more affordable than currently	14.3
6	Yes, other	1.1
7	No, apartment-owners will not collaborate	17.1
8	No, no need	30.9
9	No, it is too expensive: we cannot afford that	20.7
10	No, we do not trust such options	4.9
11	No, technical solutions will be difficult to find for our block	4.2
12	No, apartment owners are mostly very poor	10.9
13	No, other	6.6

Source` AHS (2011)

30.9% of HH-s mentioned that there was no need for such a boiler, 20.7% emphasized a scarcity of financial resources, and 17.1% had a pessimistic opinion about the readiness of neighbours to cooperate.

Annex 1. Methodology of the Survey on “Assessment of Heat Supply and Heating Options in Multi-Apartment Blocks in Armenia”

HH heating options survey aimed at getting reliable data on heating conditions and their improvement in multi-blocks in Armenia urban areas, as well as, on opportunities of obtaining affordable and high-quality heat supply with help of public administration bodies and private organizations.

This Survey ensured gathering data on 2010-2011 heating season, and thus supplemented the dynamic series of quantitative data obtained via surveys conducted in previous years, giving an opportunity to make assessment of situation change and dynamic developments.

Like the previous surveys, some part of the data has a qualitative nature, for example, subjective assessment of HH-s on various issues. However, the Survey is mainly quantitative, that is, we got concrete quantitative data on population demographic structure, heating devices or heating options, heated area and thers.

Survey sample and a questionnaire are the surve tools. The survey methodology, as well as the mentioned tools, were developed by Economic Development and Research Center.

Sample design and the survey implementation

Formal statistics was used to design the sample. In particular, RA NSS “Housing resources and public utility of Armenia” statistical handbooks were used. The Survey was based on the report published in 2010, which introduces the situation as of December 31, 2009. Changes occurred in 2010 could not be used in the Survey during its projecting, as this report is published in August of each year by RA NSS. It is worth mentioning, that this fact can not cause significant changes, because, as the previous experience shows, no notable changes in marz proportions occur, and occurred changes do not have or have very small impact on sample size and proportions.

Thus, using current statistics, the number of apartments in multi-apartment blocks in urban areas of Armenia was 402.6 thousands, 54.9% of which is in Yerevan.

Based on this statistics, main population stratification and number of PSU-s in each strata were determined. Surveyed HH-s were selected with two-stage stratified random sampling. The applied sampling methodology allows ensuring reliable representativeness of data at Yerevan, each marz and national levels. The sample size is 2000 households which are included in 200 primary sampling units, spread over almost all urban communities of Armenia.

Sample size in Yerevan

According to administrative statistics, at the beginning of 2010, in Yerevan, the number of apartments in multi-apartment blocks was 221 thousands, which makes 54.9% of apartments in all urban areas of Armenia.

In general, for main population stratification it was assumed that the heating options selection behavior of HH-s living in multi-apartment blocks in Yerevan is mainly similar, than in other marzes and communities. Therefore, in Yerevan, each household represents a bigger number of households, than it does in marzes.

The minimal suggested sample size was 2000 households, according to which the Survey sample was designed. Building the Sample, comprised of those 2000 households, it was decided to provide minimal necessary number of HH-s to Yerevan, in order to ensure maximal possible cases in marzes.

Table 1. Main population, Yerevan and marzes

	Number of Communities	Number of Apartments	Percentage structure (share in total)	Proportional distribution, sample of 2000 HH-s	Suggested distribution, 10 HH-s in a PSU in each strata
Yerevan, administrative units	12	221040	54.90%	1098	700
Marzes	47	181603	45.10%	902	1300
Total	59	402,643	100.00%	2,000	2,000

Source: Housing resources and public utility of Armenia in 2009, RA NSS, 2010

According to the stratification of main population proportions, it was necessary to survey 1098 HH-s in Yerevan, and 902 HH-s in marzes. However, applying the above described approach, the minimal required sample size, 700 HH-s, was given to Yerevan, and thus 1300 HH-s were surveyed in marzes.

It is worth mentioning that during previous surveys, EDRC did not apply linear proportional method while building sample plan for heating options selection survey². In this case, the maximum value of standard deviation in Yerevan, related to main objectives, did not exceed the indicator of marzes.

Such an approach gave an opportunity to enhance possibility of inclusion of HH-s in smaller marzes into the survey.

Below, the distribution of the Sample, comprising 700 cases, is presented by administrative units of Yerevan.

Table 2. Main Population and Sample Distribution by Administrative Units of Yerevan

Administrative Units of Yerevan	Number of apartments	Structure, %	Suggested distribution in case of 700 HH-s	Suggested distribution in case of 700 HH-s 10 HH-s in each PSU
Adjapnyak	22,989	10.40%	72.80	70
Avan	11,097	5.02%	35.14	40
Arabkir	33,124	14.99%	104.90	100
Davtashen	8,996	4.07%	28.49	30
Erebuni	13,361	6.04%	42.31	40
Kentron	28,720	12.99%	90.95	90
Malatia-Sebastia	26,996	12.21%	85.49	90
Nor Norq	35,288	15.96%	111.75	110
Norq-Marash	14	0.01%	0.04	0
Nubarashen	1,149	0.52%	3.64	0
Shengavit	23,499	10.63%	74.42	80
Qanaqer Zeytun	15,807	7.15%	50.06	50
Total	221,040	100%	700	700

Source: Housing resources and public utility of Armenia in 2009, RA NSS, 2010

Sample size in marzes

Requirements on spreading and representativeness of data obtained by the Survey relate not only to national but also marz levels. That is, the data should be representative for each marz. For each marz, the main population is all HH-s living in multi-apartment blocks of urban areas in that marz. In order to avoid possible cluster effects, and to ensure the same probability of inclusion for all types of HH-s in the Sample, the Sample was built by PSU. At that, the number of HH-s was 10 in each PSU, according to the Survey features.

Table 3. Proportional Distribution of the Sample and number of Survey PSU-s by marzes

	Number of Communities	Number of Apartments	Percentage structure of apartments (share in total)	Proportional distribution of the sample, 1300 HH	Suggested distribution, 10 HH-s in PSU-s of each strata
Kotayq	7	39553	21.78%	283	280
Lori	8	37820	20.83%	271	270
Shirak	3	25774	14.19%	185	180
Syuniq	7	20291	11.17%	145	150
Armavir	3	15326	8.44%	110	110
Ararat	4	13663	7.52%	98	100
Gegharquniq	5	11557	6.36%	83	80
Tavush	5	8210	4.52%	59	60
Aragatsotn	3	4891	2.69%	35	40
Vayots dzor	3	4518	2.49%	32	30
Total	59	181,603	100%	1,300	1,300

² See "Assessment of Heating Situation in Multy-Apartment in Urban Areas of Armenia" statistical sample survey reports, EDRC, www.edrc.am

Source: Housing resources and public utility of Armenia in 2009, RA NSS, 2010

We should notice, that disorder in linear proportion at national level assumed need to do data reweigh to get indicators.

Selection of towns/cities

The next step of the sampling assumes selection of PSU-s by clusters, when the areas, that will be included in the Survey, are determined. The number of PSU-s by area, like the previous surveys, was determined based on probability weights, but in a way that towns were included as much as possible. As a result, 40 towns out of all 47 in Armenia, and 10 administrative units out of all 12 units of Yerevan were included.

Only very small towns, as well as Norq-Marash and Nubarashen administrative units of Yerevan were not included in the sample, and the number of apartments in multi-apartment blocks in mentioned areas had very small weight.

Selected 40 towns, PSU-s in them and the sample size are presented in the Table 4.

Table 4. Sample sizes of HH-s in multi-apartment blocks in urban areas of Armenia

No	Marzes/Towns	Revised number of apartments as of 1.01.2010	Structure, share in marz	Number of PSU-s	Sample size
	Aragatsotn	4,891	100.0	4	40
1	Ashtarak	3,139	64.2	2	20
2	Talin	947	19.4	1	10
3	Aparan	805	16.5	1	10
	Ararat	13,663	100.0	10	100
4	Artashat	5,146	37.7	4	40
5	Masis	3,772	27.6	3	30
6	Ararat	3,758	27.5	2	20
7	Vedi	987	7.2	1	10
	Armavir	15,326	100.0	11	110
8	Vagharshapat	7,259	47.4	5	50
9	Armavir	5,318	34.7	4	40
10	Metsamor	2,749	17.9	2	20
	Gegharquniq	10,848	100.0	8	80
11	Sevan	5,624	51.8	4	40
12	Gavar	2,600	24.0	2	20
13	Vardenis	1,558	14.4	1	10
14	Martuni	1,066	9.8	1	10
	Lori	35,945	100.0	27	270
15	Vanadzor	26,536	73.8	20	200
16	Alaverdi	5,644	15.7	3	30
17	Stepanavan	1,610	4.5	2	20
18	Tashir	1,114	3.1	1	10
19	Spitak	1,041	2.9	1	10
	Kotayq	39,398	100.0	28	280
20	Abovyan	13,766	34.9	9	90
21	Hrazdan	12,484	31.7	9	90
22	Charencavan	7,847	19.9	5	50
23	Nor Hatchn	2,215	5.6	2	20
24	Byureghavan	2,126	5.4	2	20
25	Yeghvard	960	2.4	1	10
	Shirak	25,774	100.0	18	180
26	Gyumri	21,960	85.2	15	150
27	Artik	2,932	11.4	2	20
28	Maralik	882	3.4	1	10
	Syuniq	20,211	100.0	15	150
29	Kapan	10,989	54.4	8	80
30	Goris	2,519	12.5	2	20
31	Sisian	2,492	12.3	2	20
32	Qajaran	2,294	11.4	1	10
33	Agarak	1,191	5.9	1	10
34	Meghri	726	3.6	1	10
	Vayots dzor	4,518	100.0	3	30
35	Jermuk	2,080	46.0	1	10
36	Vayq	1,265	28.0	1	10
37	Yeghegnadzor	1,173	26.0	1	10
	Tavush	7,044	100.0	6	60
38	Idjevan	3,489	49.5	3	30
39	Dilijan	2,798	39.7	2	20
40	Berd	757	10.7	1	10
Total selected		177,618	-	130	1300

Field works of the Survey were conducted in april-May months of 2011, in all marzes of Armenia. The interviewers were provided with both primary and reserve addresses. The latter should be used in case if the queries in primary addresses was impossible.

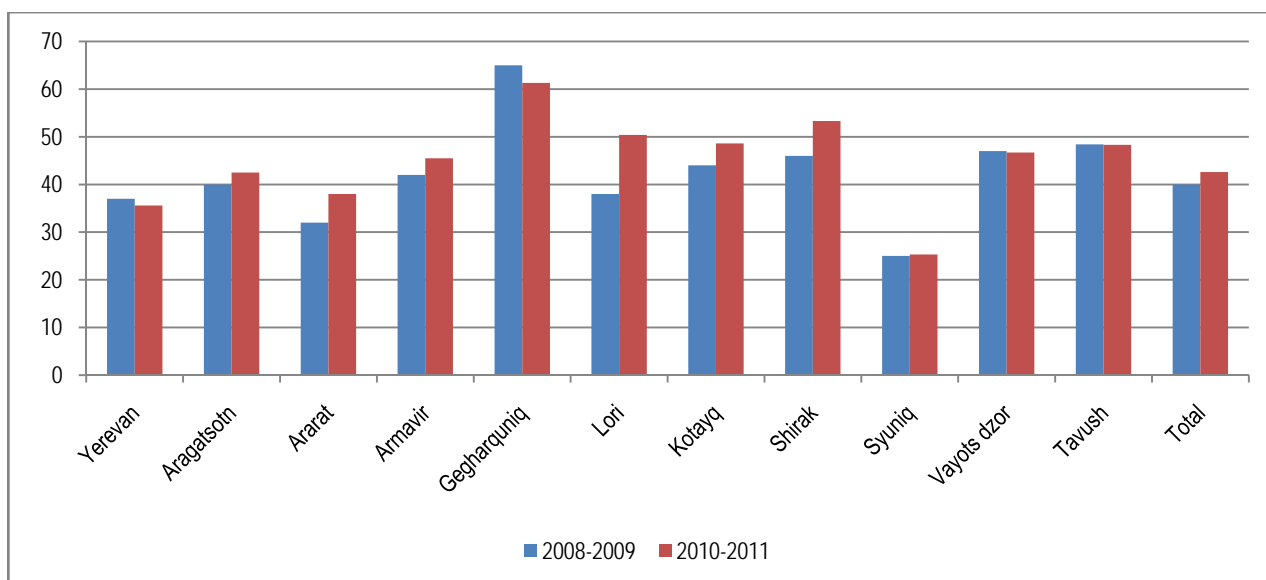
The level of usage of reserve addresses was comparably high in Gegharquniq, Shirak and Lori marzes, and the lowest level was in Syuniq marz. As a result, 2852 visits were made in order to survey necessary number of HH-s.

Table 5. Usage of reserve addresses by marzes

	Usage of main addresses	Usage of reserve addresses	Total number of surveyed HH-s	Level of usage of reserve addresses
Yerevan	451	249	700	35.6
Aragatsotn	23	17	40	42.5
Ararat	62	38	100	38.0
Armavir	60	50	110	45.5
Gegharquniq	31	49	80	61.3
Lori	134	136	270	50.4
Kotayq	144	136	280	48.6
Shirak	84	96	180	53.3
Syuniq	112	38	150	25.3
Vayots dzor	16	14	30	46.7
Tavush	31	29	60	48.3
Total	1148	852	2000	42.6

In almost all marzes, the level of reserve address usage increased. If we compare field works' results of this survey with those of 2008-2009 heating season survey, the usage of reserve addresses in the republic increased by 2.6 percentage points, comparably high rises were recorded in Lori, Shirak and Ararat marzes.

Figure 1. Usage of reserve addresses by marzes, for 2008-2009 and 2010-2011 heating seasons



The Questionnaire

As it was mentioned above, the main tool of data gathering and survey implementation was the "Statistical survey of heating options of households" Questionnaire.

For Questionnaire development, the questionnaire of "Assessment of Heat Supply and Heating Options in Multi-apartment Blocks in Armenia" 2010 was used.

The Questionnaire was improved which was based on lessons learned from previous survey.

The Questionnaire consists of 9 separate sections:

Section 1. List of household members

Section 2. Apartment conditions and Condominiums

Section 3. Heated area

Section 4. Heating and heat supply options

Section 5. Heating assessment and preferences

Section 6. Household expenses

Section 7. Illness due to heating conditions

Section 8. Additional indicators of wealth

Section 9. Assessment of interviewer

There are 70 questions in the Questionnaire, thus more than 200 data were collected for each household in average.

Analyses of data collected with this Questionnaire allows to assess main dependent variables of the Survey for households, that varied by demographic and educational features, employment, wealth, apartment conditions, type of building, etc.

Taking into account the fact that the survey conducted with this questionnaire had success, there was no need for the Questionnaire testing.

The Questionnaire enabled complete compatibility with data from previous surveys.

Annex 2. Analytical Tables

Section 1: Analysis of Heating Options

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

	Heating season 2010-2011		Heating season 2009-2010		Heating season 2008-2009	
	Major	Secondary	Major	Secondary	Major	Secondary
Electricity	22.8	15.0	22.0	15.6	21.6	20.5
Natural Gas	69.8	6.6	70.9	5.7	72.5	5.2
Firewood	5.3	1.0	4.2	1.0	3.9	1.7
Centralized Heating	0.5	0.0	0.5	0.0	0.6	0.0
Other	1.0	1.1	0.3	1.1	0.6	2.7
Heated HHs	99.4	23.7	98.0	23.4	97.6	30.1
Non-heated HHs	0.6	76.3	2.0	76.6	2.4	69.9

Table 1.2: Usage of Secondary Heating Options per Major Option in 2010-2011 heating season, %

Heated HHs per Major Heating Option	Not using	Using	Electricity	Natural Gas	Firewood	Liquid Gas	Other
Total HHs	59.5	40.5	26.1	11.0	1.7	0.7	1.0
Electricity	47.8	52.2	0.0	45.7	2.6	3.5	0.4
Natural Gas	63.5	36.5	33.9	0.0	1.5	0.0	1.1
Firewood	52.3	47.7	24.5	20.2	0.0	0.0	3.0
Other	27.9	72.1	72.1	0.0	0.0	0.0	0.0

Table 1.3. Non-heated HHs by Marzes, %

	Heating season 2010-2011	Heating season 2009-2010	Heating season 2008-2009	Heating season 2007-2008	Heating season 2006-2007
Aragatsotn	0.0	4.0	3.8	4.2	2.5
Ararat	0.0	0.0	0.0	1.5	1.0
Armavir	0.0	1.3	1.3	2.6	0.0
Gegharqunig	0.0	1.8	1.8	3.5	0.0
Lori	1.1	3.7	4.2	6.3	1.4
Kotayq	0.4	1.5	0.5	3.6	1.1
Shirak	0.6	0.8	0.0	3.1	1.1
Syunig	0.7	2.0	0.0	1.0	0.7
Vayots Dzor	0.0	0.0	0.0	4.5	0.0
Tavush	0.0	2.5	0.0	2.4	0.0
Yerevan	0.7	2.2	0.5	1.4	1.1
Armenia	0.6	2.0	0.9	2.4	1.0

Table 1.4. Usage of major heating options in 2010-2011 heating season by Marzes, %

	Electricity	Natural Gas	Firewood	Other	Not heated
Aragatsotn	10.0	85.0	2.5	2.5	0.0
Ararat	12.0	81.0	6.0	1.0	0.0
Armavir	15.5	78.2	6.4	0.0	0.0
Gegharqunig	3.7	88.8	5.0	2.5	0.0
Lori	11.9	74.4	10.0	2.6	1.1
Kotayq	17.9	73.6	6.8	1.4	0.4
Shirak	2.2	90.0	5.0	2.2	0.6
Syunig	28.0	59.3	11.3	0.7	0.7
Vayots Dzor	20.0	76.7	0.0	3.3	0.0
Tavush	16.7	61.7	21.7	0.0	0.0
Yerevan	30.1	64.6	3.1	1.5	0.7
Armenia	22.8	69.8	5.3	1.5	0.6

Table 1.5. Dynamics of Mainly Electricity-heated HHs by Marzes, %

	Heating season 2010-2011	Heating season 2009-2010	Heating season 2008-2009	Heating season 2007-2008	Heating season 2006-2007
Aragatsotn	10.0	8.0	7.7	33.3	15.0
Ararat	12.0	7.2	4.5	4.5	19.0
Armavir	15.5	14.5	9.1	10.5	25.5
Gegharquniq	3.7	1.8	1.8	1.8	5.0
Lori	11.9	12.0	12.0	13.1	9.3
Kotayq	17.9	18.0	20.3	20.4	26.1
Shirak	2.2	3.1	3.1	5.5	3.9
Syuniq	28.0	29.4	23.5	27.5	18.0
Vayots Dzor	20.0	18.2	18.2	27.3	20.0
Tavush	16.7	17.5	12.2	9.8	6.7
Yerevan	30.1	28.7	29.1	32.1	50.9
Armenia	22.8	21.9	21.6	23.9	34.6

Table 1.6. Dynamics of Mainly Natural Gas-heated HHs by Marzes, %

	Heating season 2010-2011	Heating season 2009-2010	Heating season 2008-2009	Heating season 2007-2008	Heating season 2006-2007
Aragatsotn	85.0	84.0	69.2	66.7	65.0
Ararat	81.0	79.7	88.1	76.1	65.0
Armavir	78.2	77.6	87.0	84.2	64.5
Gegharquniq	88.8	89.3	89.5	87.7	88.8
Lori	74.4	77.5	72.3	68.6	70.4
Kotayq	73.6	76.3	73.1	69.9	61.8
Shirak	90.0	91.3	88.2	81.1	85.0
Syuniq	59.3	53.9	64.7	56.9	40.0
Vayots Dzor	76.7	72.7	77.3	59.1	70.0
Tavush	61.7	50.0	75.6	75.6	65.0
Yerevan	64.6	66.5	68.4	63.4	41.3
Armenia	69.8	70.9	72.5	67.5	53.0

Table 1.7. Dynamics of mainly firewood-heated HHs by Marzes, %

	Heating season 2010-2011	Heating season 2009-2010	Heating season 2008-2009	Heating season 2007-2008	Heating season 2006-2007
Aragatsotn	2.5	0.0	3.8	4.2	10.0
Ararat	6.0	11.6	7.5	14.9	11.0
Armavir	6.4	6.6	2.6	2.6	9.1
Gegharquniq	5.0	3.6	3.5	3.5	6.3
Lori	10.0	5.8	9.9	11.0	16.8
Kotayq	6.8	4.1	5.1	5.1	9.6
Shirak	5.0	2.4	4.7	6.3	4.4
Syuniq	11.3	14.7	11.8	14.7	40.0
Vayots Dzor	0.0	4.5	4.5	4.5	10.0
Tavush	21.7	30.0	12.2	12.2	28.3
Yerevan	3.1	1.7	1.4	2.3	5.9
Armenia	5.3	4.2	3.9	5.0	9.8

Table 1.8. Usage of major heating Options in building with natural gas supply by Marzes, %

	Electricity	Natural Gas	Firewood	Centralized heating	Other	Not heated
Aragatsotn	10.0	85.0	2.5	0.0	2.5	0.0
Ararat	12.1	80.8	6.1	0.0	1.0	0.0
Armavir	15.5	78.2	6.4	0.0	0.0	0.0
Gegharqunig	3.8	89.9	3.8	2.5	0.0	0.0
Lori	9.3	77.2	10.0	0.4	2.3	1.1
Kotayq	16.7	75.1	6.3	0.0	1.5	0.4
Shirak	2.3	91.5	5.1	1.1	0.0	0.6
Syuniq	22.2	65.9	11.1	0.0	0.0	0.7
Vayots Dzor	20.0	76.7	0.0	0.0	3.3	0.0
Tavush	16.9	62.7	20.3	0.0	0.0	0.0
Yerevan	28.8	66.1	3.1	0.4	0.9	0.7
Armenia	21.4	71.6	5.1	0.4	1.0	0.6

Table 1.9. Usage of major heating options by type of building and apartment ownership, %

	Electricity	Natural Gas	Firewood	Other	Not heated
Stone Buiding, Stalin Design	20.0	68.1	8.4	3.1	2.8
Stone Buildng, Khrushchev Design	24.8	65.2	7.5	2.5	2.5
Stone Building, Other Design	20.8	71.8	5.4	1.2	0.3
Bearing-wall Building, Khrushchev Design	21.0	72.0	5.2	1.8	1.8
Bearing-wall Building, Other Design	24.7	70.0	3.6	0.9	0.6
Monolith	23.6	63.7	6.5	6.2	2.1
Other Design	24.7	62.7	12.6	0.0	-
Apartment is Private	19.9	72.9	5.2	1.4	0.7
Apartment is Rented	53.7	41.1	2.3	3.0	0.0
Neither Private, nor Rented	45.1	41.4	11.5	2.1	0.0

Table 1.10. Usage of major heating options by number of floors in a building, in armenia, marzes and yerevan, %

	Electricity	Natural Gas	Firewood	Other	Not heated
Up to 4 Floors	22.1	65.6	9.6	1.9	0.8
5 Floors	20.2	72.5	5.5	1.4	0.3
6-8 Floors	30.9	62.3	4.0	0.0	2.8
9 Floors	23.2	71.0	3.3	1.9	0.6
10 and nore Floors	32.1	65.0	1.2	0.8	0.8
Total Armenia	22.8	69.8	5.3	1.5	0.6
Up to 4 Floors	11.9	74.1	11.3	2.1	0.6
5 Floors	13.5	77.7	6.8	1.4	0.6
6-8 Floors	0.0	83.8	16.2	0.0	0.0
9 Floors	19.2	74.1	5.3	1.5	0.0
10 and more Floors	0.0	89.8	10.2	0.0	0.0
Total Marzes, without Yerevan	13.8	76.3	7.9	1.6	0.5
Up to 4 Floors	42.5	48.8	6.3	1.3	1.3
5 Floors	29.4	65.5	3.8	1.3	0.0
6-8 Floors	33.3	60.6	3.0	0.0	3.0
9 Floors	24.8	69.7	2.5	2.2	0.8
10 and nore Floors	33.3	64.0	0.9	0.9	0.9
Yerevan	30.1	64.6	3.1	1.5	0.7

Table 1.11. Usage of major heating options per number of rooms in apartment, %

	Electricity	Natural Gas	Firewood	Other	Not heated
1 Room	33.0	52.4	10.8	3.2	0.5
2 Rooms	26.0	66.8	5.5	1.3	0.4
3 Rooms	18.3	75.8	3.8	1.1	0.9
4 Rooms	17.5	77.7	3.2	1.5	0.0
5 and more Rooms	0.0	92.1	7.9	0.0	0.0

Table 1.12. Usage of major heating options per interviewer assessment of the overall condition of the apartment, %

	Electricity	Natural Gas	Firewood	Other	Not heated
Very Bad	22.7	48.1	18.9	7.8	2.5
Bad	29.2	58.8	9.9	1.6	0.5
Good	22.1	73.5	3.0	0.8	0.6
Very Good	11.8	84.7	1.0	2.5	0.0

Table 1.13. Usage of major heating options per overall condition of windows in the apartment, %

	Electricity	Natural Gas	Firewood	Other	Not heated
Good	14.4	82.5	1.1	1.3	0.7
Average	26.0	67.6	4.6	1.5	0.3
Bad	26.7	56.5	13.6	1.7	1.5

Table 1.14. Usage of major heating options per assessment of HH average monthly income, %

	Electricity	Natural Gas	Firewood	Other	Not heated
1001 USD and more	10.9	85.3	1.8	2.1	0.0
601-1000 USD	23.8	74.0	1.2	1.1	0.0
301-600 USD	23.7	73.7	1.6	0.7	0.2
101-300 USD	24.6	67.4	5.6	1.6	0.7
Up to 100 USD	16.1	54.4	22.8	4.2	2.4

Table 1.15. Usage of major heating options per assessment of HH welfare, %

	Electricity	Natural Gas	Firewood	Other	Not heated
<i>According to the subjective assessment of HH head</i>					
Extremely Poor	26.3	37.9	29.3	2.2	4.3
Poor	22.2	62.6	11.4	3.3	0.5
Non-poor	24.5	71.7	2.7	0.7	0.5
Wealthy	13.2	83.4	1.3	1.8	0.3
<i>According to the subjective assessment of interviewer</i>					
Extremely Poor	23.7	41.7	26.6	4.1	3.9
Poor	22.1	58.6	14.2	4.4	0.8
Non-poor	25.4	70.7	2.9	0.6	0.5
Wealthy	11.4	86.0	0.7	1.6	0.2

Table 1.16. Usage of major heating options per quintile groups, %

	Electricity	Natural Gas	Firewood	Other	Not heated
Quintile 1	21.2	52.7	17.9	5.1	3.1
Quintile 2	27.1	68.9	3.3	0.7	0.0
Quintile 3	24.2	71.6	3.5	0.5	0.2
Quintile 4	25.5	72.2	1.8	1.0	0.0
Quintile 5	15.8	81.9	1.0	2.6	0.0

Table 1.17. Major heating devices used, %

	2010-2011 heating season			2009-2010 heating season		
	Armenia	Yerevan	Marzes	Armenia	Yerevan	Marzes
Self-made gas heater	1.3	0.4	2.3	0.9	0.0	1.9
Manufactured Gas Heater	38.6	24.6	55.6	39.4	26.0	56.5
Individual Heating Boiler	28.1	38.1	15.9	27.4	37.7	14.7
Gas stove	2.2	1.7	2.9	4.3	4.0	4.3
Non-manufactured Electric Appliances	10.5	15.0	5.1	11.5	15.9	6.0
Manufactured Electric Appliances	11.7	14.3	8.4	10.5	13.2	7.8
Firewood Stove	5.5	3.4	8.0	4.1	1.6	7.2
Other	2.1	2.3	1.9	1.8	1.7	1.5

Table 1.18. Major heating devices used per heating options, %

	Electricity	Natural Gas	Firewood	Centralized heating	Other
Self-made gas heater	0.0	1.8	0.0	0.0	0.0
Manufactured Gas Heater	0.0	54.9	0.0	0.0	7.6
Individual Heating Boiler	0.2	39.7	0.0	0.0	0.0
Gas stove	0.0	3.1	0.0	0.0	7.6
Non-manufactured Electric Appliances	46.2	0.0	0.0	0.0	0.0
Manufactured Electric Appliances	51.0	0.0	0.0	0.0	0.0
Centralized heating and local-collective boiler	0.1	0.0	0.0	100.0	0.0
Firewood Stove	0.0	0.0	98.6	0.0	32.3
Other	2.5	0.5	1.4	0.0	52.5

Table 1.19. Major heating devices used per subjective assessment of welfare, %

	Extremely Poor	Poor	Non-poor	Wealthy
Self-made gas heater	7.2	1.5	1.0	0.7
Manufactured Gas Heater	21.1	44.7	40.3	22.2
Individual Heating Boiler	7.5	13.2	28.6	59.6
Centralized heating	0.0	0.0	0.2	0.7
Gas stove	4.6	3.6	1.8	0.7
Manufactured Electric Appliances	10.6	12.4	11.1	4.4
Non-manufactured Electric Appliances	17.5	9.5	12.8	8.1
Firewood Stove	29.1	12.7	2.7	1.3
Other	2.4	2.4	1.5	2.3

Table 1.20. Major heating devices per quintile groups, %

	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5
Self-made gas heater	3.3	1.3	1.1	0.5	0.9
Manufactured Gas Heater	38.5	46.7	44.0	37.5	29.0
Individual Heating Boiler	9.8	17.1	25.5	33.6	51.7
Centralized heating	0.2	0.4	0.0	0.4	1.3
Gas stove	6.2	3.8	2.2	0.2	0.4
Manufactured Electric Appliances	9.5	14.9	12.0	13.6	8.0
Non-manufactured Electric Appliances	12.4	11.6	10.7	11.7	7.2
Firewood Stove	17.9	3.5	3.6	1.8	1.0
Other	2.2	0.7	0.9	0.7	0.5

Table 1.21. Options for getting hot water (including for shower), %

	2010-2011 heating season		2009-2010 heating season		2008-2009 heating season	
	Major	Secondary	Major	Secondary	Major	Secondary
Gas Water Heater	27.0	0.9	27.1	1.5	28.7	0.3
Electric Water Tank, Boiler	4.9	0.8	4.9	1.3	4.6	0.6
Electric Water Heater (Geyser type)	13.0	1.3	13.1	2.1	13.9	1.1
Non-manufactured Electric Immersion Heater	8.7	6.2	8.6	10.4	12.3	7.5
Furnace	1.3	1.3	1.2	2.1	1.5	1.1
Individual Heating Boiler	26.1	0.1	26.3	0.1	18.4	0.0
Local-collective Heating Boiler	0.1	0.0	0.1	0.0	0.2	0.0
Centralized Heating	0.4	0.0	0.4	0.0	0.1	0.1
Gas stove	17.4	15.0	17.2	25.7	19.1	18.0
Other Devices/Options	0.5	1.0	1.1	1.6	0.9	1.2
Hot Water Users	99.4	26.6	99.5	44.8	99.6	30.0
Hot Water Non-users	0.6	73.4	0.5	55.2	0.4	70.0
Total HHs	100.0	100.0	100.0	100.0	100.0	100.0

Table 1.22 Options for getting hot water (including for shower) per major heating options, %

	Electricity	Natural Gas	Firewood	Centralized Heating	Other	Not heated	Total
Gas Water Heater	27.3	28.5	11.9	14.3	0.0	15.0	27.0
Electric Water Tank, Boiler	8.5	4.0	2.1	0.0	0.0	0.0	4.9
Electric Water Heater (Geyser type)	26.9	8.8	10.8	0.0	6.3	7.9	13.0
Non-manufactured Electric Immersion Heater	19.0	4.3	19.5	0.0	6.2	33.5	8.7
Furnace	0.0	0.6	15.6	0.0	6.2	3.1	1.3
Individual Heating Boiler	3.1	35.9	1.3	7.3	41.6	3.5	26.2
Local-collective Heating Boiler	0.0	0.1	0.0	0.0	0.0	0.0	0.1
Gas stove	0.0	0.0	0.0	71.1	0.0	0.0	0.4
Centralized Heating	13.9	17.4	32.4	7.2	5.9	33.4	17.4
Other Devices/Options	0.7	0.2	4.2	0.0	0.0	0.0	0.5
Not heated	0.6	0.0	2.2	0.0	33.9	3.6	0.5

Table 1.23 Options for getting hot water (including for shower) per Armenia, Yerevan and Marzes, %

	Armenia	Yerevan	Marzes
Gas Water Heater	27.0	23.7	31.1
Electric Water Tank, Boiler	4.9	7.0	2.3
Electric Water Heater (Geyser type)	13.0	14.9	10.7
Non-manufactured Electric Immersion Heater	8.7	8.4	9.0
Furnace	1.3	0.4	2.3
Individual Heating Boiler	26.2	36.9	13.1
Gas stove	17.4	7.0	30.2
Other Devices/Options	1.0	1.1	0.8
Not heated	0.5	0.6	0.5

Table 1.24 Options for getting hot water (including for shower) per Marzes, %

	Aragatsotn	Ararat	Armavir	Gegharkunik	Lori	Kotayq	Shirak	Syuniq	Vayots Dzor	Tavush
Gas Water Heater	27.5	13.0	38.5	32.1	48.7	15.4	27.9	37.6	26.7	38.3
Electric Water Tank, Boiler	0.0	4.0	1.8	2.6	0.7	0.7	3.9	6.7	0.0	1.7
Electric Water Heater (Geyser type)	5.0	19.0	11.9	2.6	6.3	10.8	6.1	22.8	30.0	3.3
Non-manufactured Electric Immersion Heater	0.0	16.0	11.9	17.9	5.9	11.1	2.8	8.7	20.0	3.3
Furnace	2.5	1.0	0.0	2.6	3.7	1.1	1.7	4.0	0.0	6.7
Individual Heating Boiler	12.5	10.0	14.7	7.7	5.6	23.3	18.4	9.4	10.0	3.3
Gas stove	50.0	37.0	21.1	32.1	27.5	35.5	38.0	9.4	13.3	43.3
Other Devices/Options	2.5	0.0	0.1	1.1	0.9	2.1	0.6	0.1	0.0	0.1
Not heated	0.0	0.0	0.0	1.3	0.7	0.0	0.6	1.3	0.0	0.0

Section 2: Duration of Heating Season

Table 1.1. 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	0.0	2.5	12.5	30.0	52.5	2.5	0.0
Ararat	0.0	6.0	56.0	33.0	5.0	0.0	0.0
Armavir	0.0	4.5	51.8	41.8	1.8	0.0	0.0
Gegharqunig	0.0	0.0	6.2	7.5	60.0	26.2	0.0
Lori	0.0	5.6	9.3	38.9	39.3	5.9	1.1
Kotayq	0.0	3.2	25.0	36.4	32.5	2.5	0.4
Shirak	0.0	1.1	5.0	11.7	66.7	15.0	0.6
Syunig	0.0	8.0	11.3	40.7	36.7	2.7	0.7
Vayots Dzor	0.0	26.7	26.7	16.7	26.7	3.3	0.0
Tavush	0.0	3.3	21.7	56.7	16.7	1.7	0.0
Yerevan	0.1	14.0	64.7	17.6	2.7	0.1	0.7
Armenia	0.1	9.8	44.7	24.3	17.7	2.8	0.6

Table 1.2. 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	0.6	0.1	9.8	44.7	24.3	17.7	0.6
Yerevan	0.7	0.1	14.0	64.7	17.6	2.7	0.7
Marzes	0.5	0.0	4.6	20.3	32.5	36.0	0.5
Electricity	0.0	13.2	55.5	21.3	9.2	0.8	0.0
Natural Gas	0.1	8.4	42.9	25.1	20.0	3.5	0.0
Firewood	0.0	13.3	32.0	27.5	24.6	2.7	0.0
Other	0.0	0.0	23.3	47.9	14.3	14.5	0.0

Table 1.3. 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	0.0	11.0	41.1	26.0	19.5	2.1	0.3
Stone Building, Khrushchev Design	0.0	9.9	43.1	19.2	25.5	2.3	0.0
Stone Building, Other Design	0.0	8.1	34.6	31.0	21.7	3.8	0.8
Bearing-wall Building, Khrushchev Design	0.0	11.6	45.1	16.1	25.5	1.6	0.0
Bearing-wall Building, Other Design	0.2	9.9	54.0	21.5	11.0	2.7	0.8
Monolith	0.0	17.6	33.7	20.6	26.0	2.1	0.0
Other Design	0.0	14.9	51.7	17.2	13.8	2.3	0.0

Table 1.4. 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	0.3	10.6	50.7	23.1	12.3	2.3	0.7
Average condition	0.0	8.3	43.9	25.5	19.0	3.2	0.2
Bad condition	0.0	12.6	38.4	22.4	22.5	2.6	1.5

Table 1.5. 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	0.0	10.3	49.7	21.1	15.2	3.7	0.0
601-1000 USD	0.0	12.6	43.7	30.1	11.6	1.9	0.0
301-600 USD	0.2	6.6	53.2	23.1	14.7	1.9	0.2
101-300 USD	0.0	10.3	42.6	21.6	21.1	3.7	0.7
Up to 100 USD	0.0	13.8	24.8	30.6	24.7	3.7	2.4

Table 1.6. 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
Armenia	0.1	9.8	44.7	24.3	17.7	2.8	0.6
Yerevan	0.1	14.0	64.7	17.6	2.7	0.1	0.8
Marzes	0.0	4.6	20.3	32.5	36.0	6.1	0.5
No Children	0.1	10.2	47.1	23.3	16.1	2.4	0.8
HH with Children	0.0	9.1	40.5	26.0	20.6	3.6	0.3
1 Child	0.0	10.7	41.6	25.2	19.0	3.3	0.2
2 children	0.0	7.0	39.0	26.7	22.9	3.9	0.5
3 and more Children	0.0	8.9	40.3	27.6	19.6	3.6	0.0
No Elderly	0.1	9.1	43.7	24.0	19.3	3.2	0.6
HHs with Elderly	0.0	10.7	46.2	24.8	15.4	2.3	0.6
1 Elderly	0.0	10.9	46.8	24.8	14.4	2.3	0.8
2 and more Elderly	0.0	10.1	44.5	24.7	18.0	2.3	0.3

Table 1.7. Duration of heating season per subjective assessment of HH welfare and subjective assessment of the interviewer, %

	Up to 2 Months	3 Months	4 Months	5 Months	6 Months	More than 6 Months	Not heated
Armenia	0.1	9.8	44.7	24.3	17.7	2.8	0.6
Yerevan	0.1	14.0	64.7	17.6	2.7	0.1	0.7
Marzes	0.0	4.6	20.3	32.5	36.0	6.1	0.5
<i>According to HH head Subjective Assessment</i>							
Extremely Poor	0.0	6.5	38.8	28.8	20.6	1.1	4.3
Poor	0.0	11.8	36.2	30.5	18.3	2.7	0.5
Non-poor	0.1	9.8	47.7	21.7	17.6	2.5	0.5
Wealthy	0.0	6.2	45.7	25.7	16.5	5.6	0.3
<i>According to Interviewer Subjective Assessment</i>							
Extremely Poor	0.0	9.5	25.2	34.8	21.4	5.1	3.9
Poor	0.0	12.0	33.8	33.5	18.2	1.7	0.8
Non-poor	0.1	9.6	50.7	19.9	17.1	2.1	0.5
Wealthy	0.0	7.7	36.7	29.5	19.5	6.3	0.2

Section 3. Heated Area

Table 3.1. Entirety of apartment heating per number of rooms, %

	1-room Apartments	2-room Apartments	3-room Apartments	4 and more room Apartments	Total Apartments
1 Room	95.3	31.0	17.0	21.7	32.7
2 Rooms	0.0	67.1	18.7	15.5	32.8
3 Rooms	0.0	0.0	62.6	13.5	27.4
4 and more Rooms	0.0	0.0	0.0	48.6	5.0
Not heated	4.7	1.9	1.7	0.7	2.1

Table 3.2. Heated rooms per types in 2008/2009 and 2009/2010, each room type total = 100%

	Heated in 2010-2011	Heated in 2009-2010	Heated in 2008-2009
Living Room	96.8	96.9	95.7
Bedroom	63.8	76.2	69.4
Corridor/Hall	65.0	65.7	66.4
Kitchen	67.4	67.7	68.7
Bathroom/Toilette	45.6	45.6	35.4

Table 3.3. 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	62.8	36.6	0.6	67.4	32.6	45.6	54.4
Yerevan	61.7	37.6	0.7	66.6	33.4	45.7	54.3
Marzes	64.1	35.4	0.5	68.5	31.5	45.4	54.6
Electricity	50.5	49.5	0.0	49.0	51.0	26.6	73.4
Natural Gas	69.9	29.4	0.7	75.8	24.2	53.5	46.5
Firewood	54.9	45.1	0.0	39.3	60.7	22.0	78.0
Other	36.0	56.5	7.5	61.6	38.4	47.2	52.8
Not heated	0.0	0.0	100.0	50.9	49.1	45.0	55.0

Table 3.4 Entirety of apartment heating per type of building, %

	Heated Entirely	Heated Partially	Not Heated	Kitchen Heated	Kitchen Not Heated	Bathroom/Toilette Heated	Bathroom/Toilette Not Heated
Stone Building, Stalin Design	54.1	44.9	1.0	62.5	37.5	31.5	68.5
Stone Building, Khrushchev Design	53.0	46.6	0.4	60.0	40.0	38.4	61.6
Stone Building, Other Design	64.7	34.1	1.2	68.7	31.3	48.8	51.2
Bearing-wall Building, Khrushchev Design	66.7	31.0	2.3	68.9	31.1	41.7	58.3
Bearing-wall Building, Other Design	67.3	31.2	1.5	69.6	30.4	50.5	49.5
Monolith	55.1	44.9	0.0	65.8	34.2	24.5	75.5
Other Design	75.8	24.2	0.0	57.4	42.6	27.6	72.4

Table 3.5. Entirety of apartment heating per HH size, %

	Heated Entirely	Heated Partially	Not Heated	Kitchen Heated	Kitchen Not Heated	Bathroom/Toilette Heated	Bathroom/Toilette Not Heated
All HHs	62.8	36.6	0.6	67.4	32.6	45.6	54.4
1 Member HH	29.4	69.0	1.6	51.3	48.7	27.4	72.6
2 Members HH	55.4	41.9	2.7	61.4	38.6	37.4	62.6
3 Members HH	65.1	33.7	1.2	69.6	30.4	48.5	51.5
4 Members HH	70.6	29.2	0.2	72.8	27.2	53.6	46.4
5 and more Members HH	75.6	23.4	1.0	71.8	28.2	49.4	50.6

Table 3.6. Entirety of apartment heating per presence of children and elderly in HH, %

	Heated Entirely	Heated Partially	Not Heated	Kitchen Heated	Kitchen Not Heated	Bathroom/Toilette Heated	Bathroom/Toilette Not Heated
No Children	59.5	39.0	1.5	64.6	35.4	43.1	56.9
HH with Children	71.0	28.2	0.8	72.3	27.7	49.8	50.2
1 Child	70.0	29.4	0.6	71.3	28.7	48.1	51.9
2 children	72.4	26.5	1.1	74.2	25.8	51.3	48.7
3 and more children	70.5	28.3	1.2	69.1	30.9	53.2	46.8
No Elderly	65.6	33.2	1.1	69.4	30.6	49.4	50.6
HHs with Elderly	61.0	37.7	1.4	64.6	35.4	40.1	59.9
1 Elderly	59.3	39.4	1.3	63.2	36.8	38.0	62.0
2 and more Elderly	65.4	32.9	1.7	68.4	31.6	45.8	54.2

Table 3.7. Entirety of apartment heating per assessment of HH monthly income, %

	Heated Entirely	Heated Partially	Not Heated	Kitchen Heated	Kitchen Not Heated	Bathroom/Toilette Heated	Bathroom/Toilette Not Heated
1,001 USD and more	90.8	9.2	0.0	94.2	5.8	79.5	20.5
601-1000 USD	83.8	15.7	0.5	83.8	16.2	69.0	31.0
301-600 USD	74.1	25.5	0.5	74.2	25.8	53.0	47.0
101-300 USD	51.2	47.3	1.5	57.4	42.6	33.9	66.1
Up to 100 USD	39.1	57.5	3.4	49.5	50.5	18.9	81.1

Table 3.8. 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	30.4	61.8	7.8	27.5	72.5	18.8	81.2
Poor	48.6	49.9	1.6	61.8	38.2	33.1	66.9
Non-poor	67.0	32.2	0.8	68.1	31.9	46.9	53.1
Wealthy	85.7	14.0	0.3	87.6	12.4	71.4	28.6
<i>According to HH head Subjective Assessment</i>							
Extremely Poor	28.0	63.8	8.2	32.3	67.7	13.6	86.4
Poor	45.8	52.6	1.6	57.3	42.7	30.7	69.3
Non-poor	65.5	33.5	0.9	66.7	33.3	44.9	55.1
Wealthy	86.0	13.8	0.2	91.3	8.7	75.0	25.0

Section 4. Temperature Analysis

Table 4.1. Share of rooms in apartment per average temperature groups during day times, %

	Heated Rooms	Cold	Not Warm, Mostly Cold	Warm	Very Warm
	%	8-14 C°	15-18 C°	19-21 C°	Above 22 C°
Living Room	96.8	11.7	33.2	49.6	5.5
Bedroom 1	63.8	10.6	35.5	47.7	6.2
Bedroom 2	33.8	9.2	33.1	51.2	6.5
Bedroom 3	4.8	12.1	27.7	54.5	5.7
Corridor/Hall	65.0	8.9	31.9	53.9	5.3
Closed Habitable Balcony	26.4	12.5	29.0	50.4	7.9
Kitchen	67.4	6.9	36.0	49.9	7.2
Bathroom/Toilette	45.6	10.7	36.2	46.6	6.5

Table 4.2. Share of rooms in apartment per average temperature groups during nighttimes, %

	Heated Rooms	Cold	Not Warm, Mostly Cold	Warm	Very Warm
	%	8-14 C°	15-18 C°	19-21 C°	Above 22 C°
Living Room	96.8	20.0	35.5	39.8	4.7
Bedroom 1	63.8	17.5	31.5	42.9	8.2
Bedroom 2	33.8	16.6	29.7	45.1	8.6
Bedroom 3	4.8	17.3	23.2	53.8	5.7
Corridor/Hall	65.0	20.2	31.9	43.0	4.9
Closed Habitable Balcony	26.4	21.3	31.2	39.4	7.9
Cabinet	1.4	17.0	27.4	36.4	19.2
Kitchen	67.4	21.4	37.4	35.9	5.3
Bathroom/Toilette	45.6	17.2	25.1	57.7	0.0

Table 4.3. Average temperature in apartments in January, 2011 by Marzes, %

	Cold	Not Warm, Mostly Cold	Warm	Very Warm	Average Temperature C ⁰
	8-14 C°	15-18 C°	19-21 C°	Above 22 C°	
Aragatsothn	50.0	37.5	7.5	5.0	15.4
Ararat	17.0	44.0	36.0	3.0	17.5
Armavir	1.8	59.1	39.1	0.0	18.0
Gegharqunig	9.9	33.7	51.3	5.0	18.8
Lori	29.6	54.8	15.6	0.0	15.9
Kotayq	14.3	62.5	21.8	1.4	17.0
Shirak	20.0	54.4	24.4	1.1	16.7
Syunig	17.3	47.3	34.0	1.3	17.2
Vayots Dzor	20.0	46.7	26.7	6.7	16.6
Tavush	13.4	71.7	15.0	0.0	16.6
Yerevan	7.5	39.4	40.3	12.9	18.3
Armenia	12.5	46.0	33.9	7.7	17.7

Table 4.4. Average temperature in January 2011 per duration of heating season, %

	Cold	Not Warm, Mostly Cold	Warm	Very Warm	Average Temperature C ⁰
	8-14 C°	15-18 C°	19-21 C°	Above 22 C°	
Up to 2 Months	0.0	0.0	100.0	0.0	19.0
3 Months	18.2	50.0	21.4	10.3	17.0
4 Months	7.8	45.3	38.4	8.5	18.1
5 Months	13.1	41.8	35.3	9.9	17.8
6 Months	17.0	53.6	26.5	2.9	17.0
More than 6 Months	14.9	41.3	43.8	0.0	17.5
Not heated	100.0	0.0	0.0	0.0	7.0

Table 4.5. Average Temperature in Apartments in January, 2011 per Major Heating Option Used, %

	Cold	Not Warm, Mostly Cold	Warm	Very Warm	Average Temperature C ⁰
	8-14 C°	15-18 C°	19-21 C°	Above 22 C°	
Armenia	12.5	46.0	33.9	7.6	17.7
Yerevan	7.5	39.4	40.3	12.9	18.3
Marzes	18.6	53.9	26.1	1.4	16.9
Electricity	14.2	62.8	20.6	2.4	17.0
Natural Gas	8.1	41.5	40.5	9.9	18.2
Firewood	44.7	41.9	12.1	1.3	14.5
Other	40.6	31.7	15.0	12.7	15.9
Not heated	100.0	0.0	0.0	0.0	7.0

Table 4.6. Average temperature in apartments in January, 2011 per type of building, %

	Cold	Not Warm, Mostly Cold	Warm	Very Warm	Average Temperature C ⁰
	8-14 C°	15-18 C°	19-21 C°	Above 22 C°	
Stone Building, Stalin	15.9	52.1	21.6	10.5	17.0
Stone Building,	12.9	54.0	28.2	4.9	17.3
Stone Building, Other	11.2	43.9	36.5	8.3	17.9
Bearing-wall Building,	11.3	57.1	22.4	9.2	17.4
Bearing-wall Building,	11.5	43.1	38.7	6.8	17.8
Monolith	27.1	55.4	13.0	4.5	16.1
Other Design	24.1	16.6	43.7	15.5	17.6

Table 4.7. Average temperature in apartments in January, 2011 per overall condition of windows, %

	Cold	Not Warm, Mostly Cold	Warm	Very Warm	Average Temperature C ⁰
	8-14 C°	15-18 C°	19-21 C°	Above 22 C°	
Good Condition	4.7	29.3	50.5	15.5	19.0
Average Condition	10.6	52.5	31.9	4.9	17.6
Bad Condition	29.0	53.7	13.9	3.4	15.8

Table 4.8. Average Temperature in Apartments in January, 2009 per HH Size, %

	Cold	Not Warm, Mostly Cold	Warm	Very Warm	Average Temperature C ⁰
	8-14 C ⁰	15-18 C ⁰	19-21 C ⁰	Above 22 C ⁰	
All HHs	12.5	46.0	33.9	7.7	17.7
1 Member HH	25.9	48.1	23.3	2.8	16.2
2 Members HH	16.2	45.1	30.2	8.6	17.4
3 Members HH	9.3	49.9	33.5	7.3	17.3
4 Members HH	8.5	45.9	34.6	10.9	18.2
5 and more Members HH	10.1	43.2	39.8	6.8	17.9

Table 4.9. Average temperature in apartments in January, 2011 per presence of children and elderly in HH, %

	Cold	Not Warm, Mostly Cold	Warm	Very Warm	Average Temperature C ⁰
	8-14 C ⁰	15-18 C ⁰	19-21 C ⁰	Above 22 C ⁰	
No Children	14.6	46.7	31.3	7.5	17.4
HH with Children	8.8	44.8	38.3	8.1	18.0
1 Child	7.9	46.7	36.4	9.1	18.1
2 children	8.8	43.5	40.6	7.0	18.0
3 and more Children	15.4	38.7	39.6	6.3	17.4
No Elderly	12.4	46.7	33.2	7.7	17.7
HHs with Elderly	12.5	44.9	34.9	7.7	17.6
1 Elderly	13.0	45.5	35.4	6.1	17.6
2 and more Elderly	11.4	43.0	33.5	12.2	17.8

Table 4.10. Average temperature in apartments in January, 2011 per assessment of HH average monthly income, %

	Cold	Not Warm, Mostly Cold	Warm	Very Warm	Average Temperature C ⁰
	8-14 C ⁰	15-18 C ⁰	19-21 C ⁰	Above 22 C ⁰	
1,001 USD and more	1.8	23.0	48.4	26.7	19.8
601-1000 USD	3.9	30.9	52.0	13.2	19.0
301-600 USD	6.8	40.4	42.3	10.4	18.5
101-300 USD	15.1	58.0	23.7	3.2	16.9
Up to 100 USD	36.8	49.7	12.9	0.7	15.0

Table 4.11. Average temperature in apartments in January, 2011 per assessment of HH welfare, %

	Cold	Not Warm, Mostly Cold	Warm	Very Warm	Average Temperature C ⁰
	8-14 C ⁰	15-18 C ⁰	19-21 C ⁰	Above 22 C ⁰	
<i>According to HH head Subjective Assessment</i>					
Extremely Poor	53.9	41.3	4.9	0.0	13.6
Poor	26.9	54.0	17.3	1.8	16.0
Non-poor	6.8	47.8	38.0	7.3	18.1
Wealthy	4.9	19.6	51.1	24.3	19.5
<i>According to Interviewer Subjective Assessment</i>					
Extremely Poor	57.0	40.5	2.5	0.0	14.0
Poor	27.6	57.3	13.9	1.2	15.8
Non-poor	8.1	47.9	37.0	7.0	18.0
Wealthy	3.8	22.0	52.7	21.5	19.5

Table 4.12. Average temperature in apartments in January, 2010 per heating device used, %

	Cold	Not Warm, Mostly Cold	Warm	Very Warm	Average Temperature C ⁰
	8-14 C°	15-18 C°	19-21 C°	Above 22 C°	
Self-made Gas Heater	39.4	49.0	8.7	2.9	14.7
Manufactured Gas Heater	9.9	56.5	29.5	4.2	17.5
Individual Heating Boiler	2.1	20.3	59.0	18.6	19.6
Gas Stove	38.5	49.4	12.1	0.0	13.0
Non-manufactured Electric Appliance	15.7	59.1	24.5	0.7	16.8
Manufactured Electric Appliance	13.7	68.0	15.0	3.4	17.0
Centralized Heating and Local-collective Boiler	0.0	23.1	38.5	38.5	21.0
Firewood Stove	45.8	40.6	13.6	-	14.3
Other	19.0	24.5	39.4	17.1	18.1

Table 4.13. Average temperature in apartments in January, 2011 per quintile groups, %

	Cold	Not Warm, Mostly Cold	Warm	Very Warm	Average Temperature C ⁰
	8-14 C°	15-18 C°	19-21 C°	Above 22 C°	
Quintile 1	32.3	53.7	13.0	1.0	15.5
Quintile 2	13.6	55.4	25.8	5.3	17.2
Quintile 3	9.2	53.4	30.1	7.3	17.9
Quintile 4	6.1	39	46.2	8.8	18.5
Quintile 5	3.4	30.9	50.4	15.3	19.1

Section 5: Analysis of Expenditures on Heating and Hot Water

Table 5.1. Average monthly expenditures on heating and hot water in 2010-2011 heating season , AMD

	Mean	Median	Mode	Std. Deviation	Range	Minimum	Maximum
Armenia	27,600	27,152	27,600	13,946	93,840	2,760	96,600
Yerevan	30,159	27,600	27,600	14,684	93,840	2,760	96,600
Marzes	24,483	22,080	27,600	13,190	80,454	2,346	82,800
Electricity	23,595	20,700	20,700	11,166	62,100	6,900	69,000
Natural gas	30,035	27,600	27,600	14,257	91,080	5,520	96,600
Firewood	15,897	14,000	15,000	6,547	30,000	8,000	38,000
Other	15,102	4,140	4,140	15,138	41,400	2,760	44,160

Table 5.2. Distribution of HHs per average monthly expenditures on heating and heating options used, %

	Average Expenditures, AMD	Up to 5000	5001-10000 AMD	10001-15000 AMD	15001-20000 AMD	20001 AMD and more
Armenia	27,600	0.8	6.2	13.7	8.6	70.7
Yerevan	30,159	0.6	4.0	10.9	6.8	77.7
Marzes	24,483	1.1	8.9	17.1	10.7	62.3
Electricity	23,595	-	8.3	17.8	13.2	60.7
Natural gas	30,035	-	4.8	9.3	7.0	78.9
Firewood	15,897	-	15.7	58.8	10.8	14.7
Other	15,102	72.7	13.6	9.1	-	4.5

Table 5.3. Distribution of HHs per average monthly expenditures on heating and heating device used, %

	Average Expenditures, AMD	Up to 5000	5001-10000 AMD	10001-15000 AMD	15001-20000 AMD	20001 AMD and more
Self-made Gas Heater	21,200	8.3	10.1	18.1	5.2	58.3
Manufactured gas Heater	25,941	0.3	4.6	12.8	9.9	72.5
Individual Heating Boiler	36,938	1.2	2.2	2.8	2.9	90.9
Gas Stove	14,408	8.9	36.4	22.6	7.2	25.0
Non-manufactured Electric Appliance	23,618	1.7	8.6	18.1	12.5	59.1
Manufactured Electric Appliance	23,244	-	8.2	18.1	12.5	61.2
Firewood Stove	15,897	3.3	15.1	56.7	10.7	14.3
Other	29,216	-	-	-	19.6	80.4

Table 5.4. Distribution of HHs per average monthly expenditures on heating by Marzes, %

	Average Expenditures, AMD	Up to 5000	5001-10000 AMD	10001-15000 AMD	15001-20000 AMD	20001 AMD and more
Aragatsotn	23,068	-	5.0	20.0	10.0	65.0
Ararat	34,357	1.0	3.0	8.0	8.0	80.0
Armavir	27,629	-	3.6	10.9	2.7	82.7
Gegharquniq	26,088	-	10.0	16.3	5.0	68.8
Lori	19,994	3.7	14.1	22.6	13.0	46.7
Kotayq	24,813	2.1	8.2	15.0	13.2	61.4
Shirak	24,602	2.2	10.6	14.4	8.9	63.9
Syuniq	23,531	2.7	8.0	21.3	12.0	56.0
Vayots Dzor	26,082	-	3.3	3.3	10.0	83.3
Tavush	20,633	-	6.7	30.0	16.7	46.7
Yerevan	30,194	1.3	4.0	10.9	6.7	77.1
Armenia	27,600	2.9	7.7	11.7	8.2	69.5

Table 5.5. Distribution of HHs per average monthly expenditures on heating and type of building, %

	Average Expenditures, AMD	Up to 5000	5001-10000 AMD	10001-15000 AMD	15001-20000 AMD	20001 AMD and more
Stone Building, Stalin Design	24,767	1.7	10.2	19.3	7.3	61.6
Stone Building, Khrushchev Design	24,861	2.9	10.0	16.5	11.0	59.6
Stone Building, Other Design	26,185	1.2	6.1	15.9	10.0	66.8
Bearing-wall Building, Khrushchev Design	23,441	1.8	4.6	18.3	8.2	67.1
Bearing-wall Building, Other Design	30,924	1.5	4.4	9.1	7.4	77.6
Monolith	24,651	2.1	8.0	8.6	8.0	73.3
Other Design	26,760	2.3	6.9	14.9	-	75.9

Table 5.6. Distribution of HHs per average monthly expenditures on heating and HH size, %

	Average Expenditures, AMD	Up to 5000	5001-10000 AMD	10001-15000 AMD	15001-20000 AMD	20001 AMD and more
1 Member HH	17,890	3.6	22.5	29.9	7.6	36.4
2 Members HH	24,194	3.5	8.8	16.5	10.6	60.6
3 Members HH	26,722	1.2	3.4	14.5	9.4	71.6
4 Members HH	29,058	0.2	2.2	10.7	9.5	77.5
5 and more Members HH	32,764	1.0	3.2	7.4	6.1	82.3

Table 5.7. Distribution of HHs per average monthly expenditures on heating and assessment of HH average monthly income, %

	Average Expenditures, AMD	Up to 5000	5001-10000 AMD	10001-15000 AMD	15001-20000 AMD	20001 AMD and more
1,001 USD and more	40,594	-	-	3.7	2.9	93.4
601-1000 USD	35,551	-	0.5	2.2	5.4	91.9
301-600 USD	30,682	0.2	1.8	8.7	7.9	81.4
101-300 USD	23,640	1.0	6.5	18.9	11.6	62.1
Up to 100 USD	15,765	3.5	30.3	31.2	6.0	28.9
Total	27,612	0.8	6.2	13.7	8.5	70.8

Table 5.8. Distribution of HHs per average monthly expenditures on heating and assessment of HH welfare, %

	Average Expenditures, AMD	Up to 5000	5001-10000 AMD	10001-15000 AMD	15001-20000 AMD	20001 AMD and more
<i>According to HH head Subjective Assessment</i>						
Extremely Poor	16,583	2.4	23.5	35.4	8.6	30.1
Poor	20,583	2.6	12.7	25.0	9.6	50.0
Non-poor	28,668	0.3	4.1	10.6	8.8	76.3
Wealthy	37,527	-	1.3	4.4	5.0	89.3
<i>According to Interviewer Subjective Assessment</i>						
Extremely Poor	15,452	2.9	30.2	36.9	4.4	25.6
Poor	19,282	3.4	14.7	27.9	11.2	42.8
Non-poor	28,448	0.2	4.0	10.8	9.0	76.1
Wealthy	36,792	-	1.2	4.4	3.5	90.9

Table 5.9. Distribution of HHs per average monthly expenditures on heating and welfare and quintile groups, %

	Average Expenditures, AMD	Up to 5000	5001-10000 AMD	10001-15000 AMD	15001-20000 AMD	20001 AMD and more
Quintile 1	16,178	4.3	22.9	34.8	8.8	29.2
Quintile 2	22,795	-	8.5	17.7	12.5	61.2
Quintile 3	27,617	0.2	1.1	11.9	9.2	77.7
Quintile 4	32,904	-	0.6	4.7	8.6	86.1
Quintile 5	36,387	-	0.5	2.9	4.0	92.6

Table 5.10. Average monthly expenses by average temperature in January and applied device, AMD

	Total Average Expenditures	Cold (8-14 C°)	Not warm, cold (15-18 C°)	Warm (19-21 C°)	Almost hot (22 C° and more)
Self-made Gas Heater	21,200	10,068	22,253	27,413	27,600
Manufactured Gas Heater	25,941	22,329	23,629	27,056	35,057
Individual Heating Boiler	36,638	17,302	30,306	38,366	41,788
Gas Stove	14,408	9,560	16,354	12,514	-
Non-manufactured Electric Appliance	23,618	15,736	24,080	24,695	41,400
Manufactured Electric Appliance	23,244	20,111	23,184	23,009	27,788
Firewood Stove	15,897	12,347	15,166	30,448	-
Other	29,216	6,775	8,248	10,744	8,261

Section 6: Analysis of Cases of Illness Due to Heating Conditions

Table 6.1. Cases of illness due to heating conditions in 2010-2011 heating season, % in total HHs

	HHs with Illness Cases	No Illness Cases	More Frequent Illness Cases	The Same Frequency of Illness Cases	Less Frequent Illness Cases
Armenia	45.0	55.0	30.8	32.4	36.8
Yerevan	28.6	71.4	42.2	15.7	42.2
Marzes	65.0	35.0	22.4	44.7	32.8
Aragatsotn	82.5	17.5	41.0	35.9	23.1
Ararat	70.0	30.0	18.2	74.2	7.6
Armavir	74.5	25.5	17.6	47.3	35.2
Geghargunig	47.5	52.5	4.3	87.1	8.6
Lori	60.7	39.3	28.8	41.0	30.2
Kotayq	68.2	31.8	14.9	36.8	48.3
Shirak	76.7	23.3	36.5	41.6	21.9
Syunig	55.3	44.7	17.6	37.8	44.6
Vayots Dzor	70.0	30.0	40.0	30.0	30.0
Tavush	38.3	61.7	1.7	28.3	70.0
Electricity	44.1	55.9	32.5	30.9	36.6
Natural Gas	42.6	57.4	30.0	32.4	37.6
Firewood	66.9	33.1	30.5	40.6	29.0
Other	55.1	44.9	43.3	34.6	22.1

Table 6.2. Cases of illness due to heating conditions per heating options used and by Marzes, % in total HHs

	HHs with 1 Illness Case	HHs with 2 Illness Cases	HHs with 3 and more Illness Cases
Armenia	32.9	31.4	35.8
Yerevan	31.4	30.9	37.6
Aragatsotn	33.3	30.3	36.4
Ararat	44.3	38.6	17.1
Armavir	36.6	48.8	14.6
Geghargunig	44.7	42.1	13.2
Lori	33.5	34.8	31.7
Kotayq	26.2	20.4	53.4
Shirak	31.2	26.1	42.8
Syunig	33.7	39.8	26.5
Vayots Dzor	28.6	19.0	52.4
Tavush	56.5	21.7	21.7
Electricity	37.2	29.5	33.3
Natural Gas	30.5	31.6	37.9
Firewood	35.1	34.0	30.8
Other	48.3	29.7	22.0

Table 6.3. Cases of illness due to heating conditions per presence of children and elderly in HHs, %

	HHs with Illness Cases	No Illness Cases
Armenia	55.0	45.0
Yerevan	71.4	28.6
Marzes	35.0	65.0
No Children	57.9	42.1
HH with Children	51.4	46.5
1 Child	53.5	52.1
2 children	47.9	44.3
3 and more Children	55.7	56.9
No Elderly	57.1	42.9
HHs with Elderly	53.2	46.8
1 Elderly	53.0	47.0
2 and more Elderly	53.9	46.1

Table 6.4. Cases of illness 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
Quintile 1	41.2	58.8	29.7	17.5	11.7
Quintile 2	53.5	46.5	13.2	16.7	16.6
Quintile 3	53.6	46.4	12.0	12.6	21.8
Quintile 4	64.4	35.6	9.4	12.0	14.2
Quintile 5	62.9	37.1	10.3	11.6	15.1

Table 6.5. Cases of illness due to heating conditions per type of building and entirety of apartment heating, % in total

	No Illness Cases	HHs with Illness Cases
Stone Building, Stalin Design	55.4	44.6
Stone Building, Khrushchev Design	47.5	52.5
Stone Building, Other Design	54.1	45.9
Bearing-wall Building, Khrushchev Design	52.1	47.9
Bearing-wall Building, Other Design	59.8	40.2
Monolith	43.1	56.9
Other Design	48.8	51.2
Entirely Heated	60.5	39.5
Partially Heated	53.7	46.3
Not Heated	37.3	62.7
Kitchen Heated	56.5	43.5
Kitchen Not Heated	53.6	46.4
Bathroom/Toilette Heated	62.0	38.0
Bathroom/Toilette Not Heated	50.2	49.8

Table 6.6. Cases of Illness due to Heating Conditions per Average Temperature in Apartment in January, 2011, %

	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	18.4	16.7	16.7	17.1	16.9
Very Cold	34.7	65.3	25.6	19.1	20.6
Cold	47.8	52.2	16.2	15.9	20.2
Not Warm, Mostly Cold	69.1	30.9	9.1	10.8	11.0
Warm	76.2	23.8	11.8	7.6	4.4

Table 6.7. Cases of illness due to heating conditions per expenditure 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 5,000 AMD	45.3	54.7	21.0	23.7	10.0
5,001-10,000 AMD	33.5	66.5	31.1	21.4	14.0
10,001-15,000 AMD	41.3	58.7	22.8	17.5	18.5
15,001-20,000 AMD	44.4	55.6	20.2	11.3	24.1
20,001 AMD and more	62.1	37.9	10.5	12.4	15.0

Table 6.8. Cases of illness 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	55.5	44.5	14.6	13.9	16.0
1 Member HH	50.9	49.1	43.9	5.2	0.0
2 Members HH	57.2	42.8	15.2	27.1	0.4
3 Members HH	65.5	34.5	10.0	10.8	13.7
4 Members HH	53.0	47.0	11.6	14.9	20.5
5 and more Members HH	52.0	48.0	8.3	10.7	29.1

Table 6.9. Cases of illness 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
1,001 USD and more	71.4	28.6	8.9	7.7	12.0
601-1000 USD	70.2	29.8	7.5	10.6	11.7
301-600 USD	65.7	34.3	9.6	10.9	13.8
101-300 USD	45.8	54.2	16.7	17.5	20.0
Up to 100 USD	31.6	68.4	35.3	18.0	15.1

Table 6.10. Cases of illness due to heating conditions per assessment of 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	24.2	75.8	37.7	20.0	18.1
Poor	39.3	60.7	22.5	17.6	20.7
Non-poor	60.3	39.7	11.1	13.0	15.5
Wealthy	68.1	31.9	13.7	10.4	7.8
<i>According to Interviewer Subjective Assessment</i>					
Extremely Poor	34.8	65.2	33.4	17.5	14.3
Poor	37.3	62.7	23.6	17.6	21.5
Non-poor	58.6	41.4	12.2	13.6	15.6
Wealthy	69.8	30.2	10.4	10.1	9.7

Section 7. Satisfaction with and Preferences in Heating Conditions

Table 7.1. 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	33.6	11.7	25.6	26.8	3.8	1.2	0.8	6.4	14.6	1.8
Yerevan	48.1	7.1	14.6	10.0	0.7	0.9	0.7	2.7	12.3	2.9
Marzes	16.0	11.6	26.0	20.2	4.5	1.7	0.8	1.4	17.5	0.3
Self-made Gas Heater	12.1	10.8	24.9	16.0	5.4	5.6	0.0	0.0	19.7	5.4
Manufactured Gas Heater	21.0	8.4	25.2	24.3	2.1	1.3	1.7	3.7	11.8	0.3
Individual Heating Boiler	79.0	0.9	3.1	1.4	0.2	0.4	0.0	0.5	13.8	0.6
Gas Stove	8.2	18.2	34.1	9.7	0.0	6.4	0.0	4.8	15.3	3.4
Manufactured Electric Appliances	5.0	26.1	21.9	16.8	0.3	0.4	0.0	1.8	24.7	3.0
Non-manufactured Electric Appliances	13.7	14.3	31.0	15.1	0.0	1.7	0.7	1.4	19.5	2.7
Firewood Stove	6.1	8.2	30.5	9.7	25.5	2.3	0.0	1.4	6.1	10.3

Table 7.2. Preference in heating options per currently used one, %

	Current Option is Sufficient	Electric Heating Appliances	Firewood Stove	Gas Heater	Individual Heating Boiler	Local-collective Heating Boiler	Centralized Heating	Air Conditioner	Other
Armenia	17.7	0.7	1.2	4.9	52.2	11.3	11.3	0.7	17.7
Yerevan	17.9	0.7	1.2	3.6	55.0	10.3	10.3	1.0	17.9
Marzes	17.5	0.6	1.1	6.0	49.9	12.1	12.1	0.6	17.5
Self-made Gas Heater	6.9	0.0	6.7	3.4	58.3	17.9	6.8	0.0	6.9
Manufactured Gas Heater	12.1	0.7	0.5	1.7	57.9	12.2	13.6	1.3	12.1
Individual Heating Boiler	68.8	0.0	0.0	1.4	16.7	5.4	7.4	0.3	68.8
Gas Stove	9.5	0.0	3.4	20.7	49.1	13.9	3.4	0.0	9.5
Manufactured Electric Appliances	5.8	1.9	3.0	4.1	67.4	9.0	7.9	0.9	5.8
Non-manufactured Electric Appliances	6.4	0.0	1.1	7.1	57.5	15.2	12.6	0.0	6.4
Firewood Stove	4.3	1.4	2.1	20.5	49.7	10.6	11.5	0.0	4.3

Table 7.3. Assessment of satisfaction from heating options per currently used heating devices, %

	Completely Satisfied	Partially Satisfied	Not Satisfied
Armenia	28.6	31.1	40.4
Yerevan	40.6	29.7	29.7
Marzes	13.9	32.7	53.3
Self-made Gas Heater	5.7	23.1	71.2
Manufactured Gas Heater	11.7	42.5	45.8
Individual Heating Boiler	77.8	12.0	10.2
Gas Stove	3.2	33.3	63.5
Manufactured Electric Appliances	3.5	37.8	58.7
Non-manufactured Electric Appliances	8.0	39.8	52.2
Firewood Stove	3.4	19.6	76.9

Table 7.4. Reasons for heating device preference, %

	Secure	Clean	Affordable	Sufficient Heat	Other
Armenia	40.6	13.0	7.3	36.9	2.2
Yerevan	45.9	11.4	8.2	31.0	3.5
Marzes	36.2	14.4	6.6	41.8	1.1
Electric Heating Appliance	23.5	40.0	7.5	29.0	0.0
Firewood Stove	35.4	4.4	23.8	26.7	9.7
Gas Heater	35.0	22.9	15.4	25.7	1.0
Individual Heating Boiler	41.1	12.2	2.7	41.5	2.5
Local-collective Heating Boiler	40.3	16.2	12.5	29.6	1.4
Centralized Heating	44.0	8.2	18.8	29.1	0.0
Air Conditioner	26.9	18.1	0.0	48.6	6.4
Other	40.6	13.0	7.3	36.9	2.2

Table 7.5. Reasons for not using preferred heating device, %

	Lack of Money	Difficulty in Technical Solutions	Absence of Suppliers	Other
Armenia	77.7	8.5	7.1	6.7
Yerevan	73.0	10.6	7.1	9.3
Marzes	81.3	6.9	7.1	4.7
<i>Preferred Heating Devices</i>				
Electric Heating Appliance	100.0	0.0	0.0	0.0
Firewood Stove	76.2	14.0	0.0	9.7
Gas Heater	87.9	6.2	2.0	3.9
Individual Heating Boiler	84.9	5.5	1.8	7.8
Local-collective Heating Boiler	65.0	14.4	13.5	7.1
Centralized Heating	48.1	18.9	29.8	3.3
Air Conditioner	100.0	0.0	0.0	0.0
Other	100.0	0.0	0.0	0.0

Section 8. Awareness on Loans and Intention to Borrow for Heating Improvement

Table 8.1. Awareness of loans and intention to borrow per quintile groups and actual expenditures on heating, %

	Unaware of Loans	Aware of Loans	Willing to Borrow	Unwilling to Borrow
Quintile 1	66.8	33.2	3.9	96.1
Quintile 2	54.0	46.0	6.4	93.6
Quintile 3	41.0	59.0	10.3	89.7
Quintile 4	28.3	71.7	9.7	90.3
Quintile 5	31.0	69.0	8.5	91.5
Up to 5,000 AMD	59.9	40.1	2.5	97.5
5,001-10,000 AMD	65.9	34.1	6.0	94.0
10,001-15,000 AMD	59.2	40.8	5.5	94.5
15,001-20,000 AMD	40.7	59.3	8.7	91.3
20,001-25,000 AMD	38.0	62.0	8.6	91.4
25,001 AMD and more	34.0	66.0	7.9	92.1

Table 8.2. Awareness of loans and intention to borrow per heating devices used, %

	Unaware of Loans	Aware of Loans	Willing to Borrow	Unwilling to Borrow
Self-made Gas Heater	73.1	26.9	5.7	94.3
Manufactured Gas Heater	51.1	48.9	11.2	88.8
Individual Heating Boiler	30.8	69.2	2.5	97.5
Gas Stove	54.4	45.6	8.9	91.1
Non-manufactured Electric Appliances	36.8	63.2	8.0	92.0
Manufactured Electric Appliances	35.9	64.1	11.2	88.8
Centralized heating and local-collective boiler	30.8	69.2	2.5	97.5
Firewood Stove	70.7	29.3	5.4	94.6

Table 8.3. Awareness of loans and preparedness to borrow per heating devices preferred, %

	Unaware of Loans	Aware of Loans	Willing to Borrow	Unwilling to Borrow
Electric Heating Appliance	44.7	55.3	16.5	83.5
Firewood Stove	60.7	39.3	4.1	95.9
Gas Heater	70.5	29.5	4.1	95.9
Individual Heating Boiler	46.1	53.9	11.4	88.6
Local-collective Heating Boiler	33.0	67.0	19.2	80.8
Centralized Heating	55.7	44.3	7.4	92.6
Air Conditioner	58.7	41.3	14.3	85.7

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	29.5	51.2	19.2
Yerevan	38.9	45.4	15.7
Marzes	18.1	58.4	23.5
Stone Building, Stalin Design	28.0	48.0	24.0
Stone Building, Khrushchev Design	23.3	48.0	28.7
Stone Building, Other Design	29.2	52.8	18.0
Bearing-wall Building, Khrushchev Design	21.7	52.2	26.0
Bearing-wall Building, Other Design	32.6	52.3	15.1
Monolith	31.1	39.1	29.8
Other Design	33.3	42.6	24.1

Table 9.2. Assessment of overall condition of windows per heating options, heating device used and quintile group, %

	Good Condition	Average Condition	Bad Condition
Electricity	18.7	58.7	22.6
Natural Gas	34.9	49.6	15.6
Firewood	6.1	44.8	49.2
Other	26.0	52.5	21.5
Self-made Gas Heater	19.8	31.5	48.7
Manufactured Gas Heater	17.5	62.1	20.4
Individual Heating Boiler	61.0	32.9	6.1
Gas Stove	13.9	54.4	31.6
Non-manufactured Electric Appliances	13.0	62.1	24.9
Manufactured Electric Appliances	24.1	55.1	20.8
Firewood Stove	6.1	44.8	49.2
Quintile 1	12.4	47.4	40.2
Quintile 2	19.8	54.5	25.7
Quintile 3	25.8	59.0	15.2
Quintile 4	35.3	54.0	10.7
Quintile 5	51.5	41.2	7.2

Table 9.3. HH-s that will save on heating expenditures in case of window replacement, %

	HHs who will save	There is no need in replacement	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	67.4	43.2	10.6	22.7	23.5
Yerevan	65.1	53.4	9.2	18.2	19.1
Marzes	70.3	30.5	12.3	28.2	29.0
Electricity	71.3	36.8	12.2	23.1	27.8
Natural Gas	65.1	47.6	9.3	21.8	21.2
Firewood	76.9	16.9	17.9	33.0	32.2
Quintile 1	75.9	25.4	19.6	28.3	26.7
Quintile 2	69.2	37.0	12.0	27.7	23.3
Quintile 3	65.0	41.3	10.5	23.0	25.2
Quintile 4	63.3	52.8	7.4	18.4	21.4
Quintile 5	65.0	56.8	4.7	17.2	21.3
Average Actual Expenditures, AMD	23,180.0	31,905.0	21,453.0	23,547.0	23,605.0
Up to 5,000 AMD	73.4	21.0	21.2	24.1	33.7
5,001-10,000 AMD	71.0	29.4	15.4	31.3	23.9
10,001-15,000 AMD	76.3	29.0	15.5	27.9	27.5
15,001-20,000 AMD	76.6	29.2	12.0	25.3	33.5
20,001-25,000 AMD	64.3	49.7	8.6	20.5	21.2
25,001 AMD and More	67.4	55.3	7.9	17.7	19.1

