

**ENERGY USE IN ARMENIA:  
NATIONWIDE SURVEY FINDINGS**

**Prepared for**

**The EcoArmenia Consortium  
Save Our Forests Campaign**

**Prepared by**

**Lucig H. Danielian, Ph.D.  
Director  
Turpanjian Center for Policy Analysis  
American University of Armenia**

**Ani Dallakyan, M.A.  
Research Associate  
Turpanjian Center for Policy Analysis  
American University of Armenia**

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## **Summary of Key Findings**

- Nine in ten Armenians believe that poverty reduction will decrease the illegal use of forests for firewood.
- Making gas available to all households in Armenia is indicated as the top solution that might help to save forests in Armenia.

### *Use of forests*

- Fourteen percent of Armenians go to forests for gathering wood for own home fuel use.
- Far more rural and marz residents than urban and Yerevan residents gather wood for own home fuel use in the forests. Similarly, far more residents of forest adjacent villages than residents of non-forest adjacent villages go to forests for this purpose.

### *Using wood for fuel*

- Three in ten Armenians use wood at home as fuel for cooking in the house or for heating the house.
- Many more rural and marz residents than urban and Yerevan residents use wood at home for fuel for cooking or heating. Most Armenians using wood at home are living in marzes with large forest areas.
- Eight in ten Armenians living in forest adjacent villages and only four in ten Armenians living in non-forest adjacent villages use wood for cooking or heating purposes. Similarly, eight in ten Armenians living in villages without gas and five in ten Armenians living in villages with gas use wood for these purposes.
- About 60 percent of Armenians using wood at home gather it from fallen trees and branches.
- Nearly 40 percent of Armenians using wood at home buy it from trees cut in outside areas.
- Four in ten Armenians living in rural areas and using wood at home buy it from others in the village.
- On average, 68 percent of heating of the houses and 22 percent of cooking come from burning wood. Annually Armenians use in total 6.7 cubic meters of wood for heating and cooking on average, with rural and marz residents using more wood than urban and Yerevan residents.

*Using non-wood fuels*

- About two-thirds of Armenians use natural gas for heating and/or cooking at home, four in ten Armenians use electricity, two in ten use manure, and about one in five -- propane gas.
- Not all of the urban residents living in buildings connected to gas have it at home, mainly because they lack finances necessary to bring gas to the home.
- When asked about taking a low interest loan for bringing gas to the home, nearly six in ten Armenians who do not use gas agree to take such a loan.
- Seven in ten Armenians living in rural areas believe that rural residents would stop using wood as fuel, if they were provided with gas.

## **Background**

The EcoArmenia Consortium has initiated a campaign aimed at addressing the multifaceted problem of deforestation in Armenia through its Save Our Forests Campaign. The Consortium is made up of some of the most active and effective environmental organizations in Armenia – the World Wildlife Fund Armenia, the Environmental Conservation and Research Center at the American University of Armenia, the Armenia Tree Project, and the Armenian Forests NGO. The overall campaign will include a comprehensive program that addresses joint natural resource management, economic development and good governance in Armenia. The Save Our Forests campaign aims to introduce and advocate for a series of solutions aimed at addressing this multifaceted problem of deforestation in Armenia.

The Turpanjian Center for Policy Analysis (TCPA) at the American University of Armenia was contracted to conduct a survey in order to provide information for the design of the public awareness campaign in the framework of the Save Our Forests initiative. The purpose of this nationwide study is to assess the understanding and level of knowledge in the public about forests and deforestation, to determine the Armenian public's beliefs, attitudes, and behavior toward the protection of forests, and to understand wood use patterns.

This report presents part of the data from the survey and focuses on energy use in Armenia.

## **Methodology**

In order to create a representative sample of Armenian citizens between the ages of 18 and 75, the ROA National Statistical Service was contacted for current information on the following parameters: 1) population by marzes; 2) population by rural and urban residents within each of the ten marzes and; 3) population by the twelve communities in Yerevan. Households were selected from the city of Yerevan and from the ten marzes proportionately to reflect the most recent ROA census figures. From each marz, one city and one village participated in the survey. For each of the ten cities, detailed maps produced by the ROA Geodesy and Cartography Center were used.<sup>1</sup> A map indicating buildings in Yerevan by community was employed. Each of the ten marz cities and the twelve Yerevan communities was contacted in order to determine the proportion of apartment buildings and single-household dwellings. For each of the marz cities and the Yerevan communities, the maps were employed to randomly select buildings using systematic random sampling. On site in the ten cities and Yerevan, for each apartment building one household per building was selected using simple random sampling.

One of the requirements of this study was to interview residents of both forest adjacent and non-forest adjacent villages. Forest adjacent villages<sup>2</sup> were selected for five marzes with the largest forest areas<sup>3</sup> (Tavush, Lori, Syunik, Gegharkunik and Kotayk marzes). For each of these five marzes sampling frames of only forest adjacent villages were created with the assistance of

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<sup>1</sup> These were produced originally for the ROA 2001 census.

<sup>2</sup> Defined as villages located within 5 km from forests

<sup>3</sup> As of January 1, 1999, according to the ROA National Statistical Service

the Environmental Conservation and Research Center at the American University of Armenia.<sup>4</sup> For each of these five marzes, one forest adjacent village was randomly selected. In the remaining five marzes one village per marz was randomly sampled. Each of the ten villages was contacted to determine the number of households and households were selected on site using systematic random sampling. The availability of gas in the village was also determined beforehand. As a result, six villages with gas and four villages without gas were included in the survey.

Within households, respondents were selected randomly. See Tables 1 through 5 for the numbers of interviews conducted by marz, urban versus rural sampling populations, forest adjacent versus non-forest adjacent sampling populations, and gas availability in the villages. Fifty-one percent of the respondents in marz cities and about 14 percent of the respondents in Yerevan communities are living in single-household dwellings.

TCPA designed custom measures and an original questionnaire based on the information needs of EcoArmenia. A search was made by TCPA for appropriate surveys on forests and deforestation in other countries that could provide reliable and valid indicators.<sup>5</sup> A pre-test was conducted of all measures and adjustments were made accordingly. A total of 1006 interviews were conducted from December 6 through December 19, 2006.<sup>6</sup> All data, both quantitative and recoded qualitative, were input in SPSS for analysis.

At the completion of interviews, participants in the survey were provided with an information leaflet with an overview of Save Our Forests Campaign and contacts of organizations involved in the initiative.

## **Findings**

The mean age of respondents was 45 years (see Table 20) and 32 percent were male and 68 percent female (see Table 19).

Almost 61 percent of the respondents indicated that the condition of forests has been getting worse in the past five years in Armenia (see Table 6).

Ninety-four percent of the respondents said that the illegal use of the forest for firewood would decrease if poverty decreased (see Table 7).

When asked to rate solutions that might help to save forests in Armenia, the highest rating was given to making gas available to all Armenian households (mean = 9.5), followed by providing households with low interest loans to connect to gas (mean = 9.0). (See Table 8.) Marz residents were more likely than Yerevan residents to give higher ratings to gas-related

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<sup>4</sup> Retrieved from the forests map of Armenia through Geographical Information System (GIS) program

<sup>5</sup> Two measures were adapted from the questionnaires of the consumer survey of the EU FAIR Project FP4-CT95-766 conducted in 1996 in the UK, and of the public opinion survey on sustainable forest management conducted in 2005 in Canada by the Collaborative for Advanced Landscape Planning (CALP) at the University of British Columbia, Canada.

<sup>6</sup> Refusal rate is 8.5 percent.

solutions: providing with gas and providing with low interest loans to connect to gas. Making gas available to all Armenian households was rated higher by residents of villages without gas than by residents of villages with gas.

### **Use of forests**

About 14 percent of the respondents gather wood for their own home fuel use, while not surprisingly only one percent of the respondents reported going to forests for cutting wood to sell to others (see Table 9).

Thirty percent of the rural residents and only five percent of the urban residents gather wood for own home fuel use in the forests. Far more marz residents (20 percent) than Yerevan residents (three percent) go to forests for gathering wood for own home fuel use. When compared by forest adjacent and non-forest adjacent villages, far more residents of forest adjacent villages (58 percent) than residents of non-forest adjacent villages (seven percent) reported this purpose of forest use. There is also a difference in the responses based on gas availability in the village: about 37 percent of the residents of villages without gas and 27 percent of the residents of villages with gas reported that they gather fuel wood in the forests.

All of the rural respondents who said that they go to forests for cutting wood for sale to others (n=5) are residents of forest adjacent villages.

### **Use of wood and non-wood fuels**

Nearly 62 percent of the respondents use natural gas for heating and/or cooking at home. Other methods include electricity (39 percent), wood (23 percent), atar (or manure, 22 percent), and propane gas (17 percent) (see Table 10).

#### *Using wood for fuel*

In a more concrete question about the use of wood at home as fuel for cooking in the house or for heating the house about 30 percent of the respondents (n=299) reported using wood for these purposes (see Table 11).

Far more rural residents (58 percent) than urban residents (14 percent) and far more marz residents (43 percent) than Yerevan residents (six percent) use wood at home for fuel for cooking in the house or for heating the house. When compared by marzes, far more residents of marzes with larger forest areas reported using wood than residents of marzes with smaller forest areas. For instance, the overwhelming majority of respondents of Tavush marz (93 percent) use wood for fuel, followed by respondents of Syunik (77 percent) and Lori marzes (51 percent). As would be expected, far more residents of forest adjacent villages (82 percent) than residents of non-forest adjacent villages (38 percent) and far more residents of villages without gas (81 percent) than residents of villages with gas (48 percent) use wood for cooking or heating purposes.

Respondents who ever use wood at home for fuel were asked in a question with multiple responses permitted how they obtain it. Of the 299 respondents who ever use wood at home, 58

percent reported that they gather it from fallen trees and branches, about 41 percent buy wood from trees cut in outside areas, and about six percent of the respondents themselves or their family members cut trees. In addition, of the 207 rural respondents who ever use wood at home, nearly 36 percent buy it from others in the village (see Table 12a).

Table 12b provides a summary of means for percentages of ways of getting wood. On average, nearly 82 percent of the wood was bought from trees cut in outside areas, 71 percent was gathered from fallen trees and branches, 61 percent bought from others in the village, and 53 percent cut by the respondents or their family members.

On average, 68 percent of heating of the respondents' houses and about 22 percent of cooking in their houses come from burning wood. The interviewed households use 5.4 cubic meters of wood for just heating and nearly 1.3 cubic meters of wood for cooking per year on average. In sum, these households use about 6.7 cubic meters of wood per year.

Rural residents use more wood than urban residents per year for heating and cooking. On average, annually rural residents use 6.0 cubic meters of wood for heating, while urban residents use 4.1 cubic meters. In addition, rural residents use 1.5 cubic meters for cooking, while urban residents 0.8 cubic meters annually.

Marz residents use more wood than Yerevan residents per year for heating and cooking, with marz residents using on average 5.6 cubic meters of wood per year for heating compared to 2.5 cubic meters for Yerevan residents. Similarly, marz residents use 1.3 cubic meters of wood per year for cooking and Yerevan residents only 0.7 cubic meters.

As would be expected, residents of forest adjacent villages use more wood per year than residents of non-forest adjacent villages for heating and cooking. On average, 7.0 and 4.2 cubic meters of wood are used per year for heating by residents of forest adjacent and non-forest adjacent villages, respectively. Similarly, 1.7 and 1.1 cubic meters of wood are used per year for cooking by residents of forest adjacent and non-forest adjacent villages, respectively. In addition, on average about 78 percent of heating of the houses in forest adjacent villages come from burning wood, while in non-forest adjacent villages 42 percent come from burning wood.

In villages without gas about 77 percent of heating and 37 percent of cooking come from burning wood, while the rates in villages with gas are about 57 percent for heating and nearly 13 percent for cooking. Residents of villages without gas use more wood than residents of villages with gas per year for cooking and for heating -- residents of villages without gas use 2.0 cubic meters of wood per year for cooking, residents of villages with gas use only 1.0 cubic meter, on average. Similarly, residents of villages without gas use 6.4 cubic meters of wood per year for heating, whereas residents of villages with gas use 5.7 cubic meters.

Seventeen percent of the respondents (n=173) said that they had bought wood the previous month,<sup>7</sup> while 11 percent indicated that they got wood for free. The amount spent on wood for fuel by these 173 households the previous month ranged from 800 to 30,000 drams with the average amount by household at 8,641 drams (see Table 16).

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<sup>7</sup> November 2006

Interestingly, households of villages with gas spent more on wood for fuel the previous month than households of villages without gas, on average, 11,455 drams versus 5,855 drams. This finding can be explained by the fact that nearly one-fourth of the households of villages with gas (n=60) do not use gas even though it is available in the village.

### *Using non-wood fuels*

Several questions were asked of respondents in order to determine what other fuels are being used and why some households use wood instead of gas when gas is available.

Respondents using gas (n=621) were asked how much the household spent on gas the previous month and the reported range of the gas expenditures was 450 to 60,000 drams with the average amount by household at 7,786 drams (see Table 17).

The reported amount paid for gas expenditures the previous month by marz households was higher than the gas bill of Yerevan households. It was on average 9,108 drams for marz households versus 5,613 drams for Yerevan households. Similarly, households in non-forest adjacent villages paid more for gas than households in forest adjacent villages: 9,373 drams versus 7,154 drams, respectively.

The fifty-five urban respondents not using gas were asked in an open-ended question why they do not use it. Sixty-nine percent of these 55 respondents said that they do not have gas at home because they lack finances necessary to bring gas to the home. (See Table 13.)

These 55 urban respondents living in the buildings connected to gas but not having it at home were also asked whether or not they would take a low interest loan to bring gas to the home. About 62 percent of these respondents would take such a loan (see Table 14).

This same question about taking a low interest loan to bring gas to the home was also asked of the rural respondents who are not using gas even though it is available in the village (n=60). Fifty-eight percent of these 60 rural respondents reported that they would take such a loan, while 23 percent could not answer this question (see Table 14).

Respondents were also asked for the amount spent on electricity the previous month, and the reported amount ranged from 400 to 65,000 drams with the average amount by household at 4,940 drams (see Table 18).

Nearly 66 percent of the rural residents indicated that providing gas could keep people in the village from using wood as fuel, while 25 percent explained that cheaper gas would be a solution, and 16 percent said that improving living conditions could help to stop the use of wood as fuel (see Table 15).

Many more residents of villages without gas (96 percent) than residents of villages with gas (52 percent) indicated providing with gas as a solution, while more residents of villages with gas (35 percent) than residents of villages without gas (four percent) suggested making gas cost cheaper. More residents of non-forest adjacent villages (23 percent) than residents of forest adjacent villages (nine percent) mentioned improving living conditions as a solution.



<b>Table 1: Number of interviews conducted by Yerevan and ten marzes compared to ROA census data</b>			
	Frequency	Percent	ROA 2001 Census data
Yerevan	351	34.9	34.3
Aragatsotn	43	4.3	4.3
Ararat	85	8.4	8.5
Armavir	86	8.5	8.6
Gegharkunik	73	7.3	7.4
Lori	89	8.8	8.9
Kotayk	85	8.4	8.5
Shirak	88	8.7	8.8
Syunik	47	4.7	4.8
Tavush	42	4.2	4.2
Vayots Dzor	17	1.7	1.7
<b>Total</b>	<b>1006</b>	<b>100.0</b>	<b>100.0</b>

<b>Table 2: Number of interviews conducted by urban and rural populations compared to ROA census data</b>			
	Frequency	Percent	ROA 2001 Census data
Urban	650	64.6	64.3
Rural	356	35.4	35.7
<b>Total</b>	<b>1006</b>	<b>100.0</b>	<b>100.0</b>

<b>Table 3: Number of interviews conducted in forest adjacent villages</b>		
	Frequency	Percent
forest adjacent	163	45.8
non-forest adjacent	193	54.2
<b>Total</b>	<b>356</b>	<b>100.0</b>

<b>Table 4: Number of interviews conducted in villages with gas</b>		
	Frequency	Percent
gas to village	245	68.8
no gas to village	111	31.2
<b>Total</b>	<b>356</b>	<b>100.0</b>

**Table 5: Number of interviews conducted by Yerevan and marzes compared to ROA census data**

	Frequency	Percent	ROA 2001 Census data
Yerevan	351	34.9	34.3
Marzes	655	65.1	65.7
<b>Total</b>	<b>1006</b>	<b>100.0</b>	<b>100.0</b>

**Table 6: The condition of forests has not been getting worse in the past five years in Armenia**

	Frequency	Percent	Valid Percent**	Cumulative Percent
strongly agree	80	8.0	9.6	9.6
agree	248	24.7	29.7	39.3
disagree	337	33.5	40.4	79.6
strongly disagree	170	16.9	20.4	<b>100.0</b>
don't know/can't say	171	17.0	<b>100.0</b>	
<b>Total</b>	<b>1006</b>	<b>100.0</b>		

Mean=2.71, Mode=3, Median=3.00 (1=strongly agree and 4=strongly disagree; don't know/can't say excluded)

\*\*Valid percent is percentage without don't know/can't say

**Table 7: If poverty decreased, then the illegal use of the forest for firewood would decrease**

	Frequency	Percent	Valid Percent	Cumulative Percent
strongly agree	529	52.6	53.8	53.8
agree	396	39.4	40.2	94.0
disagree	54	5.4	5.5	99.5
strongly disagree	5	0.5	0.5	<b>100.0</b>
don't know/can't say	22	2.2	<b>100.0</b>	
<b>Total</b>	<b>1006</b>	<b>100.0</b>		

Mean=1.53, Mode=1, Median=1.00 (1=strongly agree and 4=strongly disagree; don't know/can't say excluded)

**Table 8: Means for ratings given to solutions that might help to save forests in Armenia***(in descending order)*

	Mean	Mode	Median
Making gas available to all Armenian households	9.49	10	10.00
Government providing monies to plant trees and restore forests	9.34	10	10.00
Providing households with low interest loans to connect to gas	9.03	10	10.00
Government providing monies to guard forests	8.84	10	10.00

*(1=not a solution and 10=a perfect solution; don't know and don't understand excluded)***Table 9: Reasons respondents or their families go to forests in Armenia**

		Yes	No	Total
Relaxation and recreation	Count	727	279	1006
	percentage	72.3	27.7	100.0
Gathering non-wood products like herbs	Count	497	509	1006
	percentage	49.4	50.6	100.0
Gathering wood for own home fuel use	Count	140	866	1006
	percentage	13.9	86.1	100.0
Cutting wood for sale to others	Count	14	992	1006
	percentage	1.4	98.6	100.0

**Table 10: Methods used for heating and/or cooking at home***(multiple responses permitted; in descending order)*

	Frequency	Percent of total (1006)
Natural gas	621	61.7
Electricity	394	39.2
Wood	226	22.5
Atar (manure)	223	22.2
Propane gas	169	16.8
Other	10	1.0

<b>Table 11: Use wood at home for fuel - for example, for cooking in the house or for heating the house</b>		
	Frequency	Percent
yes	299	29.7
no	707	70.3
<b>Total</b>	<b>1006</b>	<b>100.0</b>

<b>Table 12a: If respondents ever use wood at home for fuel, how wood is obtained</b>				
		Yes	No	Total
Gather from fallen trees and branches myself	Count	174	125	299
	percentage	58.2	41.8	100.0
Buy from trees cut somewhere outside this area	Count	121	178	299
	percentage	40.5	59.5	100.0
Buy from others in the village**	Count	74	133	207
	percentage	35.7	64.3	100.0
Cutting trees myself or by family member	Count	17	282	299
	percentage	5.7	94.3	100.0
Other	Count	30	269	299
	percentage	10.0	90.0	100.0
<i>** asked only in villages</i>				

<b>Table 12b: Means for percentages of ways of getting wood in table 12a</b>	
<i>(in descending order)</i>	
	Mean
Buy from trees cut somewhere outside this area	81.69
Gather from fallen trees and branches myself	71.32
Buy from others in the village**	61.22
Cutting trees myself or by family member	53.24
<i>** asked only in villages</i>	

<b>Table 13: Why do not use gas even though available in the building</b>		
<i>(open-ended question)</i>		
	Frequency	Percent
lack of finances	38	69.1
have not connected to gas yet	15	27.3
other	2	3.6
<b>Total</b>	<b>55</b>	<b>100.0</b>

<b>Table 14: Responses by urban and rural respondents who do not use gas even though it is available -- would take a low interest loan if offered to bring gas to the home</b>				
<i>(asked in cities as well as villages with gas)</i>				
		Urban	Rural	Total
yes	Count	34	35	69
	<i>percentage</i>	<i>61.8</i>	<i>58.3</i>	<i>60.0</i>
no	Count	12	11	23
	<i>percentage</i>	<i>21.8</i>	<i>18.3</i>	<i>20.0</i>
don't know/can't say	Count	9	14	23
	<i>percentage</i>	<i>16.4</i>	<i>23.3</i>	<i>20.0</i>
<b>Total</b>	<b>Count</b>	<b>55</b>	<b>60</b>	<b>115</b>
	<b><i>percentage</i></b>	<b><i>100.0</i></b>	<b><i>100.0</i></b>	<b><i>100.0</i></b>

<b>Table 15: What needs to be done so that people in the village stop using wood as fuel</b>		
<i>(multiple responses permitted; in descending order; open-ended question; asked only in villages)</i>		
	Frequency	Percent of total (356)
provide with gas	234	65.7
make gas cost cheaper	89	25.0
improve living conditions/solve financial issues	58	16.3
strengthen control of forests	12	3.4
make electricity cheaper	10	2.8
provide with loans	5	1.4
provide with coal	4	1.1
nothing will help since villagers will always use wood	2	0.6
provide with central heating system	2	0.6
provide with manure	1	0.3
don't know/can't say	18	5.1

<b>Table 16: How much is spent on wood for fuel in AMD last month</b>			
	Frequency		
bought wood	173	Mean	Median
		8640.75	7000.00
		Min	Max
		800	30000
do not use wood	707		
got wood for free	111		
not yet bought wood this year	2		
don't know/can't say	13		
<b>Total</b>	<b>1006</b>		

<b>Table 17: Gas bill in AMD last month</b>			
	Frequency		
use gas	621	Mean	Median
		7785.68	6000.00
		Min	Max
		450	60000
do not use gas	55		
<b>Total</b>	<b>676</b>		

<b>Table 18: Electricity bill in AMD last month</b>		
	Mean	Median
	4939.93	3800.00
	Min	Max
	400	65000

<b>Table 19: Gender</b>		
	Frequency	Percent
male	324	32.2
female	682	67.8
<b>Total</b>	<b>1006</b>	<b>100.0</b>

<b>Table 20: Age</b>		
	Mean	Median
	44.96	45.00
	Min	Max
	18	75

<b>Crosstab 1a: Respondents or their families go to forests in Armenia for gathering wood for own home fuel use by urban and rural</b>				
		Urban	Rural	Total
yes	Count	32	108	140
	<i>percentage</i>	4.9	30.3	13.9
no	Count	618	248	866
	<i>percentage</i>	95.1	69.7	86.1
<b>Total</b>	<b>Count</b>	<b>650</b>	<b>356</b>	<b>1006</b>
	<b><i>percentage</i></b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

<b>Crosstab 1b: Respondents or their families go to forests in Armenia for gathering wood for own home fuel use by Yerevan and marz</b>				
		Yerevan	Marz	Total
yes	Count	10	130	140
	<i>percentage</i>	2.8	19.8	13.9
no	Count	341	525	866
	<i>percentage</i>	97.2	80.2	86.1
<b>Total</b>	<b>Count</b>	<b>351</b>	<b>655</b>	<b>1006</b>
	<b><i>percentage</i></b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

<b>Crosstab 1c: Respondents or their families go to forests in Armenia for gathering wood for own home fuel use by forest adjacent and non-forest adjacent villages</b>				
		Forest adjacent	Non-forest adjacent	Total
yes	Count	95	13	108
	<i>percentage</i>	58.3	6.7	30.3
no	Count	68	180	248
	<i>percentage</i>	41.7	93.3	69.7
<b>Total</b>	<b>Count</b>	<b>163</b>	<b>193</b>	<b>356</b>
	<b><i>percentage</i></b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

<b>Crosstab 1d: Respondents or their families go to forests in Armenia for gathering wood for own home fuel use by villages with and without gas</b>				
		Gas to village	No gas to village	Total
yes	Count	67	41	108
	<i>percentage</i>	27.3	36.9	30.3
no	Count	178	70	248
	<i>percentage</i>	72.7	63.1	69.7
<b>Total</b>	<b>Count</b>	<b>245</b>	<b>111</b>	<b>356</b>
	<b><i>percentage</i></b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>



<b>Crosstab 2: Respondents or their families go to forests in Armenia for cutting wood for sale to others by forest adjacent and non-forest adjacent villages</b>				
		Forest adjacent	Non-forest adjacent	Total
yes	Count	5	0	5
	percentage	3.1	0.0	1.4
no	Count	158	193	351
	percentage	96.9	100.0	98.6
<b>Total</b>	<b>Count</b>	<b>163</b>	<b>193</b>	<b>356</b>
	<b>percentage</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

<b>Crosstab 3a: Use wood at home for fuel - for example, for cooking or heating by urban and rural</b>				
		Urban	Rural	Total
yes	Count	92	207	299
	percentage	14.2	58.1	29.7
no	Count	558	149	707
	percentage	85.8	41.9	70.3
<b>Total</b>	<b>Count</b>	<b>650</b>	<b>356</b>	<b>1006</b>
	<b>percentage</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

<b>Crosstab 3b: Use wood at home for fuel - for example, for cooking or heating by Yerevan and marz</b>				
		Yerevan	Marz	Total
yes	Count	20	279	299
	percentage	5.7	42.6	29.7
no	Count	331	376	707
	percentage	94.3	57.4	70.3
<b>Total</b>	<b>Count</b>	<b>351</b>	<b>655</b>	<b>1006</b>
	<b>percentage</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

<b>Crosstab 3c: Use wood at home for fuel - for example, for cooking or heating by forest adjacent and non-forest adjacent villages</b>				
		Forest adjacent	Non-forest adjacent	Total
yes	Count	134	73	207
	percentage	82.2	37.8	58.1
no	Count	29	120	149
	percentage	17.8	62.2	41.9
<b>Total</b>	<b>Count</b>	<b>163</b>	<b>193</b>	<b>356</b>
	<b>percentage</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

<b>Crosstab 3d: Use wood at home for fuel - for example, for cooking or heating by villages with and without gas</b>				
		Gas to village	No gas to village	Total
yes	Count	117	90	207
	percentage	47.8	81.1	58.1
no	Count	128	21	149
	percentage	52.2	18.9	41.9
<b>Total</b>	<b>Count</b>	<b>245</b>	<b>111</b>	<b>356</b>
	<b>percentage</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

<b>Crosstab 3e: Use wood at home for fuel - for example, for cooking or heating by marz</b>				
<i>(in descending order by agreement)</i>				
		Yes	No	Total
Tavush	Count	39	3	42
	percentage	92.9	7.1	100.0
Syunik	Count	36	11	47
	percentage	76.6	23.4	100.0
Lori	Count	45	44	89
	percentage	50.6	49.4	100.0
Gegharkunik	Count	33	40	73
	percentage	45.2	54.8	100.0
Vayots Dzor	Count	7	10	17
	percentage	41.2	58.8	100.0
Kotayk	Count	34	51	85
	percentage	40.0	60.0	100.0
Armavir	Count	30	56	86
	percentage	34.9	65.1	100.0
Ararat	Count	24	61	85
	percentage	28.2	71.8	100.0
Shirak	Count	24	64	88
	percentage	27.3	72.7	100.0
Aragatsotn	Count	7	36	43
	percentage	16.3	83.7	100.0
Yerevan	Count	20	331	351
	percentage	5.7	94.3	100.0
<b>Total</b>	<b>Count</b>	<b>299</b>	<b>707</b>	<b>1006</b>
	<b>percentage</b>	<b>29.7</b>	<b>70.3</b>	<b>100.0</b>

**Crosstab 4a: What needs to be done so that people in the village stop using wood as fuel by villages with and without gas***(open-ended question; multiple responses permitted)*

		Gas to village	No gas to village	Total
provide with gas	Count	128	106	234
	<i>percentage</i>	52.2	95.5	65.7
make gas cost cheaper	Count	85	4	89
	<i>percentage</i>	34.7	3.6	25.0
improve living conditions/ solve financial issues	Count	52	6	58
	<i>percentage</i>	21.2	5.4	16.3
strengthen control of forests	Count	12	0	12
	<i>percentage</i>	4.9	0.0	3.4
make electricity cheaper	Count	7	3	10
	<i>percentage</i>	2.9	2.7	2.8
provide with loans	Count	5	0	5
	<i>percentage</i>	2.0	0.0	1.4
provide with coal	Count	1	3	4
	<i>percentage</i>	0.4	2.7	1.1
nothing will help since villagers will always use wood	Count	2	0	2
	<i>percentage</i>	0.8	0.0	0.6
provide with central heating system	Count	0	2	2
	<i>percentage</i>	0.0	1.8	0.6
provide with manure	Count	1	0	1
	<i>percentage</i>	0.4	0.0	0.3
don't know/can't say	Count	17	1	18
	<i>percentage</i>	6.9	0.9	5.1

**Crosstab 4b: What needs to be done so that people in the village stop using wood as fuel by forest adjacent and non-forest adjacent villages**

*(open-ended question; multiple responses permitted)*

		Forest adjacent	Non-forest adjacent	Total
provide with gas	Count	114	120	234
	percentage	69.9	62.2	65.7
make gas cost cheaper	Count	50	39	89
	percentage	30.7	20.2	25.0
improve living conditions/ solve financial issues	Count	14	44	58
	percentage	8.6	22.8	16.3
strengthen control of forests	Count	3	9	12
	percentage	1.8	4.7	3.4
make electricity cheaper	Count	3	7	10
	percentage	1.8	3.6	2.8
provide with loans	Count	0	5	5
	percentage	0.0	2.6	1.4
provide with coal	Count	2	2	4
	percentage	1.2	1.0	1.1
nothing will help since villagers will always use wood	Count	0	2	2
	percentage	0.0	1.0	0.6
provide with central heating system	Count	2	0	2
	percentage	1.2	0.0	0.6
provide with manure	Count	0	1	1
	percentage	0.0	0.5	0.3
don't know/can't say	Count	11	7	18
	percentage	6.7	3.6	5.1