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EAPS

ENVIRONMENTAL ACTION PROGRAMME SUPPORT PROJECT

MUNICIPAL GASIFICATION PROJECT
ATTITUDES AND EXPECTATIONS OF THE CITIZENS OF STARA ZAGORA

ENVIRONMENTAL ACTION PROGRAMME SUPPORT PROJECT
Project No. DHR-0039-C-00-5034-00

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SECTION I

INTRODUCTION

SECTION I INTRODUCTION

Three years ago, the Municipality of Stara Zagora initiated a project to distribute natural gas to industrial, commercial, and residential facilities and buildings. In 1993, Gasosnabdyavane Stara Zagora, Inc. was established as a joint venture between the municipality and Overgas, Inc. for the construction of a natural gas pipeline and the sales of natural gas to interested customers. The municipality has a 48 percent ownership share in the joint venture, while Overgas, Inc. owns 52 percent. Conversion to natural gas began in the city's industrial area where the first connections to the gas lines had already been made.

In conjunction with this project, the Citizen's Commission was set up in Stara Zagora, with assistance from the Institute for Sustainable Communities, the U.S. Environmental Protection Agency, the municipality, and the NGO, Ecoglasnost Stara Zagora. The Commission is working on a project to develop the Municipal Environmental Action Plan, which is financed by the U.S. Agency for International Development. Within the project framework, the commission, which embodies a new form of civil cooperation on the local level in Bulgaria, studied, defined, and ranked the city's environmental problems. Health risks were analyzed, and environmental problems were ranked according to priority. The analyses showed that pollution from low-stack chimneys and mobile sources constitutes the health highest risk to city residents. If heating facilities in the city's residential and commercial areas were converted to natural gas, then the air and the environmental quality would improve dramatically.

The conversion to natural gas heating in the households of Stara Zagora was one of a number of projects discussed by the Bulgarian Ministry of the Environment and U.S. AID. The agencies agreed that the Stara Zagora Gasification Project could meet all the conditions required for effectively using available U.S. assistance for improving air quality. The ministry will support the project in its role as a major partner and by supervising the national work group that supports the Stara Zagora City Council.

USAID has offered to provide part of the capital costs in converting Stara Zagora households to natural gas heating. These funds, which will be provided at no cost to the municipality, will be used for household loans to finance the conversion. Through its Environmental Action Program Support Project (EAPS), USAID is also providing technical assistance to the Stara Zagora Gasification Project. Expert teams fielded by EAPS are helping the municipality to assist households in financing conversions.

SECTION II

SURVEY OBJECTIVES AND DESIGN

SECTION II SURVEY OBJECTIVES AND DESIGN

As a part of the assistance effort, a team of interviewers conducted a survey of Stara Zagora households to gauge residents' interest in converting to natural gas. The survey, conducted between June 25 and July 5, 1995, was designed by the EAPS team and the Humanities Research Center in Sophia, in cooperation with a team of professional interviewers from the Center for Free Information in Stara Zagora. The purpose of the survey was to elicit residents' opinions about and attitudes toward a wide range of issues related to the conversion to gas heating. The survey addressed the following main issues:

- Opinions concerning the city's environmental condition.
- Public awareness of the gasification project.
- Attitudes toward current methods of heating.
- General perceptions about the advantages and disadvantages of natural gas versus current methods of heating.
- Willingness to convert to natural gas heating.
- Perceptions of conditions necessary to convert to natural gas heating.
- Social, demographic, and income profiles.

The results of the survey will enable project authorities to design a suitable loan program for financing conversions and will aid in developing an educational program on the benefits of converting to natural gas.

The survey population included households in the area that would be covered by the proposed gas distribution system. Through consultations with the joint venture and municipal officials, the team identified an area bordered by Slavyanska, Stephan Karadga, Augusta Trayana, Bustanitcheska, and Kosta Tsiporanov Streets as the study area. The survey was conducted using a random sample of 300 households, selected through the "random walk" method. Enumerators were given designated starting points and instructions for selecting their interviewees. All interviews were conducted in the evening to increase the possibility of interviewing heads of households. Answers to questions on a standardized questionnaire (See Annex A) were collected during face-to-face interviews. Respondents were given a copy of the questionnaire to read or consult during the interview process, while surveyors recorded responses on a separate questionnaire.

All enumerators participated in a two-day training workshop conducted by the Humanities Research Center. They received an orientation on the Stara Zagora Gasification Project and the purpose of the survey. The random walk methodology was introduced and specific instructions on selecting households, conducting the interviews, answering respondents' questions, and recording

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answers were reviewed. On the second day of training, participants conducted a practice interview with randomly-selected households. These interviews were not included in the sample of 300 households.

Experts from the survey team closely supervised and monitored the interviews and collected completed questionnaires throughout the 11-day survey. Problems or questions raised in the process were discussed and solved on the spot. In written reports submitted at the end of the field work, interviewers indicated that respondents took an active interest in the topics covered by the survey questions.

Raw data from completed questionnaires were entered twice by research assistants to ensure accuracy. In effect, two data sets were prepared and each response in one data set was then compared to the response in the corresponding data set. All 300 surveys were validated by the Humanities Research Center. There were no missing responses.

SECTION III

RESULTS

SECTION III RESULTS

A. Characteristics of the Sample Households

Individual respondent characteristics described in the survey, such as sex and age, refer to the head of household. Consequently, they do not coincide with the demographic structure of the population of the region or the country.

Household size. The largest number of respondents (52.3 percent) had households consisting of three or four members. Less than a quarter (23 percent) had two members, while 16.4 percent had five or six. Only 8.3 percent consisted of only one member. Differences in household size may be explained by differences in respondents' stage in the family life cycle. Full families with dependent children made up 38 percent of the sample; retirees constituted 31.3 percent; households with a working head of household and financially independent, grown-up children made up 22.3 percent; recently married couples or single people 15.7 percent; while people living alone made up the remaining 3 percent.

Household income. An important characteristic of sample households was the income category into which they could be classified. This was especially important because of the survey's emphasis on assessing the respondent's interest in converting to natural gas, a potentially expensive investment. The average monthly income per household was 3145 leva (at the time of the survey 66 leva=\$1). The break down of sample households, by monthly income per household member, is as follows:

Less than or equal to	2000 leva	22 percent
	3000 leva	40 percent
	4000 leva	16 percent
	5000 leva	13 percent
over	5000 leva	8 percent

Age structure. Interviewees fell into the following age groups.

Up to age 34	11 percent
35-44	20 percent
45-54	26 percent
55-64	24 percent
over 65	19 percent

Considering that the sample was based on households and that the ages of household heads were recorded, the observed age structure and the strict control of the sampling procedure suggest that the survey results are based on a representative sample of the city.

B. Respondents' Concerns About the Environment of Stara Zagora

The survey included two questions about the environment designed to elicit respondents' general opinion about environmental quality and to identify the most severe environmental problems. About 60 percent of the interviewees thought that the environment was unsatisfactory or in very bad condition. Most respondents (78 percent) cited air pollution as the most acute problem. Noise pollution was second (61 percent), followed by poor drinking water quality (57.1 percent). (The respondents were allowed to indicate as many environmental problems as they thought appropriate.)

Fifty percent of respondents who considered the environment unsatisfactory also cited air pollution as one of the most acute problems. Younger respondents, on average, were more concerned about the environment and air pollution than other age groups.

C. Awareness of the Municipal Gasification Project

Although the municipality began its gasification project as early as 1992 and formed a joint venture in 1993 to undertake the development and operation of the distribution system, public awareness of these activities appeared quite low. Only about 20 percent of the respondents had prior knowledge of the gasification project. Half of this group learned about the project through conversations with friends and acquaintances, while the other half (or 10 percent of all respondents) learned about it from local newspapers or radio stations.

Half of those who had heard of the project indicated having only a very general idea about it. They only knew that there was such a project or that something was going on. About one-third knew about specific aspects of the project—usually that the project was expected to begin this year, that it was related to improving air quality, or that it was a Bulgarian-American project (although U.S. assistance was initiated only in April 1995 and is limited to the development of the loan program).

D. Residents' Attitudes Toward Natural Gas Heating and Other Types of Heating

D1. Overview of Heat Energy Use

Most of the respondents (80 percent) lived in apartment blocks. Only 14 percent lived in houses, and the remaining 6 percent lived in apartments within houses. Respondents living in blocks with over 50 apartments constituted the largest group (37 percent). Those living in blocks with 10 to 50 apartments made up the second largest group (33 percent), and those in apartment blocks with less than 10 units made up 10 percent of the sample.

More than half of the apartments (61 percent) had a living area of 80 square meters, which is about 15 square meters more than the national average (based on statistics reported by the National Statistical Office, 1992 census). Another 30 percent of the residences had living areas of 50 to 80 square meters. Three-quarters of the households had three or four rooms that had to be heated in winter.

Almost all the respondents (92 percent) used electric appliances to heat their water, and 83 percent used electric cookers. Households that used gas or combined gas/electric cookers constituted about 12 percent. Eighty-six percent of the respondents mainly used electricity for heating purposes, another 11 percent mainly used solid fuels (coal or wood), and the remaining 3 percent used heating oil. During the past heating season, respondents said their household spent approximately 825 leva per month for heat, which is about 26 percent of the household monthly income during the heating season.

In the past few years, many of the households (12.3 percent) used heat only in the living area. Another 47 percent said that in the past few years, their heating expenses represented a more significant share of the family's expenses. This trend is continuing and at the end of the last heating season, even with comparatively stable currency rates and lower inflation than in recent years, electricity rates rose dramatically to over three times the inflation rate. Another 25 percent increase in electricity rates was announced in September. This trend will inevitably result in a marked increase in the heating bills of households relying on electric appliances.

D2. Satisfaction with the Current Type of Heating

More than 40 percent of the respondents were dissatisfied with the temperatures they maintained in their homes during winter. Because electricity is expensive, respondents decrease the temperature and/or heat fewer rooms. The majority of respondents used a separate heating appliance in each room, or moved them from room to room, which prevented them from maintaining comfortable ambient temperatures.

Thus, because of high heating costs and the resulting low temperatures in "heated" living areas, the majority of respondents (85 percent) expressed unhappiness with the comfort level achieved by their heating option. They were not as negatively concerned about other characteristics of their current heating options and expressed general satisfaction with their convenience, space requirements, and cleanliness.

D3. Attitude Toward Natural Gas Heating

The use of natural gas in households is unfamiliar to Bulgarians. Therefore, opinions or attitudes of respondents are not based on personal experiences but on second-hand information or on experiences abroad.

Since the national BBSS survey was conducted (Gasification Image in Bulgaria, Overgas Project-1993) the availability of natural gas and public experience with natural gas heating have not changed significantly (see Annex B). In the BBSS survey, only 8.8 percent of the respondents were knowledgeable about the residential use of natural gas. Of those respondents, 44.3 percent had gained this knowledge through experiences traveling or living abroad.

Respondents to the Stara Zagora household survey were asked a series of questions about the potential advantages and disadvantages of natural gas. When asked how the cost of natural gas would compare to their heating option, over 50 percent of the respondents believed that natural gas would be cheaper, while 7 percent thought it would be more expensive and 43 percent

offered no opinion. The large proportion of those registering a "no opinion" response is not surprising, given the limited information available on natural gas prices. (Note that these questions were asked prior to questions about respondents' willingness to convert to natural gas, which assumed natural gas to be cheaper.)

Almost all of the respondents identified the elimination of prepayments as a second potential economic benefit of natural gas. Such is not the case with other kinds of fuel (solid fuel or diesel oil).

About 76 percent of the respondents believed natural gas heating would be better for the environment. However, over 15 percent of the respondents said they had no information on the environmental impacts of heating with natural gas.

Regarding the convenience and comfort provided by heating with natural gas, the majority of respondents had favorable impressions. Ninety-five percent recognized the advantage of not needing storage capacity; 61 percent believed that it would not contribute to increased dirt in living spaces (although 21 percent expressed no opinion on this subject). Almost half (47 percent) of the respondents claimed no knowledge about potential disruptions in the supply of natural gas, while one third believed it would be subject to fewer interruptions than other sources of heating.

To better understand respondents' attitudes toward natural gas, a Likert scale index was constructed utilizing the responses to seven questions about natural gas. Four categories from "very negative" to "very positive" attitudes were developed, and respondents were each assigned to one of the following groups:

Value label	Frequency	Percent
very negative	8	2.7
negative	42	14.0
positive	104	34.7
very positive	146	48.7
	Mean	3.293
	Median	3.000

The results show that, in general, respondents had a positive attitude toward the use of natural gas to heat households.

E. Willingness to Switch to Natural Gas Heating

Interviewers explained the process of natural gas conversion to respondents. The interviewers also informed them about what the expected cost would be for each household, using a chart prepared prior to the survey. The expected conversion cost depended on two major factors: the type of current heating method and the number of households served by the heating method. For example, an estimated per household cost for converting an oil-burning boiler in an

apartment building was prepared by dividing the overall costs by the number of apartments in the building.

Interviewers explained that households would have the option of paying cash for the conversion or financing the cost of the conversion. Some alternative mechanisms under consideration by the municipality were explained to respondents. Respondents were then asked whether they would be interested in converting to natural gas if the annual cost of natural gas was 20 percent less than what they were currently paying. If they answered yes to this question, they were also asked to indicate which financing option (including payment in cash) they would prefer.

Those who answered "no" were then asked if they would convert if natural gas prices were 30 percent, rather than 20 percent, cheaper. If they again answered "no", they were then asked the same question but with natural gas being 40 percent cheaper. Respondents who indicated that they were not interested in converting to natural gas, even when the annual cost was 40 percent less than current costs, were then asked: "Would you be willing to convert to gas, if you only were required to pay for 75 percent of the costs of conversion?"

E1. Classification of the Respondents, Based on Their Desire to Convert to Gas Heating

Eighty-eight percent of the respondents indicated they would convert to natural gas under one of the four scenarios posed by the interviewers (i.e., 20 percent, 30 percent, or 40 percent reduction in cost or with 25 percent of conversion costs subsidized). Fifty-three percent of the respondents said they would convert if natural gas was 20 percent cheaper. Only a small number of respondents (3 percent) said they would convert if natural gas was 30 percent cheaper. By increasing the savings to 40 percent, an additional 8.3 percent indicated they would convert to natural gas.

An additional 23.7 percent of the respondents said they would convert if natural gas was cheaper *and* if 25 percent of the cost of conversion would be subsidized. Only 12 percent indicated they would not make the conversion under any conditions. Most of these refusals came from people who indicated that they simply could not afford such a conversion, while some reported that they had recently solved their heating problems on their own and were not interested in making another change.

Exactly half of the respondents indicated a willingness to convert their heating systems to natural gas if they could take advantage of preferential loans that would be offered by the municipality's loan program. The most popular loan term among the respondents was a six-month grace period and a 36-month period to repay the loan with a 32 percent interest rate.

Of those interviewed, 14 percent were willing to pay the complete conversion costs in cash, without using preferential financing.

E2. Factors Related to the Respondents' Interest in Converting to Natural Gas

Additional statistical analysis of the responses to the conversion questions was undertaken to identify social and demographic differences between respondents who favored conversion and those who did not (See Annex C). A strong negative relationship was observed between respondents' willingness to convert and their age. Older respondents were more likely to refuse to convert than younger respondents. The majority of the younger respondents were willing to make changes, but only if they could obtain credit or favorable financing terms.

A strong positive relationship was observed between interest in converting and income. Respondents in lower income groups were more likely to refuse to switch to gas heating. No one in the highest income group rejected the option of converting to gas heating.

Retired and unemployed people most often refused to convert to gas heating. In the group of those who had a permanent job, the percentage of respondents willing to obtain credit was a little higher than the average for the total sample of the survey.

E3. Differences in Attitudes Motivated by Different Terms for Conversion to Natural Gas and in Attitudes Toward Gasification in General

The analysis of the data shows that the citizens with a definitely positive attitude towards gas heating in households were less likely to refuse to participate in the project, compared with those who did not have a marked positive attitude.

The most significant differences were observed in the groups formed on the basis of the expected costs for conversion to gas heating, as well as in the more complex variable "payback period."

Over a third of the respondents with expected conversion costs of 20,000 leva were prepared to pay cash. The percentage of those prepared to pay cash for expected conversion costs between 20,000 and 50,000 leva was lower but significantly higher than the average for the total sample. Groups offered significantly higher conversion costs during the interview reveal a sharply contrasting tendency: they refused to convert to gas or attach additional terms.

Similar trends were observed in the analysis of the data for the expected payback period. With longer payback period terms, respondents tended to refuse to convert to gas heating. With a payback period lasting an average length, respondents were inclined to look for alternatives by obtaining credit. A short payback period tended to influence the respondents' decision to pay in cash (see Annex D).

E4. Factors Influencing Expected Behavior

Several kinds of analyses were applied to the data to rank the factors that affected the respondents' decision to switch to gas heating.

Logistic regression analysis. This analysis was used to equate responses or attitudes toward gas conversions with a number of variables including:

1. Annual income of the household
2. Age of the household head
3. Concern about air pollution
4. General attitude toward natural gas heating
5. Expected savings with 40 percent lower heating expenses
6. Natural gas conversion costs

The results suggested that conversion cost, age of head of household, annual household income, and expected financial savings were significant factors affecting the respondents' willingness to convert to natural gas (see Annexes E and F).

The logistic regression analysis of the variables, where the aggregate payback period was substituted for the last two variables (expected savings with 40 percent lower heating expenses and natural gas conversion costs) provided an even better fit of the survey data to this second estimated equation. *Age of head of household* and *payback period* are consequently the most important determinants.

CHAID-SPSS Analysis. All responses to the gas conversion questions were analyzed using CHAID-SPSS (See Annex G). This approach separated respondents into a small number of groups, based on factors such as conversion costs, attitudes toward natural gas, income, and age. This analysis yielded results similar to those from the logistic regressions. The following five groups were obtained:

Group 1--28 people *Conversion costs up to 100,000 leva*
Respondents with highly positive attitudes to natural gas

Will pay cash	17.9 percent
Will take a loan	78.6 percent
Additional terms	3.6 percent

Group 2--48 people *Conversion costs up to 100, 000 leva*
Respondents with a different attitude to natural gas

Will pay cash	39.6 percent
Will take a loan	47.2 percent
Additional terms	4.2 percent
Will refuse	8.3 percent

Group 3--96 people *Conversion costs over 100, 000 leva*
Respondents with average monthly income per person up to 4,000 leva
Respondents from the younger age groups

Will pay cash	6. percent
Will take a loan	54.2 percent
Additional terms	29.2 percent
Will refuse	10.4 percent

Group 4--78 people *Conversion costs over 100, 000 leva*
Respondents with average monthly income per person up to 4,000 leva
Respondents from the older age groups

Will pay cash	6.4 percent
Will take a loan	28.2 percent
Additional terms	38.5 percent
Will refuse	26.9 percent

Group 5--50 people *Conversion costs over 100, 000 leva*
Respondents with average monthly income per person over 4,000 leva

Will pay cash	16.0 percent
Will take a loan	68.0 percent
Additional terms	20.0 percent
Will refuse	2.0 percent

These results can be useful in working out the municipal financial fund and in defining the terms for offering credit.

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SECTION IV
CONCLUSIONS AND SUGGESTIONS

SECTION IV CONCLUSIONS AND SUGGESTIONS

The results from the analyses of the survey data suggest that respondents appear willing to convert to natural gas heating. The overall picture is optimistic.

Some important conclusions from the analysis of survey include:

Savings. The success of the municipality's gasification program will depend on how attractive the savings from switching to natural gas will be for residents. If conversion costs are higher than expected, or if savings from using natural gas are less than projected, the payback period for the capital investment will be greater and conversions will be less attractive to residents (except in higher-income households).

Low costs. Where conversion to natural gas will require households in apartment buildings to finance conversions jointly (because a single heating unit exists for the apartment building), elderly and low-income residents will be less likely to support such an investment, unless the cost per household is low. Thus, the greatest interest will be in apartment buildings currently or previously heated with oil or coal-burning boilers.

The results of the survey have some important implications for the planned public awareness campaign.

- There is a general need to publicize the project.
- Knowledge of benefits of converting to natural gas needs to be improved.
- Once the loan program has been established, information will be needed to acquaint citizens with specific terms and conditions.

ANNEXES

ANNEX A

QUESTIONNAIRE

HUMANITIES RESEARCH CENTER

A Project for the gasification of Stara Zagora

Household Market Survey

Questionnaire

Interviewer:
Starting point:
Serial No

Stara Zagora, June-July 1995h

Hello. My name is I work as an interviewer for the Humanities Research Center. We're conducting a survey of public opinions concerning the joint Project of the Municipality of Stara Zagora and USAID for the gasification of the city. Could you spare some time to answer the questions in the questionnaire? This information is very important and will be very useful for the successful execution of the project. We would like to talk to the head of the household but the participation of other members of the household who are interested in the issues would be of great help as well.

IF THE TIME WHEN YOU CALL IS NOT CONVENIENT FOR THE RESPONDENT, ARRANGE A LATER VISIT AT A MORE SUITABLE TIME

- | | | |
|---|-----------------------|---|
| 1. How do you rate the environmental situation in Stara Zagora? | - Very good..... | 1 |
| | - Good | 2 |
| | - Satisfactory..... | 3 |
| | - Unsatisfactory..... | 4 |
| | - Poor..... | 5 |
-

- | | | |
|--|-------------------------------------|---|
| 2. Which are the most acute environmental problems of the city | - air pollution..... | 1 |
| | - contaminated drinking water | 2 |
| | - insufficient green spaces..... | 3 |
| | - poor sewerage facilities..... | 4 |
| | - poor public utilities..... | 5 |
| | - it a noisy city..... | 6 |
-

- | | | |
|---|-------------|---|
| 3. Have you heard or read about the Project for the gasification of Stara Zagora? | - Yes | 1 |
| | - no | 2 |
- IF "NO", GO TO QUESTION 7
-

- | | | |
|---|---------------------------------|---|
| 4. Where did you hear or read about it?

MORE THAN ONE ANSWER IS POSSIBLE | - the local newspapers..... | 1 |
| | - the local radio stations..... | 2 |
| | - the national newspapers | 3 |
| | - by word of mouth..... | 4 |
| | - elsewhere..... | 5 |
-

5. What issues and aspects of the Project have you heard or read about?

6. Which issues do you think people should have more information about?

.....

The gasification of Stara Zagora has been in progress for a couple of years. A large part of the industrial zone has already been covered. The city's authorities and USAID are jointly working on the development of a municipal financial fund which will provide financial support for the gasification of the residential areas. The Environmental Projects at the USAID will provide the funding to the local authorities.

It is expected that the gasification of the city will reduce considerably the pollution of the air. Your opinion will contribute significantly to the realization of this project.

Now I would like to know how you heat your place.

7. What kind of energy source do you use for space heating?
- Electricity 1
 - mazut 2
 - diesel oil 3
 - coal.....
 - firewood..... 5
 - gas 6

WRITE DOWN THE CORRESPONDING CODE NUMBERS

major source of heating		supplementary source of heating	
-------------------------------	--	------------------------------------	--

8. What heating facilities do you use?
- Heating installation for several households (block, entrance, etc.) .. 1
 - Heating system for the whole place 2
 - heating appliances in each room..... 3
 - portable heating appliances 4

WRITE DOWN THE CORRESPONDING CODE NUMBERS

major heating facilities		supplementary heating facilities	
--------------------------------	--	-------------------------------------	--

9. How much was your heating bill per month, on the average, during the last heating season?

Leva per month

10. During the last few years, did you have to restrict the heating to some of the rooms only?
- nothing changed..... 1
 - yes, in positive direction 2
 - yes, in negative direction..... 3

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- 11. What does this positive or negative change consist in?

.....

12. How many apartments are there in this building

13. HOW MANY FLOORS DOES THE BUILDING HAVE?

14. What is the place?

- An apartment in an apartment block 1
- a house 2
- an apartment in a house 3

15. What is the total living space of the apartment (sq. m)?

16. How many rooms are there in the dwelling?

17. Who owns the dwelling?

- the household.....
- relatives of the household that is living there 2
- the city council..... 3
- the employer..... 4
- others 5

Are you satisfied with the heating of your dwelling?	Completely satisfied	somewhat satisfied	somewhat dissatisfied	absolutely unsatisfied	don't know
18. The temperature in your dwelling	1	2	3	4	5
19. The effect on the hygiene of your dwelling	1	2	3	4	5
20. The costs this kind of heating incurs	1	2	3	4	5
21. The time it takes	1	2	3	4	5
22. The physical effort it requires	1	2	3	4	5

THE NEXT QUESTION CONCERNS ONLY THOSE WHO USE COAL, FIREWOOD, MAZUT OR DIESEL OIL FOR HEATING. THE OTHERS GO TO QUESTION 23.

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23. How much room do you spare for the storage of the fuel you need for heating?

24. How do you provide the hot water supplies for your household?

- Boiler installation for the whole building 1
- electrical boiler for the dwelling 2
- gas boiler 3
- other boiler 4

25. What kind of cooker do you use?

- electric 1
- gas 2
- solid fuel 3
- gas and electricity 4
- other 5

I will read you now different opinions about using natural gas in the household. For each of these, you have to tell me whether you strongly agree, agree, disagree, strongly disagree, or have not thought about these issues.

	Strongly agree	agree	disagree	strongly disagree	haven't thought
26. Heating with natural gas would be cheaper than the heating you're currently using.	1	2	3	4	5
27. Natural gas is much more dangerous to use than the kind of heating you're currently using.	1	2	3	4	5
28. Heating with natural gas is much more hygienic for the dwellings	1	2	3	4	5
29. Gas conversion is extremely expensive and people cannot afford it.	1	2	3	4	5
30. Using natural gas would be better for the environment.	1	2	3	4	5
31. Gas heating is more convenient as it requires no storage space.					

	Strongly agree	agree	disagree	strongly disagree	haven't thought
32. Natural gas heating is attractive because you do not pay until after the fuel is used.					
33. The supplies of natural gas fuel are guaranteed reliable.					

HAVING IN MIND:

- THE TYPE OF THE DWELLING (HOUSE OR BLOCK OF FLATS AND THE NUMBER OF THE APARTMENTS IN IT)
- THE EXISTENCE OR NOT OF HEATING INSTALLATION

USING THE TABLE DEFINE THE EXPECTED APPROXIMATE PRICE FOR THIS DWELLING CONCRETE. TYPE THE NUMBER INTO THE PRICE FORM - SHOW CARD. SHOW IT TO THE RESPONDENT.

In your case, conversion to gas would cost about Leva. This is the one-time cost of connecting to the gas pipeline and making changes in the appliance to use gas (if appropriate). Of course, at some other time, the heating appliance may need to be replaced, but this is true whether natural gas or other energy sources are used.

If you were to convert to gas, there may be alternative ways to finance this cost. Of course, you could pay the entire amount in cash at the time of conversion. However, the Municipality is developing a loan program from which you could borrow part of the money to pay this conversion. Three options are proposed, all with a six month grace period before interest would be assessed or you would have to make payment. All three options would require you to pay 1/3 of the conversion costs and would allow you to borrow 2/3 of the costs at the following terms.

Option 1:

Twelve months loan by interest rate 16% (one third of the Bulgarian National Bank interest rate).

Option 2:

Eighteen months loan by interest rate 24% (half of the Bulgarian National Bank interest rate)

Option 3:

Thirty six months loan by interest rate 32 (two thirds of Bulgarian National Bank interest rate)

In addition to these initial costs, the price of gas matters a lot as well.

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Let us consider some possibilities for conversion to gas heating in your household as well as some ways for payment of initial costs. A YES answer in no way signals that you must convert if option provided. However, we would ask you to answer the questions as honestly as you can.

34. If the costs of heating with natural gas are 20 % less than your current costs, would you convert to gas? - Yes1
 - No.....2 ⇒ SKIP TO Q.37

35. Would you pay the whole amount of the initial costs in cash? - Yes 1
 - No.....2
 IF "YES", GO TO Q. 46 - Within the 6 months grace period ... 3

36. Which of the following loans from the Municipal Fund for Gasification would you prefer? - Option 1 - 12 months..... 1
 - Option 2- 18 month 2
 - Option 3 - 36-month 3
 GO TO Q. 44.

37. If the costs of heating with natural gas are 30 % less than your current costs, would you convert to gas? - Yes1
 - No.....2 ⇒ SKIP TO Q.40

38. Would you pay the whole amount of the initial costs in cash? - Yes 1
 - No.....2
 IF "YES", GO TO Q. 46 - Within the 6 months grace period ... 3

39. Which of the following loans from the Municipal Fund for Gasification would you prefer? - Option 1 - 12 months..... 1
 - Option 2- 18 month 2
 - Option 3 - 36-month 3
 GO TO Q. 46

40. If the costs of heating with natural gas are 40 % less than your current costs, would you convert to gas? - Yes1
- No.....2 ⇒ SKIP TO Q.43

41. Would you pay the whole amount of the initial costs in cash? - Yes 1
- No..... 2
IF "YES", GO TO Q. 46. - Within the 6 months grace period ... 3

42. Which of the following loans from the Municipal Fund for Gasification would you prefer? - Option 1 - 12 months..... 1
- Option 2- 18 month 2
- Option 3 - 36-month 3
GO TO Q. 46.

43. Why don't you want to convert to gas heating?

.....
.....
.....

44. Would you convert to gas heating if you are offered to pay only 3/4 of the real initial costs for conversion? - Yes 1
- No..... 2

IF "YES", GO TO Q. 46.

45. In what conditions would you convert to gas heating?

-
-
-

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Except for space heating natural gas can be also used in the household for cooking (using gas cookers) and for water heating (using gas water boilers).

-
46. Would you like to connect your dwelling to the natural gas pipeline network in order to use natural gas for household supplies?
- yes, immediately after it will be technically possible 1
 - only if I would have the possibility to get a loan for this..... 2
 - Perhaps after some time 3
 - I am not interested in this 4
 - I have no opinion..... 5
-

47. How many of you are there in your household? -
-

48. How old are you? -

RECORD THE AGE OF THE HEAD OF THE HOUSEHOLD.

49. RECORD GENDER OF THE HEAD OF THE HOUSEHOLD.
- female 1
 - male 2
-

50. Stages in family life cycles?
- Bachelor stage 1
 - Newly married, no children..... 2
 - Full nest: youngest child under 6.... 3
 - Full nest: youngest child under 14... 4
 - Full nest: youngest child under 18... 5
 - Empty nest: head of family still working, no dependent children 6
 - Empty nest: head of family retired .. 7
 - Solitary survivor..... 8
-

51. Which of the following categories best describes your last months household income per member of the household (including incomes from all sources not only salaries or pensions, and for all household members)?
- Up to 1000 Leva..... 1
 - 1001 - 2000..... 2
 - 2001 - 3000..... 3
 - 3001 - 4000..... 4
 - 4001 - 5000..... 5
 - 5001 - 7000..... 6
 - 7000 - 8000..... 7
 - over 8000 8

52. Do you have a permanent job?	- Yes	1
	- Unemployed	2
APPLIES TO THE HEAD OF THE HOUSEHOLD	- retired	3
	- housewife, on maternity leave	4
	- other	5

53. What is your occupation?
APPLIES TO THE HEAD OF THE HOUSEHOLD

-
 -
 -
-

54. Would you like to have some additional information about the project and the possibilities for your participation in it?	- yes	1
	- no.....	2

Thank you for your cooperation.
If you have any questions or if you wish to make any other comments, you can call 24 70 70 by June 5, 1995 at the latest and you will talk with a representative of the Humanities Research Center. Information about the Project for the Gasification of Stara Zagora as well as the results of this survey will be made available to those interested.

Thank you again! See you soon.

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ANNEX B

ATTITUDE FREQUENCIES

Q26 ATTITUDE-CHEAPER

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
strongly agree	1	104	34.7	60.5	60.5
agree	2	52	17.3	30.2	90.7
disagree	3	9	3.0	5.2	95.9
strongly disagree	4	7	2.3	4.1	100.0
no opinion	5	128	42.7	Missing	
Total		300	100.0	100.0	

Mean 1.529
 Valid cases 172 Missing cases 128

Q27 ATTITUDE-DANGER

Valid Value Label	Cum Value	Frequency	Percent	Valid Percent	Cum Percent
strongly agree	1	133	44.3	51.0	51.0
agree	2	83	27.7	31.8	82.8
disagree	3	26	8.7	10.0	92.7
strongly disagree	4	19	6.3	7.3	100.0
no opinion	5	39	13.0	Missing	
Total		300	100.0	100.0	

Mean 1.736
 Valid cases 261 Missing cases 39

Q28 ATTITUDES-HYGIENIC

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
strongly agree	1	134	44.7	56.5	56.5
agree	2	49	16.3	20.7	77.2
disagree	3	39	13.0	16.5	93.7
strongly disagree	4	15	5.0	6.3	100.0
no opinion	5	63	21.0	Missing	
Total		300	100.0	100.0	

Mean 1.726 Median 1.000
 Valid cases 237 Missing cases 63

Q29 ATTITUDE-EXPENSIVE CONVERSION

33

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
strongly agree	1	55	18.3	37.4	37.4
agree	2	36	12.0	24.5	61.9
disagree	3	36	12.0	24.5	86.4
strongly disagree	4	20	6.7	13.6	100.0
no opinion	5	153	51.0	Missing	
Total		300	100.0	100.0	
Mean	2.143	Median	2.000		
Valid cases	147	Missing cases	153		

Q30 ATTITUDE-ENVIRONMENT

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
strongly agree	1	176	58.7	69.3	69.3
agree	2	52	17.3	20.5	89.8
disagree	3	13	4.3	5.1	94.9
strongly disagree	4	13	4.3	5.1	100.0
no opinion	5	46	15.3	Missing	
Total		300	100.0	100.0	
Mean	1.461	Median	1.000		
Valid cases	254	Missing cases	46		

Q31 ATTITUDE-NO STORAGE

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
strongly agree	1	251	83.7	87.8	87.8
agree	2	31	10.3	10.8	98.6
disagree	3	1	.3	.3	99.0
strongly disagree	4	3	1.0	1.0	100.0
no opinion	5	14	4.7	Missing	
Total		300	100.0	100.0	
Mean	1.147	Median	1.000		
Valid cases	286	Missing cases	14		

Q32 ATTITUDE-NO PREPAIMENT

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
strongly agree	1	235	78.3	87.7	87.7
agree	2	29	9.7	10.8	98.5
disagree	3	3	1.0	1.1	99.6
strongly disagree	4	1	.3	.4	100.0
no opinion	5	32	10.7	Missing	

34

Total 300 100.0 100.0

Mean 1.142 Median 1.000
Valid cases 268 Missing cases 32

Q33 ATTITUDE-RELIABLE SUP.

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
strongly agree	1	80	26.7	50.0	50.0
agree	2	41	13.7	25.6	75.6
disagree	3	25	8.3	15.6	91.3
strongly disagree	4	14	4.7	8.8	100.0
no opinion	5	140	46.7	Missing	
		-----	-----	-----	
	Total	300	100.0	100.0	
Mean	1.831	Median	1.500		
			Valid cases	160	Missing cases 140

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ANNEX C

WILLINGNESS TO CONVERT BY SOCIAL-DEMOGRAPHIC STRUCTURE



WILLINGNESS TO CONVERT BY SOCIAL-DEMOGRAPHIC STRUCTURE

	Willignes to convert			
	cash	loan	add. conditions	refuse
AGE				
UP TO 34	21.2%	57.6%	21.2%	
35 - 44	14.8%	50.8%	27.9%	6.6%
45 - 54	9.1%	62.3%	18.2%	10.4%
55 - 64	16.7%	45.8%	18.1%	19.4%
65 +	14.0%	33.3%	35.1%	17.5%
MONTHLY INCOME				
up to 1000		33.3%	55.6%	11.1%
up to 2000	8.5%	45.8%	27.1%	18.6%
up to 3000	11.7%	45.8%	28.3%	14.2%
up to 4000	21.3%	53.2%	12.8%	12.8%
up to 5000	17.5%	62.5%	17.5%	2.5%
up to 7000	27.8%	66.7%	5.6%	
up to 8000		100.0%		
over 8000	33.3%	33.3%	33.3%	
FAMILY LIFE CYCLES				
bachelor	25.0%	50.0%	12.5%	12.5%
newly married, no children	66.7%	16.7%	16.7%	
full nest, child under 6	8.3%	62.5%	29.2%	
child under 18	12.0%	55.4%	26.1%	6.5%
no dependent children	16.4%	49.3%	19.4%	14.9%
retired	13.8%	42.6%	25.5%	18.1%
solitary survivor		66.7%	11.1%	22.2%
PERMANENT JOB				
yes	17.2%	56.7%	20.4%	5.7%
unemployed	5.9%	41.2%	23.5%	29.4%
retired	11.9%	40.4%	27.5%	20.2%
other	11.8%	58.8%	29.4%	
Total	14.3%	50.0%	23.7%	12.0%

ANNEX D

**WILLINGNESS TO CONVERT BY GENERAL NATURAL GAS
HEATING ATTITUDE**

**WILLINGNESS TO CONVERT BY GENERAL NATURAL GAS HEATING ATTITUDE,
PAYBACK PERIOD AND PRICE OF CONVERSION**

	Willignes to convert			
	cash	loan	add. conditions	refuse
General NG-heating attitude				
very negative		12.5%	50.0%	37.5%
negative	14.3%	28.6%	33.3%	23.8%
positive	15.4%	54.8%	18.3%	11.5%
very positive	14.4%	54.8%	23.3%	7.5%
Payback period (years) at 40% savings				
up to 5	33.3%	57.8%	4.4%	4.4%
6 - 15	31.3%	59.4%	3.1%	6.3%
16 - 30	12.0%	64.0%	24.0%	
31 - 50	7.5%	56.3%	28.8%	7.5%
more than 50	7.7%	37.6%	32.5%	22.2%
PRICE - THOUSANDS LEVA				
up to 20	35.3%	58.8%	2.0%	3.9%
20 - 50	21.7%	60.9%	8.7%	8.7%
50 - 100	50.0%	50.0%		
100 - 150	9.8%	50.9%	27.6%	11.7%
200 and more	4.9%	36.1%	37.7%	21.3%
Total	14.3%	50.0%	23.7%	12.0%

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ANNEX E

LOGISTIC REGRESSION 1

Logistic regression - 1

Total number of cases: 300 (Unweighted)
Number of selected cases: 300
Number of unselected cases: 0

Number of selected cases: 300
Number rejected because of missing data: 1
Number of cases included in the analysis: 299

Dependent Variable Encoding:

Original Value	Internal Value
.00	0
1.00	1

Dependent Variable.. CASHLOAN Cash & Loan vs. refuse and add. conditions

Beginning Block Number 0. Initial Log Likelihood Function

-2 Log Likelihood 388.81776

* Constant is included in the model.

Beginning Block Number 1. Method: Enter

Variable(s) Entered on Step Number

1..	Q51AN	Annual Household Income
	Q48	AGE
	APC	Air polution concerns
	NG_ATT	NG heating general attitude
	BNFIT_40	Benefit at 40% decrease of heating costs
	Q55	PRICE OF CONVERSION

Estimation terminated at iteration number 4 because
Log Likelihood decreased by less than .01 percent.

-2 Log Likelihood 312.659
Goodness of Fit 329.535

	Chi-Square	df	Significance
Model Chi-Square	76.159	6	.0000
Improvement	76.159	6	.0000

Classification Table for CASHLOAN

		Predicted		Percent Correct
		Refuse or add.co R	Cash or Loan C	
Observed		+-----+-----+		
Refuse or add.co	R	55	51	51.89%
		+-----+-----+		
Cash or Loan	C	28	165	85.49%
		+-----+-----+		
				Overall 73.58%

----- Variables in the Equation -----

Variable	B	S.E.	Wald	df	Sig	R	Exp(B)
Q51AN	5.11E-06	2.236E-06	5.2277	1	.0222	.0911	1.0000
Q48	-.0306	.0105	8.4346	1	.0037	-.1286	.9699
APC	.1559	.1976	.6227	1	.4301	.0000	1.1687
NG_ATT	.4351	.2860	2.3145	1	.1282	.0284	1.5452
BNFIT_40	.0003	.0001	3.8385	1	.0501	.0688	1.0003
Q55	-1.5E-05	2.364E-06	38.4351	1	.0000	-.3061	1.0000
Constant	2.3830	.9006	7.0018	1	.0081		

Significant predictors are:

- price of conversion
- age of the head of the household
- annual household income
- expected benefits from cheaper gas fuel

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ANNEX F

LOGISTIC REGRESSION 2

Logistic regression - 2

Total number of cases: 300 (Unweighted)
 Number of selected cases: 300
 Number of unselected cases: 0

Number of selected cases: 300
 Number rejected because of missing data: 1
 Number of cases included in the analysis: 299

Dependent Variable Encoding:

Original	Internal
Value	Value
.00	0
1.00	1

Dependent Variable.. CASHLOAN Cash & Loan vs. refuse and add. conditions

Beginning Block Number 0. Initial Log Likelihood Function

-2 Log Likelihood 388.81776

* Constant is included in the model.

Beginning Block Number 1. Method: Enter

Variable(s) Entered on Step Number

1..	Q51AN	Annual Household Income
	Q48	AGE
	APC	Air polution concerns
	NG_ATT	NG heating general attitude
	PBP_40N	Payback period

Estimation terminated at iteration number 4 because
 Log Likelihood decreased by less than .01 percent.

-2 Log Likelihood	329.828
Goodness of Fit	304.013

	Chi-Square	df	Significance
Model Chi-Square	58.989	5	.0000
Improvement	58.989	5	.0000

Classification Table for CASHLOAN

	Predicted		Percent Correct
	Refuse or add.co	Cash or Loan	

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		R	C	
Observed				
Refuse or add.co	R	44	62	41.51%
Cash or Loan	C	22	171	88.60%
Overall				71.91%

----- Variables in the Equation -----

Variable	B	S.E.	Wald	df	Sig	R	Exp(B)
Q51AN	3.88E-06	2.099E-06	3.4175	1	.0645	.0604	1.0000
Q48	-.0250	.0102	6.0084	1	.0142	-.1015	.9753
APC	.1527	.1893	.6502	1	.4200	.0000	1.1650
NG_ATT	.2465	.2760	.7976	1	.3718	.0000	1.2795
PBP_40N	-.0219	.0044	24.5247	1	.0000	-.2407	.9783
Constant	1.9923	.8320	5.7342	1	.0166		

Significant predictors are only:

- *Payback period (strongly related to price of conversion and benefits from cheaper gas fuel)*
- *age of the head of the household*

***** PROBIT ANALYSIS *****

Parameter estimates converged after 11 iterations.
Optimal solution found.

Parameter Estimates (PROBIT model: (PROBIT(p) = Intercept + BX):

	Regression Coeff.	Standard Error	Coeff./S.E.
PBP40NG	-.40080	.06329	-6.33246

Intercept	Standard Error	Intercept/S.E.
1.91373	.26468	7.23037

Pearson Goodness-of-Fit Chi Square = .985 DF = 3 P = .805

Since Goodness-of-Fit Chi square is NOT significant, no heterogeneity factor is used in the calculation of confidence limits.

Observed and Expected Frequencies

PBP40NG Payback period (years) at 40% savings

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
up to 5 years	1.00	45	15.0	15.1	15.1
6 - 15 years	2.00	32	10.7	10.7	25.8
16 - 30 years	3.00	25	8.3	8.4	34.1
31 - 50 years	4.00	80	26.7	26.8	60.9
more than 50 years	5.00	117	39.0	39.1	100.0
.	.	1	.3	Missing	
	Total	300	100.0	100.0	

Valid cases 299 Missing cases 1

***** PROBIT ANALYSIS *****

Observed and Expected Frequencies

PBP40NG	Number of Subjects	Observed Responses	Expected Responses	Residual	Prob
up to 5 years	45.0	41.0	42.068	-1.068	.93485
6 - 15 years	32.0	29.0	27.743	1.257	.86696
16 - 30 years	25.0	19.0	19.039	-.039	.76156
31 - 50 years	80.0	51.0	49.754	1.246	.62192
more than 50 years	117.0	53.0	54.292	-1.292	.46403

There is a strong correlation between probability of real participation in the gasification project and supposed payback period.

ANNEX G

FACTOR ANALYSIS

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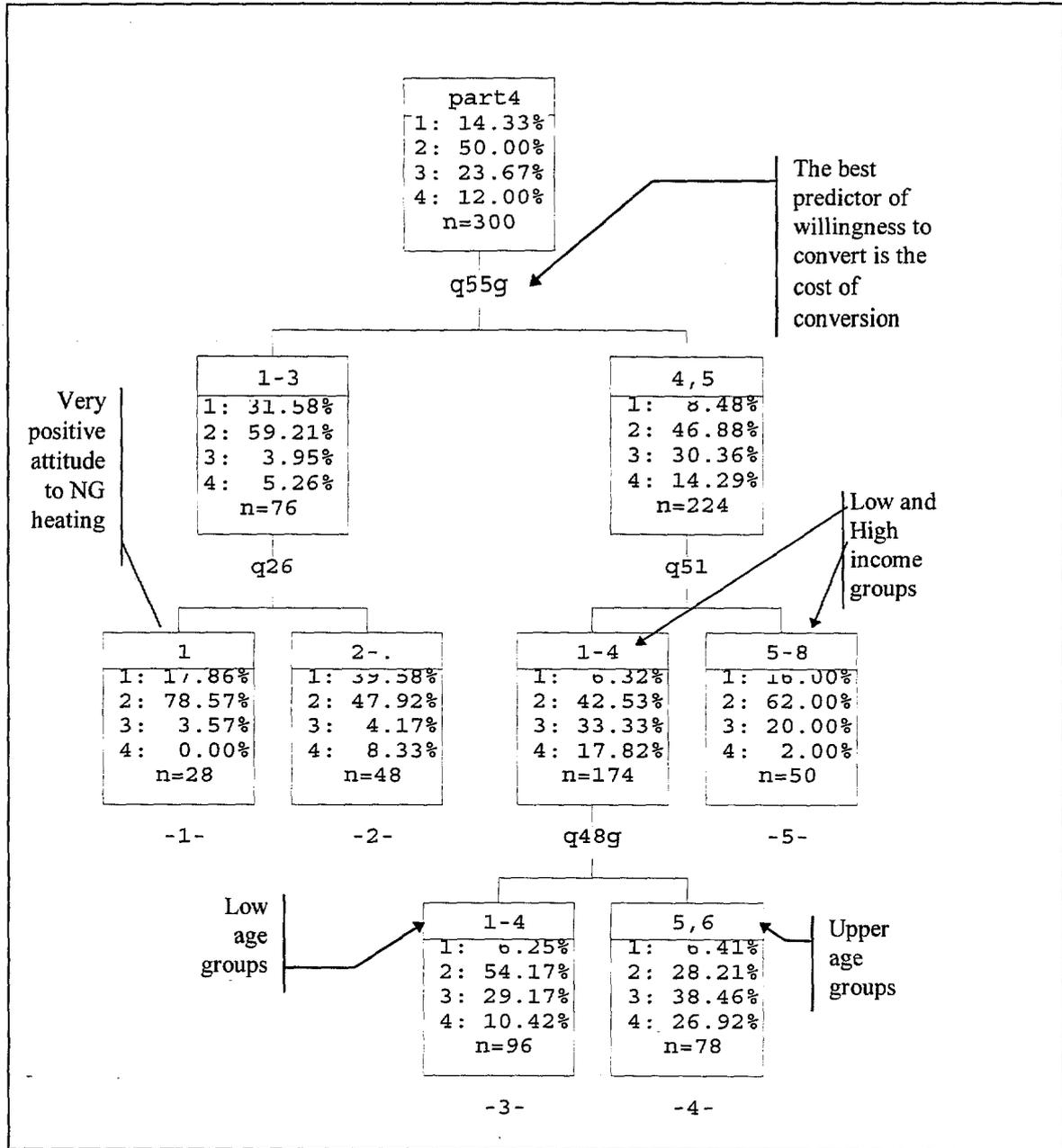
CHAID tree diagram
consecutive hierarchical division of the universe
by the best predictor into smaller and more homogenous clusters.

Dependant variable: part4 -

1. will pay cash
2. will use a loan
3. will search additional advantages
4. refuse

Predictors: q55 (Price of conversoin), q26 (Attitude to NG heating), q51 (Income level), q48 (Age)

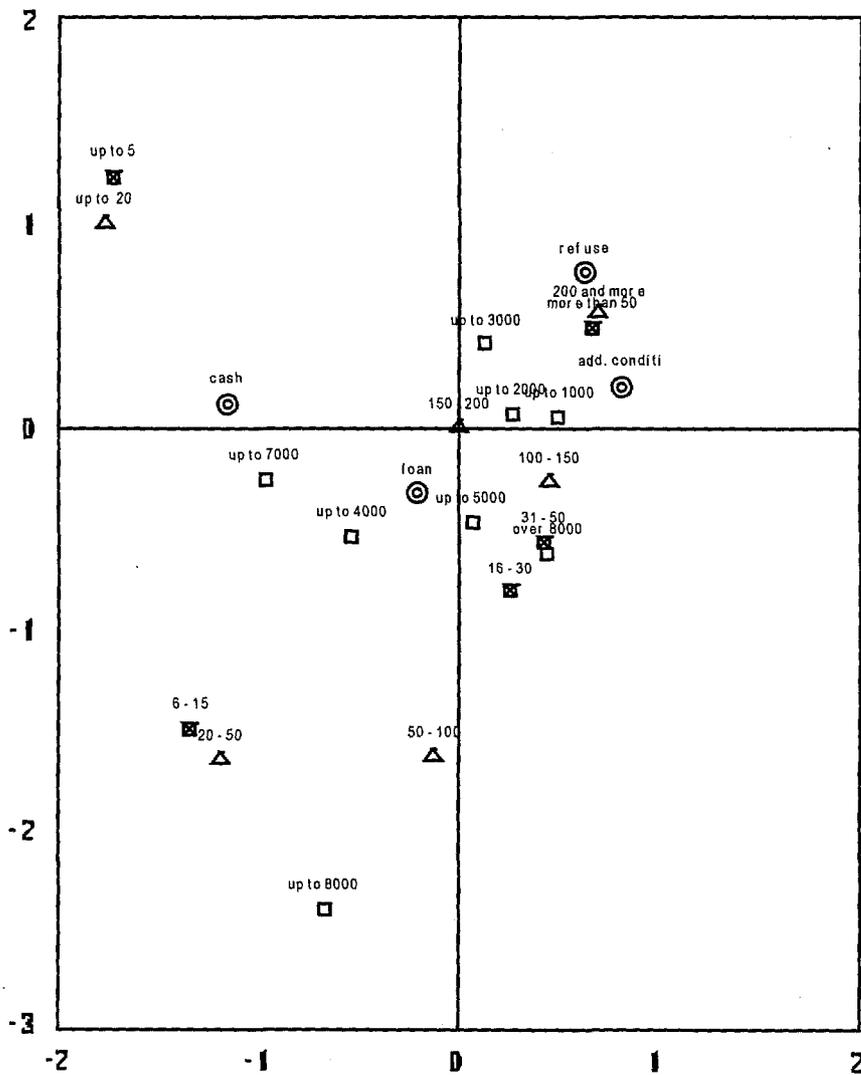
Percentages in boxes show the distribution of dependant variable in the particular cluster, n is the size of the cluster.



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Willingness to convert

Multiple correspondence analysis



Stara Zagora, june - july 1995