Impact of the withdrawal of modern energy on the urban poor

FINAL TECHNICAL REPORT

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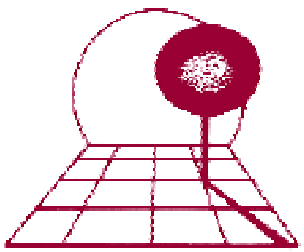

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1 Executive Summary

The project was formulated in response to observations by the partners that newly formulated energy reform programmes were likely to have adverse impacts on low income households, and to a recognition in the literature of the need for field data to assist decision makers in policy making. The project has gathered field level information on the impact to date of recent changes in energy supply industries, and has explored the various coping strategies that consumers are likely to adopt in response to forthcoming changes (increased energy costs). It has also sought to identify the likely impact of increasing energy costs on the urban poor at a household level. The project makes a contribution, therefore, to the growing body of evidence on the impacts of energy sector reforms in transitional and emerging economies.

The project worked with partners in Albania, Kyrgyzstan, and Moldova. The process involved preliminary surveys in capital cities of each, which provided opportunities to interview policy makers and stakeholders; partners also carried out preliminary household interviews to explore the research topic. The detailed design of the household survey questionnaires was based on information gathered during subsequent focus group discussions. Detailed household surveys were conducted in low income neighbourhoods of each capital, covering both urban and suburban areas. Findings the data analysis were tested through consultation exercises based on workshops and individual discussions. Aside from this report, outputs from the project include a document presenting case studies in energy service provision in low income neighbourhoods, and individual country reports designed to meet the needs expressed during the consultation exercises.

All countries share common experiences following the transition from communist systems - rapidly increasing residential demand at the same time as declining industrial demand, lack of investment in infrastructure, and escalating losses. These conditions have led to the implementation of reform programmes in an effort to improve the performance of the sectors. However, the energy and urban contexts in each are different – for example, in terms of national energy resources, local energy markets (e.g. LPG only widely available in Albania), utilisation of piped energy services (gas and district heating), housing stock (houses or flats). Moldova has made more progress with their energy sector reforms than either Albania or Kyrgyzstan; this is the only country that has attracted investment from a private company. It appears that the affects of reforms in these two countries have yet to be felt at consumer level.

Coping strategies in each country are different, confirming that there is no generic consistency of response to increasing energy costs. In Albania people are most willing to switch to alternative fuels (houses permit the flexibility to do so); in Kyrgyzstan, people are most likely to make informal (illegal) arrangements, and in Moldova, people are most likely to pay more. This tallies with the fact that there is almost universal belief that people should pay for their electrical consumption in Albania, yet 13% disagree with this in Kyrgyzstan. In all countries, it is the poorest who appear to have the strongest willingness to pay more for energy. Overall, people do not fear consequences of non-payment, indicating a degree of confidence in their ability to pay.

In general, the predicted responses of the poor to increasing costs are similar to those of the samples as a whole. A trend evident in Moldova and Kyrgyzstan (but not in Albania) is that the poorest indicate more positive attitudes towards adopting changes than the mid wealth groups. This indicates that it is low income groups that are likely to be most severely affected

by electricity price rises in particular - the poorest tend to rely more on alternative fuels and are, therefore, less exposed to price rises.

There is consistency across all countries that the greatest negative impacts are likely to be on health, arising from reduced energy use (heating, hot water and cooking). People are most likely to save money by reducing household expenditure on housing, which will have implications in terms of health, and increased energy consumption associated with potential deterioration of housing stock.

There has been a mixed response to changes to date. For example, a large proportion of households have changed fuels in Albania, but only a small proportion in Moldova. This reflects the importance of housing stock in constraining ways in which consumers can respond to increasing process e.g. flats are not designed to have wood burning stoves installed. Fuel substitution depends on local energy markets e.g. the price and availability of LPG, and the availability of wood, which in turn depends on environmental protection legislation. The case studies demonstrate ways in which low income communities can engage with authorities to secure access to energy infrastructure, an important feature of which is the role that can be played by local NGOs.

The report concludes with a number of recommendations relating to management of electricity services in low income neighbourhoods (e.g. metering), the value of communication strategies, the development of local markets (fuels and appliances), energy conservation strategies, and the legal environment. These include a number of specific recommendations for further research.

2 Introduction

2.1 Background

Energy is recognised as one of the most critical problems facing many eastern European countries. Many economies were based on energy intensive industries and the penetration of electricity to households was extremely high, leading to a high degree of dependency on electricity supplies.

Electricity was supplied by large, vertically integrated, state funded generation, transmission, and distribution networks. In several countries, the transition to a market based electricity industry has not been smooth, and systems have fallen into decline through lack of management, maintenance, and investment. Non-technical losses are high for a number of reasons, such as un-metered households, poor billing practice, and non-payment. Many countries are sparsely populated – for example, Kyrgyzstan is only slightly smaller than the United Kingdom, yet its population is less than 10% of that of the UK - this means that energy supply density of distribution networks is low, leading to relatively high technical losses. Electricity supply industries can, therefore, face total losses of 40% or more. Some interesting energy trading arrangements have arisen, notably in the former Soviet Union countries (along with the political tensions that go with them). For example, Kyrgyzstan exports electricity (generated by hydro) to neighbouring Uzbekistan, which was formerly the trading centre for the region. Changes have resulted in some countries ending up with excess generating capacity, whilst others suffer from inadequate generating capacity, especially where plant has become inoperable due to lack of maintenance.

The electricity supply industries in former soviet economies have been identified as a priority for economic development. Governments, supported by incentives of loans and investments from international institutions, have implemented policies of liberalisation and privatisation. Such policies are primarily based on macro economic considerations, but the authorities recognise the gravity of the potential consequences of increased electricity costs, especially on the poor.

Energy makes up a significant part of household expenditure. In some cases the average energy expenditure is around 40% of a households expenses. Almost inevitably the use of energy for wellbeing – basic heating lighting and cooking – is similar for a person regardless of income. This means that the poor often end up paying a higher percentage of their income on energy. The options for coping mechanisms for addressing energy needs are limited. And failure to have adequate energy in the right form can lead to negative impacts on the household in terms of health and livelihoods. In the transition to a market based electricity industry, collection of revenues is likely to increase, prices may increase, social welfare mechanisms may degrade, and it is the poor that may take the brunt of the negative impact, leading in some instances to the adoption of alternative energy acquisition and management strategies.

2.2 Project description

The research project was intended to investigate the impact of recent changes on the urban poor of three representative eastern block countries, and to consider the likely coping mechanisms being employed and to be possibly deployed in the near future. Outputs are aimed at helping policy makers and CSOs understand the likely impact of changes in energy supplies on the urban poor.

The project brought together NGOs and energy institutions in Albania, Kyrgyzstan, and Moldova. Field research was carried out in collaboration with local partners:

- Energy Efficiency Centre in Albania;
- Women's NGO 'Alga' in Kyrgyzstan;
- Agape, and NGO in Moldova.

Whilst the original proposal asserted that the urban poor would already be experiencing deterioration of energy supplies, either through reduced quality of supply (in which case they may seek alternative and more reliable energy sources), or through increased costs (tariff increases and enforcement of bill payment), this appears not to be the case in the research countries – the impacts of energy sector reforms have yet to be experienced by the poor.

The research methodology was, therefore, changed slightly to use statistical analysis to identify not only how people's behaviour with respect to energy use has already changed, but also how they are likely to cope with forthcoming changes when ongoing reforms do start to have an impact.

The project has been successful in making links with other ongoing donor funded initiatives addressing similar issues associated with social protection as part of energy sector reforms. There has been an exchange of data and reports with the DFID funded Tariff Reform Project in Kyrgyzstan, and there have been exchanges of information with the World Bank programme 'poverty and social impact assessment of utility price increases in Moldova'; as a result of this DFID research project the Moldova partners have taken part in further countrywide survey work on behalf of the World Bank.

2.3 Conclusions from Literature Review

The impact of electricity withdrawal on the rural poor due to changes in the electricity supply system is seen to be one consequence of the politico/economic developments in the Eastern European ex Communist block. Whilst the overall problems are financial, and to some extent inadequate management skills, the practical implications of the changes are very complex. Firstly with regards to the electricity system itself - previously there was regional control which has now been replaced by independent operators in the countries concerned. For a power system to operate successfully it should be regularly maintained and updated. Otherwise breakdowns will occur with increasing frequency. If the demand should increase beyond the generating capacity outages will be necessary. Similarly if the generating capacity is there but the transmission/distribution system is inadequate to meet increased demand there will be increased losses and some voltage reduction. `Losses' are frequently mentioned in the literature and can represent a significant fraction of the total power generated. Whilst some of this is undoubtedly resistive losses in the system perhaps the greater part is due to fraud and other non-payment. Authors do not always indicate the nature of the losses that they report.

The latter fraction of `losses' are financial. Other financial problems include difficulty in payment of fuel import leading to outages. Income to the power companies can be restricted by Government pressure on price reduction. The problem is exacerbated by the move to privatisation and the need to generate income for investors.

One of the problems with privatisation in general is that the entity to be privatised needs to be sufficiently attractive to encourage private sector investment. This is shown through the successful example of recent restructuring in Bolivia. Here 50% of the state owned electricity companies shares was sold to private companies, 5% given to the company's employees, and 45% into a private pension fund. The result has been that it has successfully brought about foreign investment, whilst at the same time increasing the number of electricity connections which have not by-passed the poor (Barja & Urquiola 2001). In contrast the Southern African Energy sector has failed to make itself attractive. Anneke puts this down in part to current levels of international debt, a weak economic administration and political instability. Even the recent moves to democracy over the past few decades have not been enough, as the real problem lies in high inflation and interest rates (Anneke 2000). According to USAID (2003) for Kyrgyzstan this need to make themselves attractive to foreign investment is currently hampered by weak governance, political ethnic tensions and border issues with Tajikistan and Uzbekistan. In addition 60.5% of the population live below the poverty line, current debt servicing takes up 50% of the national budget and the banking sector is very weak. Added to this is the assumption that privatisation will increase the efficient running of the sector, reduce prices and improve quality of service of the company (Birdsall & Nellis 2002). This is in part due to the introduction of competition (Webb, M 1998), which is based on the assumption that competition will reduce prices and create a new source of capital for the government to cover costs through Foreign Direct Investment.

The literature survey has shown a whole raft of information of tariff reform, differential tariffs and subsidy. Also on regulation. The results of the upheaval in the electrical industry have been planned and unplanned outages and unacceptable price rises leading to the withdrawal of electrical power from the rural poor sector. There is a considerable body of information on various measures which might be adopted to alleviate the problems of electricity to some extent. **But the impact of the problem has been less easy to discover and there is a paucity of information and a lack of field data** (Foster, 2000).

The desire to directly involve the poor in any study is supported by a quote from a participant of a World Bank sponsored Workshop on Global Coalitions of Voices of the Poor (Narayan and Shah, 2000):

> *"Sometimes they do not even let you talk. They say they already know the problem and that they will solve it."*

Whilst this comment was made in the context of emerging information technology, and its potential to redress imbalances of power in the decision –making process that affect the lives of the poor, it may also be applicable when addressing the withdrawal of modern energy. The project has, therefore, sought to explore the opinions and priorities of the poor themselves.

3 Research Methodology

3.1 Project process

The first stage of the project comprised preliminary surveys in Tirane (Albania), Biskek (Kyrgyzstan), and Chisnau (Moldova), which provided opportunities to interview policy makers and stakeholders. Partners also conducted preliminary household interviews to explore the research topic.

A second round of field work used focus group discussions with residents to identify salient issues in each country context. These were used as the basis for the design of household questionnaires (an example questionnaire from Kyrgyzstan is included in Appendix 1).

The NGO in Moldova ran the first questionnaire, and a number of shortcomings became evident, so a revised questionnaire was subsequently designed, and was consistent across Albania and Kyrgyzstan. The research framework is presented figuratively in Figure 1. This indicates the different types of data considered and the proposed interrelationship. Therefore data was gathered regarding the following:

- Household descriptors, including employment and housing status
- Household energy use and changes in fuels
- Impact of tariff reforms, including likely coping strategies and outcomes
- Problems experienced with electrical supplies
- Household financial.

Detailed household surveys were then conducted in each city, and analysis of the data has been completed (analysis reports are presented in Appendix 2 (Albania), Appendix 3 (Kyrgyzstan), and Appendix 4 (Moldova)). The preliminary findings were verified through a consultation exercise based on workshops and face to face discussion with key stakeholders in each country.

Finally, a country paper has been written for translation and dissemination in each country; the format of each country paper has been designed to meet the needs expressed during the consultation exercises.

3.2 Research Framework

The NGO in Moldova ran the first questionnaire, and a number of shortcomings became evident, so a revised questionnaire was subsequently designed, and was consistent across Albania and Kyrgyzstan. The questionnaire comprised the following sections:

- Household descriptors, including employment and housing status
- Household energy use and changes in fuels
- Impact of tariff reforms, including likely coping strategies and outcomes
- Problems experienced with electrical supplies
- Household financial.

The analysis aims to assess how people will react to changes in energy markets – increases in prices, and enforcement of payment (electricity). The options are illustrated in Figure 1:

- Pay more
- Change to cheaper fuels
- Reduce energy consumption

It goes on to consider the possible implications of each of these.

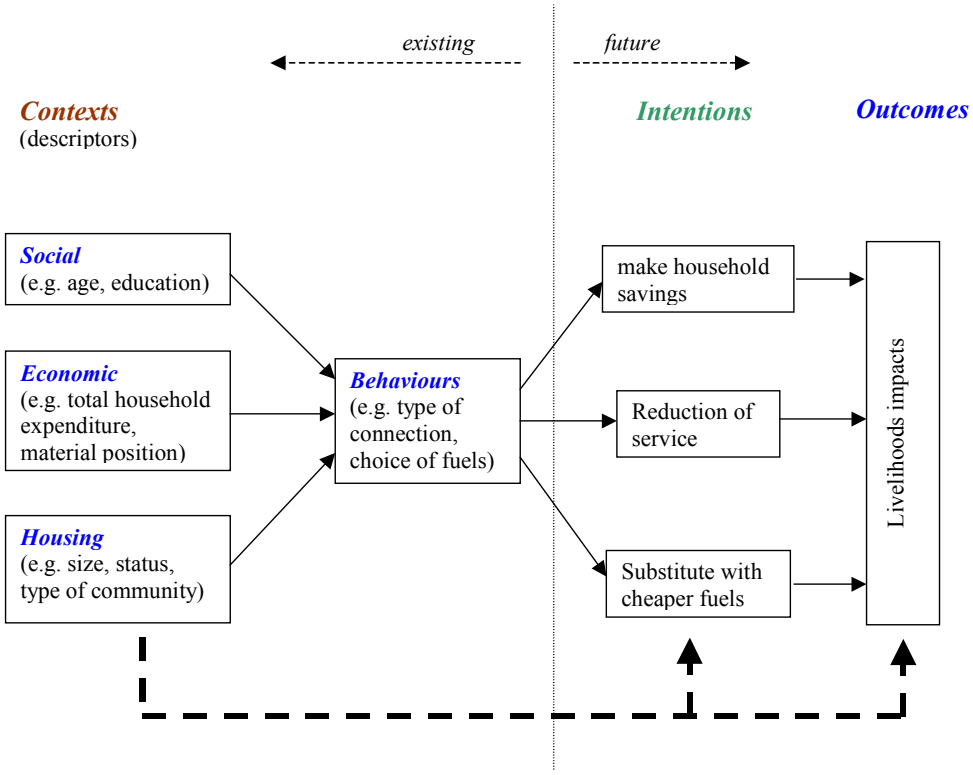

Figure 1 Links between indicators and behaviour

A random, stratified cluster sampling process was applied to population centres (city sectors) that were purposely selected to capture sub samples of urban and suburban residents i.e. findings are not necessarily representative of the national urban context, but of the selected urban centres. The household was the sampling unit; a representative of each household was interviewed. The respondents were asked to provide information regarding their individual status, as well as that of the household in general.

3.3 Description of Samples

The household survey in Moldova was the first to be conducted. The sample size was larger (400) but it was less detailed; shortcomings served to review the design of the survey instruments used in the other countries. In Albania, a sample of 210 households was surveyed within urban (26%) and suburban (74%) neighbourhoods of Tirane (Kamez). In Kyrgyzstan, a sample of 216 households was surveyed within urban (67%) and suburban (33%) neighbourhoods of Bishkek (capital city in the north of the country) and Osh (district capital in the south). A supplementary survey was subsequently carried out in Moldova using a subset of the original survey (198 households) in order to gather data that was compatible with the other country surveys. The key descriptors for each sample are presented in Table 1.

Table 1 Comparison of samples from each country

	Albania	Kyrgyzstan	Moldova
N	210	216	400
Gender (male:female)	85:15	47:53	26:74
Average age	45	35	47
pensioners	22%[1]	21%[2]	24%[3]
unemployed[4]	14%	15%	9%
Household size	5.1	4.0	3.6
Flats / hostels (%)	20%	47%	79%
Houses (%)	80%	43%	19%
Household expenditure / income	280 $/month	110 $/month	32 $/month[5]

3.4 Statistical Analysis

The analysis uses non parametric statistical tests to look for the influence of various social groupings on behaviour and coping strategies. When looking at the influence of social groupings, the analysis has used the Mann-Whitney U test to test for differences between two independent groups, and the Kruskal-Wallace H test to test for differences between three or more groups. Tables in this paper present the probability (p value) that differences between the groupings have occurred by chance. Generally, only differences with a probability of less than 0.05 have been taken to indicate a relationship i.e. statistical significance is taken to be represented by $p =<0.05$. Similarly, when considering correlations between two variables, only where the p value associated with a Spearman Rank Order Correlation Coefficient is less than 0.05, and the correlation coefficient itself is greater than 0.2, has it been assumed that a valid relationship exists.

[1] proportion of pensioner headed households in the sample
[2] proportion of households claiming to have one or more pension in the household
[3] proportion of respondents that are pensioners
[4] Unemployment is particularly difficult to assess due to the prevalence of informal and occasional work.
[5] From preliminary survey; the indicator was dropped from the main survey due to reluctance to answer.

4 Country contexts

4.1 Overview

The three countries targeted have widely different energy resources. Both Albania and Kyrgzstan have considerable hydro resources and generate almost all their electricity by this means. Albania exports crude oil and Kyrgzstan electrical power, whereas Moldova needs to import all of its energy requirements. All three countries have extensive transmission and distribution networks but it is not clear whether these can now be properly maintained, particularly in Kyrgyzstan which is larger and is mostly mountainous.

An overview of country indicators is presented in Table 1, from which it is seen that the target countries have similar population and a low average income, but population density is lower in Kyrgyzstan. On income, Moldova is the lowest having suffered particularly from the break up of the Communist Block which has resulted in a sharp fall in exports. Also, since there are no indigenous energy resources, fuel must be imported. One indicator of the change in Moldovan fortunes is the relatively high ownership of TVs, presumably dating from better times.

The following maps (Figure 2) show neighbouring countries:

Table 1: Country summary (CIA 2002)

	Albania	**Kyrgyzstan**	**Moldova**
Area Total km^2	28,748	198,500	33,843
Land km^2	27,398	191,300	33,371
Population (July 2002)	3,544,841	4,822,166	4,434,547
Pop/ km^2	129	24.3	98.6
Terrain	Mountainous, hilly Small coastal plains	Mountainous Peaks/valleys	Rolling steppe Slope to Black Sea along coast
Crops Arable %	21	7	54
Permanent %	4	0	12
Other %	75	93	34
Climate	Mediteranean	Continental	Generally Temperate
Economy GDP/Capita $ (PPP 2001)	3,800	2,800	2,550
% Below Poverty Line (2000)	30	55	80
Agriculture % (labour%)	52 (50)	38 (55)	28 (40)
Industry	21	27 (15)	21 (14)
Services	27 (Ind + ser 50)	35 (30)	51 (46)
Exports	Textiles Minerals	Ag. Products Minerals	Foodstuffs Textiles
Ag Products	Hydropower	Machinery	Crude Oil
Imports	Machinery Foodstuffs Textiles Chemicals	Oil, Gas Machinery Foodstuffs	Minerals/Fuel Machinery Chemicals/textiles
Communications			
Telephone	2/100 Poor	Poor	Poor
Radios	1,000,000	520,000	3,200,000
TV`s	700,000	210,000	1,260,000
Electricity Production Billion kwh (2000)	4,738	14,677	3,317
Fuel Fossil %	3	7.62	90.44
Hydro %	97	92.38	9.56
Consumption Billion kwh (2000)	5,378	9,818	3,655
Exports	0.1	4,153	0.63
Imports	1,072	0.321	1,2

Figure 2 Maps (Albania, Kyrgyzstan, and Moldova) (CIA 2004)

4.2 National Energy contexts

4.2.1 Albania

Electricity consumption declined sharply in the early 1990s when many industries had to close. Total electricity consumption started to grow again in 1993, initially driven by the residential sector but since 1995 also by the commerce & service sector. The consumption of the industrial sector picked up after the mid 1990s but stayed far off the pre-1990 level. Domestic consumers accounted for 58% of total consumption in 2001. Non-technical losses have been high since 1992. In 1995, they accounted for more than 55% of the total sales. Despite improvements thereafter, the 2001 value of non-technical losses was still 23%.

The high growth in consumption in the residential sector was due to an explosion in ownership of electrical appliances, and the substitution of wood with electricity for thermal applications due to the low costs of electricity (not only tariffs, but also low collection rates), especially in rural areas. The culture of non payment must be seen in the context of general decline in the rule of law which Albania experienced following the collapse of communism, and the pyramid scandal in 1997.

Losses on the Albanian system are estimated to be around 50%, most of which is thought to be due to billing irregularities. Generating capacity is limited and the utility, KESH, have introduced load shedding as a means of minimising imports, which they lack the finance to pay for. Load shedding tends to more common outside of the capital.

Only LPG gas is available, supplied through a free market. There are twelve bottling plants in Albania, all of which receive gas by road tanker (from Italy and Greece), so costs are high. The policy is to make LPG cheaper than high rate domestic electricity and the government has taken measures to reduce the cost of LPG (e.g. removed duty). There are plans to build a gas terminal alongside the existing oil terminal at Vlore, so it is likely that the price of LPG will come down in the medium term future.

4.2.2 Kyrgyzstan

Electricity reforms have unusual ***international political*** implications. Most of the country's generating capacity is hydro-electric, based on the Naryn river in the south of the country. Whilst electricity demand would suggest that water should be released in the winter, this is not when downstream countries require water for irrigation. Neighbouring countries of Uzbekistan, Kazakhstan, and recently Tajikistan make an annual agreement on the release of water, the exports of electricity from Kyrgyzstan, and imports of fossil fuels (notably gas from Uzbekistan).

There are ***district heating schemes*** in 5 cities: Bishkek, Osh, Toknok, Karabola, Jalalbad, although most probably don't work. There are no plans to increase heat tariffs in the next couple of years. The plant at Osh operates intermittently due to unreliability of supply of fossil fuels. Thermal plants are fuelled by natural gas bought from neighbouring Uzbekistan, but price rises and payment problems have resulted in gas supply cut-offs.

Kyrgyzstan's electric power industry is capable of meeting the country's domestic electricity needs while providing surplus electricity for export. Kyrgyzstan has two major electric power plants - a 1.2 GW hydropower plant at Toktogul, and a 0.76 GW thermal plant at Bishkek,

with plans for a major 6.8 GW hydropower station to be built by 2010. In 2000, Kyrgyzstan generated 14.7 billion kilowatt-hours (BkWh) of electricity, up from 13.0 BkWh in 1999, while the country consumed only 9.8 BkWh in 2000. Total consumption has increased only modestly over the last ten years; the consistency in demand is due to the fact that although demand from the residential sector has increased by 50 – 60% over a 10 year period since 1990, industrial demand has decreased.

System losses are estimated to be as much as 50%. However, this is almost entirely due to non payment, due to the policy of permitting people to make their own 'illegal' connection, but then installing a meter and issuing bills when a local inspector discovers the connection.

4.2.3 Moldova

The national energy sector is characterised by a high dependence on imports, as the republic only has modest hydro and biomass energy resources. 98% of the national energy consumption is covered by imports, which require up to 40% of GDP. Natural gas and oil are imported from Russia, coal from Russia and the Ukraine, and although electricity is generated in country, some power is imported from the Ukraine (along with small amounts from Russia and Romania).

Old and poorly maintained infrastructure results in high losses, estimated at around 29%. Efforts to improve collection rates have resulted in a recent drop in losses. Much of recent investments have been made by Union Fenosa (privatised distribution company).

Total electricity consumption has declined by over 30% over the five years to 2002. The residential sector remains the biggest (34%) although the improving economic situation in the country means that the share of the industrial sector is increasing (33% in 2002). In contrast to the situation in Albania, ownership of domestic electrical appliances has decreased (over a ten year period since 1990).

4.3 Energy Reforms

4.3.1 Albania

The Government of Albania has embarked on restructuring of the electricity industry. The Power Sector Policy Statement, approved in 2002, was developed with the assistance of foreign donors including USAID and the World Bank, and sets out six principal objectives:

- A financially and technically strong electric industry;
- An effective and transparent legal and regulatory framework;
- Restructuring of KESH through appropriate unbundling into separate distribution, transmission and generation enterprises;
- Clear market rules and processes for financial settlements;
- Significant private capital and investment by experienced strategic investors through implementation of privatisation in addition to the assistance provided by the international donor community; and
- A competitive electricity market consistent with the European Union's requirements for reform of the electricity sector (Directive 96/92 EU) and Albania's commitments under the Thessaloniki Agreement to support Albania integration within the Southeast Europe Regional Electricity Market (REM) and interconnection with the UCTE System.

One of the main objectives of the Statement is the creation of a financially and technically sound electricity industry. To achieve this, the Government is committed to supporting KESH in its efforts for improving collection rates and for reducing technical and non-technical losses.

Rationalization of electricity tariffs is considered as one of the most critical and crucial reforms for future development of power sector. In order to minimize the effects of this reform, the Statement requires the Ministry of Labour and Social Affairs and the Ministry of Finance, where is appropriate, is to create a mechanism to ease the impact of rate increases upon low-income levels for established minimum levels of service.

4.3.2 Kyrgyzstan

Electricity sector reforms are part of the conditionality of World Bank loans under the Consolidated Structural Adjustment Credit (CSAC) agreement. Within the programme, considerable attention is being paid to "social protection":

- The World Bank carried out a Poverty and Social Impact Analysis in 2002 (Social Impacts of Electricity Sector Reform in the Kyrgyz Republic").
- World Bank sponsored research on the effectiveness of the current system of state benefits - "Beneficiary Evaluation of Unified Monthly Benefits, Socially Protected Prices and Payment System of Housing Allowances"
- DFID funded Tariff Reform Project (carried out by IPA)

In 2001, Kyrgyzstan embarked on a restructuring of Kyrgyzenergo, splitting off the company's distribution networks and leaving the former monopoly as just an electricity generating company. Four joint-stock companies (Sever Elektro, Vostok Elektro, Osh Elektro, and Dzhalalabad Elektro) were created from Kyrgyzenergo in the different regions of the country. However, the new companies are still saddled by their own debts to Kyrgyzenergo and by consumers' failure to pay their electricity bills. Kyrgyzstan plans to privatize these regional electricity distribution companies as the next step in the reform process.

Under the CSAC program the Kyrgyz Government adopted a new Action Plan on recovery and restructuring within the Gas sector. One activity within the Action Plan is to install 90,000 gas meters in Bishkek tenement houses.

Utilities in Kyrgyzstan employ a system of local inspectors to read meters and collect bill payments. There is a widespread practice of reducing bill payments (illegally) by persuading the inspector to reduce the consumption registered, and splitting the benefit with the inspector.

4.3.3 Moldova

A programme of reforms was started in 1997, and the energy industry has already been unbundled and three distribution companies created; one of these was privatised in 2000 and is run by Union Fenosa, a Spanish utility company.

Domestic and agricultural electricity prices were subsidised by industrial consumers. Starting in 1997, electricity tariffs were raised to reflect real costs. However, power enterprises proceeded to purchase power on credit, and foreign debts emerged.

This project has engaged with a couple of donor funded initiatives designed to address the potential negative impact of price rises. The World Bank have carried out a Poverty and

Social Impact Analysis (PSIA) study in Moldova to explore the impact of reforms, and how the poor in particular have been affected. The team have shared data with the PSIA project, and there is a broad agreement in findings and conclusions. USAID is running a Low Income Energy and Social Assistance Program (LIESAP), intended to promote effective means of targeting compensation towards vulnerable households. The programme provides training to government professionals in management and information systems to improved the delivery of social assistance programmes.

4.4 Poverty situation

4.4.1 Albania

Groups identified as particularly poor are pensioners and households where the head is unemployed. Although unemployment has declined since 1992, it remains high (e.g. 17% in 2000). Poverty is more acute in rural areas.

The social insurance system is directed and managed by the Social Insurance Institute (SII) with structures in central, regional and local level. The registered unemployed are treated by two schemes: unemployment benefit and social assistance. There are around 130,000 families receiving some form of economic aid from the state (2001), of which 14,000 receive unemployment benefit, and 50,000 receive a disability benefit. There are around 540,000 pensioners, equivalent to roughly 15% of the total population.

4.4.2 Kyrgyzstan

There is an ongoing process of simplifying the many and complex procedures for administering state support. The principal systems are:

- Unified Monthly Benefits (UMB) – based on a target minimum level of household income; this is the main social protection mechanism covering 515,000 beneficiaries (individuals), equivalent to nearly 1-0% of the total population; rural residents are the main recipients of UMB
- Energy Price Discounts – available on electricity, heat, natural gas, bottled gas and coal; a range of discounts are awarded to different categories of eligible families (which are not related to income or poverty);
- Socially Guaranteed Prices – a system of payments to low income families (excluding Bishkek) intended to compensate for tariff increases since 2002;
- Housing Allowances – to support low income families in Bishkek (5,100 beneficiaries).

It is claimed that 630,000 families (57% of all households) are eligible for various discounts, compensations and subsidies when paying for energy, natural gas and utilities. Benefit is received by all families through lifeline tariffs (electricity).

The systems of privileges (e.g. Energy price discounts) is a legacy of the communist era, and means that benefits are given to people by virtue of their position rather than their economic need; there are over 30 categories e.g. war veterans. Some benefits are given in cash, others in kind, and the practice of paying for goods in kind still exists. The government is under pressure from donors to discontinue both of these practices. The DFID funded Tariff Reform Project (managed by IPA Ltd.) is a comprehensive programme providing advice and support to the government in the reform process, and has a clear pro-poor focus. It has conducted

nationwide household surveys (using a questionnaire similar to that used in this project), with a view to assessing the impact of reforms on consumers, and has shared data sets with this project.

5 Analysis and findings

5.1 Albania

5.1.1 Social, Housing and Economic Context of Sample

An understanding of the types of communities sampled in Albania can be gained by the following key figures:

- The respondents were predominantly male (85%).
- The average age of all respondents was 45; The majority of respondents (40%) were between 35 and 45 years of age
- The majority of respondents have a tertiary or higher level of education
- 66% of heads of households claim to be unskilled workers; 27% professionals; 16% of spouses are involved in some form of unskilled paid labour.
- Only 10% of household heads are in full time employment, 22% are pensioners, and 8% are not working;
- The average size of household was relatively small (mean = 5.09). The average number of children per household was 1.66 children
- The majority (80%) of the respondents live in individual houses, 18% in flats and only 2% in hostels or shacks[6]
- 28% of the respondents live in two room houses, but most people live in 3 room houses.
- 45% claimed their houses were not recognised by the municipal authorities
- The majority of the respondents (75%) claimed to have moved at some time from a rural village to Tirana; these people tend to lack legal tenure.

People were asked to rate the material position of their household on a subjective scale; the results correlate with other indicators of poverty (household income and expenditure, and inability to pay electricity and food bills). 34% indicated that they have difficulty providing food for the family; the majority can meet the food needs of the household but find it difficult to pay for utilities (57%), and only 9% claim to be in a position to meet the basic household needs. The main reason given for inability to pay electricity bills was employment problems (74%) (loss of employment or changing to jobs with lower salaries); increased prices were mentioned by 19%.

The mean household expenditure per year is Lek 409,500 ($280/month). Those without legal tenure reported a significantly higher mean annual expenditure, and expenditure is higher amongst those reporting a stronger material position of the household.

A number of questions were asked regarding perceived changes in the living conditions, including housing, health (child), employment, water and sanitation, education (schooling), communications, security, food and entertainment. The results were combined into a single index, which showed that the general feeling is that living conditions have improved slightly (mean = 0.18, range of scale -2 to +2). Positive changes relate to security, communications

[6] Defined by the interviewer by observation

and education. In contrast deterioration is noted regarding employment and water and sanitation services. A more positive view is expressed by those with legal tenure (as opposed to those with illegal tenure), and those with larger dwellings.

5.1.2 Current Behaviours

Choice of fuels

The three main fuels used are electricity, gas (LPG) and wood. 99% of the sample have electricity, and 96% of households claim to have a legal connection to the grid.

Table 2 Main choice of fuel - Albania

Percent	*Cooking*	*Space heating*	*Water heating*	*Clothes washing*
elec	22.9	10.0	71.0	66.2
LPG	65.2	58.1	16.2	13.8
wood	13.8	31.4	11.9	20.5

Most people use electric boilers for water heating (64%), resulting in a high use of electricity for water heating.

Gas accounts for the main energy expenditure amongst poor households (those that consider themselves in a weak material position, and those with low total household expenditure). In contrast, electricity accounts for the largest proportion of the energy budget amongst the better off. The proportion of energy budget spent on wood is highest amongst the better off, as only larger houses can be fitted with solid fuel appliances.

Choice of fuel for various activities is not, generally, sensitive to the key poverty groupings of material position of household or total expenditure. Exceptions are space heating, where poor households tend to spend a greater proportion of their energy budget on electricity and gas whilst the wealthy spend more on wood, and clothes washing on which those in weak material position spend a greater proportion on gas rather than electricity. Greater electricity dependency appears to correspond with greater fuel economy, whilst the use of wood appears to be associated with higher levels of energy expenditure.

Payment Patterns

Most households still receive nominal bills (58%) and only 37% have metered connections. Only 7% of the households sampled claim to always to be able to pay their electricity bill; At the time of the survey 25% claimed to have outstanding electricity debts; compare this with 6% having debts for food. 35% claim to make no payments, yet 99.5% of respondents feel that consumers should pay for their electrical consumption. Recovery rates are seasonal, confirming the need for flexible payment plans. There are currently 160,000 customers in Tirane, of which 10 – 15,000 are paying by instalments. Of those disconnected, 80% pay immediately and get reconnected (at no charge), so disconnection is an effective means of applying pressure to pay.

The average proportion of total household expenditure spent energy was 10%, but the figure increases with total household expenditure (those with the lowest household expenditure are only spending 6% on energy in contrast to 14% by those with the highest overall expenditure). Electricity bill payment patterns indicate that this may be due to non-payment rather than reduced energy consumption.

Households with metered connections spend a greater proportion of their energy budget on electricity than those with nominal bills.

22% have stopped paying electricity bills, most within the last 5 years (people stop when they see others get away with not paying), and 29% have started paying, most within the previous year. The payment of electricity bills is sensitive to both social and economic status - those in weaker socio-economic groups tend to demonstrate weaker payment behaviour. Households with "forfeit" bills are most likely to have stopped paying.

5.1.3 Changes to date

A large number of respondents have changed fuels (whilst in their existing home). 32% of the respondents claim to have made a change in the fuel used for cooking; the majority were using electricity before and have now changed to gas. 25% have changed the fuel commonly used for space heating; again, the majority were using electricity while others (24%) were using wood. Gas appears to be the fuel most commonly adopted. *Cost* and *accessibility* were clearly the main reasons given for changing; cost appears to be more important in choice of space heating fuel as would be expected (heating uses a lot of energy).

Households which have changed cooking fuels have a higher total household expenditure, indicating that those with greater means are more likely to change fuels, reflecting an ability to pay for replacement equipment (especially when converting to LPG).

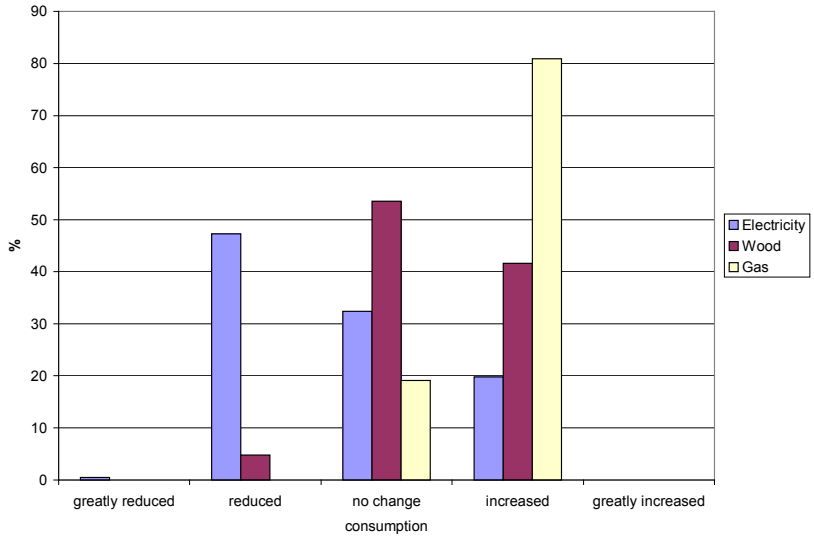

Figure 3: Perceived change in fuel consumption over last 5 years - Albania

Figure 3 illustrates how, overall, respondents feel that their consumption of electricity has reduced over the last 5 years, whilst their consumption of gas in particular has increased. Problems with access to electricity and reliability of supply were given as the reason for the shift away from electricity, along with the installation of meters; note that cost was rarely mentioned in response to open questions.

When asked about sources of information on electricity reforms, 38% of those that responded indicated that they were not interested in the issue. This apparent apathy, more acute amongst

those in a weaker economic position, confirms that the impact of reforms has yet to be realised.

5.1.4 Impact of changes in the future

Enforcement of bill payments is seen by respondents as the most likely change in the future, and it is also regarded as likely to have the greatest impact. The perception of the impact of enforcement is consistent across most groupings, indicating that even the better off, and those who do pay their bills regard this as a threat. This indicates that the enforcement of paying bills on time will cause problems amongst most groups.

Of the three suggested coping strategies, changing to a cheaper fuel is clearly the favoured option, followed by a reduction in energy consumption (Table 3).

Table 3: Ranking of proposed coping strategies - Albania

Ranking	Pay more %	Change fuel %	Reduce use %
First	1.00	57.10	25.20
second	1.90	32.40	22.40
third	21.00	2.40	3.30
% response	23.80	91.90	51.00

Those with lower household expenditure are more likely to change fuels, which contradicts behaviour to date (fuel changes have occurred amongst better off households). Bearing in mind that most people are currently using LPG for heating and cooking, the primary choice of alternative fuel is electricity, followed by LPG and then wood. Note that only those in a strong material position have a stronger preference for wood, and would choose LPG in preference to electricity. This may reflect financial barriers of equipment costs, or a lack of awareness of fuels costs. The main reason given for these choices of alternative fuels is cleanliness of fuel (26% of sample); economic considerations are second (8%). However, this is only true given the current mix of fuel costs i.e. cost could become a more influential factor if the cost of the preferred alternative (electricity) became prohibitively high.

When considering reduced use (energy conservation), space heating is clearly the application where people are most likely to make savings, followed by water heating and lighting. Households in the strongest material position show strikingly higher opportunities to make savings in lighting and cooking (indicating poor management at present), and a reluctance to sacrifice entertainment and household appliance use.

There appears to be a greater willingness to pay amongst groupings where non-payment is higher e.g. those that have not been receiving bills, those with lower household expenditure, and households where people have moved from rural villages (associated with illegal tenure). In order to pay more for energy, savings will need to be made elsewhere in the household budget – housing expenditure is the main area for savings, followed by clothing, travel and telephone expenditure.

Questions were posed to assess the strength of belief and the importance given to a number of possible outcomes regarding the impact of increased energy costs. Respondents felt that negative impacts on education and health are most likely, but they regard health as the most important issue, so negative impacts on health are likely to be the most important outcome of cost increases (e.g. not having hot water, not cooking food properly, lack of space heating).

This is evident across all groupings. Overall, people do not fear consequences of non-payment, indicating a degree of confidence in their ability to pay.

It is proposed to protect vulnerable households against the impact of tariff increases by administering additional payments through the state benefits system. However, there remain a significant number of poor families that slip through the state safety net as they fall foul of a number of regulations regarding eligibility for economic assistance (especially pertinent to those migrating from rural to urban areas).

5.1.5 Energy Industry issues

KESH are responding to rapidly increasing demand (running at 30% per annum) through an ongoing programme to upgrade the distribution network (<20 kV) in major cities throughout the country (donor funded). The survey data indicates that electricity meters have proven effective in rationalising consumption, so programmes to improve metering will help control demand.

Piecemeal LV network expansion results in a large number of small transformers, as groups of customers cannot generally afford transformers larger than 100 kVA (see case study). This leads to the creation of an inefficient and relatively expensive network, which means that poor neighbourhoods are penalised.

The government has taken steps to support the LPG industry, for example removing customs duties (all gas is imported), and imposing a reduced excise duty (25% compared with 100% on petrol). Despite these actions, the market price has not changed because of collusion amongst suppliers, and they know people will pay for LPG because the electricity supply is so poor. This means the government is loosing revenue, and customers receive no benefit.

In Tirane, the market in fuel wood has declined since 1991. At first this was because people started to use electricity, then a much greater decline occurred with the introduction of LPG in 1996. The disadvantages of wood are smoke and inconvenience, and the fact that many apartment blocks now have no flue for wood burning. Nevertheless, in the case of those households spending most on energy, the highest proportion is on wood. This suggests that wood is still an important fuel, especially for space heating, and if the gas supply is not addressed could begin to grow in importance again with increasing electricity costs.

5.2 Kyrgyzstan

5.2.1 Social, Housing and Economic Context of Sample

An understanding of the types of communities sampled in Kyrgyzstan can be gained by the following key figures:

- The gender of respondents was balanced: 47%:53% male:female;
- The average age of all respondents was 35; most (64%) are in the 20 to 40 age group.
- The majority of respondents (58%) have a tertiary or higher level of education (up to 18 years old)
- 45% of respondents are workers or government officials, 7% are professionals, 14% claim to be housewives;
- 27% of respondents are in full time employment, although 15% claim to be unemployed, only 3% claim to be unable to work; 44% work on an occasional basis;

- The average size of household was relatively small (mean = 4.03). The average number of children per household was 1.11 children
- There was a roughly equal balance of respondents living in flats (almost entirely in urban areas) and those living in houses (equally split between urban and suburban areas); 10% live in temporary shelter (e.g. mud block house which has yet to be plastered and decorated);
- The mean number of rooms was 3.14; 31.5% live in 3 rooms, and 29.6% live in two rooms;
- 84% of houses are registered with the municipal authorities;
- The majority of people moved to their current house from within the city (43% from elsewhere in the city and 13% from the same neighbourhood). 15% have moved from other cities, and only 17% have moved from rural villages; the movement of people from rural villages into cities has only become more common within the last five years.

Housing indicators build a picture of vulnerability that can be based around rental status of a household – they tend to be smaller, are not recognised by the authorities and are occupied by people who have moved more recently.

People were asked to rate the material position of their household on a subjective scale; the results correlate with other indicators of poverty (frequency of inability to pay bills, and per capital household expenditure). Only 8% indicated that they have difficulty providing food for the family; the majority can meet the food needs of the household but find it difficult to pay for utilities (57%), 25% claim to be able to meet the basic household needs, and 4% say they can make some savings. Price increases were given as the main factor affecting ability to pay for household items (38%), followed by household members loosing their jobs (30%).

Electricity bills are the most commonly reported household debt (17% of sample). 14% admitted to having 'other' debts at the time of the survey, which included heating, education and credit repayments. Only 3% of households had food debts.

The mean household expenditure per year is 54,800 som ($110/month). The existing system of benefits does not target the poor. This is primarily because it is pension (received by 19% of households) and invalidity benefits (received by 3% of households) that are received in the sampled communities, neither of which is intended to be poverty focused.

A number of questions were asked regarding perceived changes in living conditions, including housing, health (child), employment, water and sanitation, education (schooling), communications, security, food and entertainment. The results were combined into a single index, which showed that the general feeling is that living conditions have deteriorated slightly (mean = -0.13, range of scale -2 to +2). The most strongly positive changes relate to food and housing; the indicator registering the strongest sense of deterioration is security, followed by employment and entertainment. The poor feel that conditions have got worse, whilst the better off feel that things have improved.

5.2.2 Current Behaviours

Choice of fuels

Households use a variety of fuels, but the most commonly used are electricity, gas and coal (see Table 4). 99% of the sample has electricity, and 8.5% claim to have an illegal connection[7], but this does not appear to be a feature of poverty.

Table 4: Households using fuels - Kyrgyzstan

Fuel	Frequency
Electricity	200
Gas	107
LPG	34
District Heating	70
Wood	51
Dung	26
Coal	87

N.B. based on 200 respondents indicating fuel uses

Current fuel uses are presented in Table 5 and show the following characteristics:

- Where district heating is available, this is the preferred form of **space heating**; elsewhere, there is an equal split between electricity and coal use.
- Gas (piped) is the preferred **cooking** fuel, closely followed by electricity. Note that when people use coal for heating in winter, this is also used for cooking, but mostly by low grade energy users who use wood for cooking in the summer.
- Although most households connected to district heating services use central hot water for **water heating** and clothes washing, about one third of these households prefer to use electricity and gas for water heating. Electricity is clearly the preferred fuel. Again, there is a shift from wood to coal in the winter.

Table 5 Main choice of fuel (whole sample) - Kyrgyzstan

Percentages	Cooking		Space heating	Water heating		lighting	Clothes washing	
	summer	winter		summer	winter	summer	summer	winter
Elec	35.2	36.6	20.4	37.5	37.5	85.6	44.4	42.6
Piped gas8	42.1	39.8	2.8	12.0	13.0		6.5	6.0
LPG	4.2	4.6		1.4	1.4		.9	.9
central (district) heating			30.6	1.9	1.9			
central hot water			.5	19.0	19.9		19.9	19.9
Wood	10.2	5.1	3.7	12.0	5.1		7.4	1.9
cow dung			2.8	1.4	1.9		1.9	1.9
Coal	.5	5.1	20.8	.5	7.9		.5	5.6
Candles						0.9	.5	
Total	92.6	91.7	81.9	87.0	89.8	89.4	82.9	79.6

When looking at choice of backup fuels for **cooking**:

- Gas users tend to use electricity as a backup
- Electricity users tend to use coal and LPG as a backup
- Wood users use coal as a backup; coal users use wood as a backup;

[7] It is not uncommon for people to make their own illegal connection by tapping into overhead distribution cables, and then to enter into an agreement with the utility company to use the electricity – a meter can even be installed – so 'illegal' connections do not necessarily amount to non-technical losses.
[8] used exclusively in urban communities

When looking at choice of backup fuels for **space heating**:

- District heating users use electricity as backup
- Electricity users use coal and gas for backup
- Coal users use electricity as a backup.

Poverty is reflected in energy choices - people tend to use district heating and piped gas (for heating and cooking respectively) where they are available, but elsewhere the poor use solid fuels for both heating and cooking, the better off tend to use electricity, and those who can will pay a premium for gas (bottled). Nevertheless, the poor use electricity for lighting and household appliances.

Payment Patterns

92% have metered connections and only 5% claim to receive nominal bills. 59% of the households sampled claim to be able to pay their electricity bill in full; at the time of the survey 17% claimed to have outstanding electricity debts; compare this with 3% having debts for food. 5% claim to be unable to pay their electricity bills. These relatively strong payment patterns indicate that there is a good culture of payment in the domestic sector, and so there is little need for more expensive metering options to improve recovery rates, such as prepaid meters. However, 13% of the sample do not agree that households should pay for their consumption, indicating that there is likely to be resistance to measures designed to increase revenue.

The employment context of many households is unreliable and erratic e.g. many people can only find casual employment, and others may return to their villages for seasonal labouring. This means that many households have problems paying bills on a regular basis, and this is evident in the number of households (even those who pay their bills in full), reporting having difficulty in paying bills regularly. One third of households regularly use flexible payment systems whereby they can make only part payment of bills, and 64% of the sample claim to be unable to pay their bill in full at some time or other. Some form of flexible payment mechanism would help such households pay for their consumption over the longer term. Almost half of respondents indicated that they had experienced disconnection, with 5% claiming they were disconnected regularly. The frequency of disconnection is linked to ability to pay electricity bills.

The average proportion of total household expenditure spent energy was 11%. Approximately a quarter of households using wood did not disclose a payment figure, indicating that there is significant informal wood gathering taking place. Households tend to gather wood in the summer, so it can be left to dry before the winter.

Most people pay electricity bills at the post office (35%) and through local inspectors (22%), both of which are assumed to offer convenience in that they are local points of payment; it is alleged bills can be reduced (in a number of ways) by negotiating with local inspectors, who take a share of the benefit. Choice appears consistent across poverty groupings.

5.2.3 Changes to date

Many respondents have **changed fuels** (whilst in their existing home). 19% of the respondents claim to have made a change in the fuel used for cooking; the majority were using wood and piped gas before and have now changed to electricity. 16% have changed the

fuel commonly used for space heating; there appears to have been a shift from coal to electricity, and an equal shift from electricity to coal. *Cost* was clearly the main reason for changing fuels, especially for changing cooking fuel, although *accessibility* of fuels was also important in changing space heating fuels.

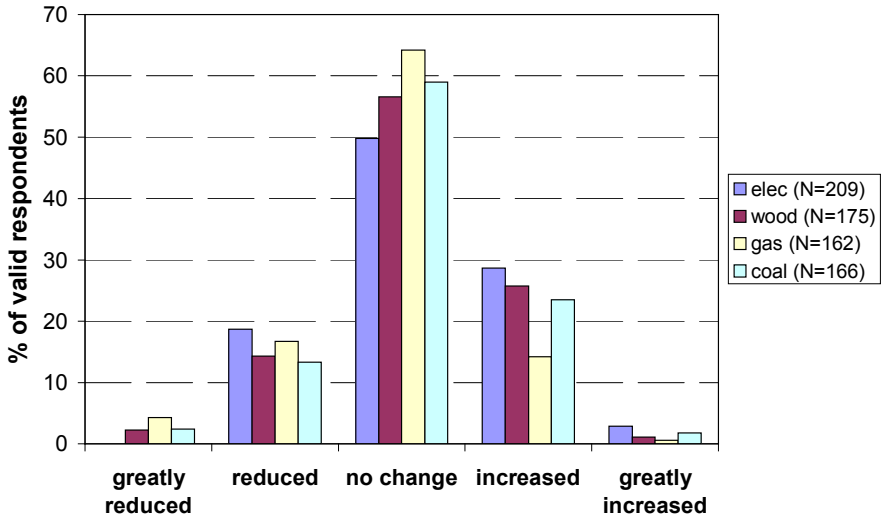

Figure 4 Perceived changes in consumptions of principal fuels (last 5 years) - Kyrgyzstan

Figure 4 shows that electricity **consumption** has been most subject to changes, with some households increasing their consumption and others reducing it. Consumption of gas is most stable. Overall, consumptions of electricity, wood and coal appear to be increasing, whilst consumption of gas is decreasing slightly. Increases in electricity consumption are due to the installation of water heaters, and increasing numbers of appliances. Households in a stronger material position are more likely to have increased consumption of electricity, whilst the poorest group indicated that they have reduced consumption.

Fuel choices appear to be most sensitive to cost, and recent changes to in choice of fuels indicate that electricity is regarded as cheap compared to other fuels. As people gain more disposable income, they will increasingly be prepared to pay for premium fuels which offer good accessibility (reliable, easy to use), notably LPG where piped gas is not available.

People complained that the quality of supplies (power cuts, voltage drop, and fusing of appliances) has deteriorated over the last five years. Deterioration in the quality of district heating systems has been most severe.

5.2.4 Impact of changes in the future

Enforcement of bill payments is seen as the most likely change in the future, and people believe fuel prices will only go up. However, people reckon electricity price increases will have the greatest impact on their household. When likelihood and impact are combined, they indicate that electricity price increases are clearly regarded as the principal threat to households. It is not surprising that potential impact of electricity price increases is more keenly felt amongst those in poorer material position.

Of the three suggested coping strategies, reduction in use is clearly the favoured option, with changing fuels only marginally more popular than paying more (Table 6). However, when looking at responses of the poorest groups (see Table 7), it appears that the poor feel they have little scope for energy saving, and are resigned to having to pay more.

Table 6: Ranking of proposed coping strategies (weighted means) - Kyrgyzstan

(Range 0 to 3)	N	Pay more %	Change fuel %	Reduce use %
Whole sample	216	1.59	1.64	2.40
Material position – difficult to provide food	17	2.59	1.65	1.47
Per capita h/hold expenditure = lowest	28	2.25	1.96	1.29

Weighted scores – 1st ranking = 3, 2nd = 2; 3rd = 1; not ranked = 0.

During the preliminary surveys, consumers gave responses to a number of statements regarding possible responses to increasing energy costs. These were used in the questionnaire as intention statements, and can be categorised according to the proposed coping strategies i.e. pay more, change fuels, and reduce consumption. Some of the statements given refer to making informal arrangements to secure power, which is evidently regarded as a coping strategy.

Mean scores for all options for the sample as a whole are negative (see Table 7), indicating that there is resistance to any change. This table also shows:

- the least negative option is to make informal arrangements, indicating that people's preference will be to try to avoid paying extra.
- the better off exhibit a stronger resistance to change;
- after making informal arrangements, the poorest are most likely to pay more (confirming the results in Table 6).

Table 7: Mean calculated coping strategies (by material position of household) - Kyrgyzstan

Range -2 to +2	N	Pay more	Change fuel	Reduce consumption	Informal arrangements
Difficult to provide the family with food	17	-.1029	-.3824	-.3913	.2157
Manage to provide food but find it difficult to pay the util	123	-.2520	-.2893	-.4673	.2263
afford required foods, clothes and manage to pay the bills	54	-.2546	-.8657	-.7359	-.3519
Have all we need and made some savings	9	-.3333	-.7222	-.5895	-.7037
Whole sample	215	-.2849	-.4988	-.5548	-.0039

These results indicate that, contrary to their declared preferences, people are more likely to pay more than to reduce consumption; this demonstrates the value of the attitude approach as it enables checking of the declared intention – people are naturally reluctant to declare that they will pay more.

In order to pay more for energy, savings will need to be made elsewhere in the household budget – travel and housing expenditure are the main area for savings, and this is also true for the poorest groups.

It appears that electricity is the preferred alternative fuel for both cooking and space heating. For cooking:

- A large number of electricity users responded that they would use electricity, implying that they would still be prepared to use electricity even if the prices go up; others would switch to wood and LPG;
- Piped gas and LPG users would switch to electricity;
- Wood users would continue to use wood others would switch to dung;
- Coal users would switch to wood.

For space heating:

- Electricity users will continue to use electricity, and will change to coal and wood;
- District heating users will switch to electricity;
- Coal users will switch to electricity and wood (and continue to use coal).

Domestic appliances and lighting are the electrical services where energy savings are most likely to be made. There appear to be few significant differences in response across various groupings.

Those households likely to be most severely affected by electricity reforms are those currently using electricity i.e. lower and middle income groups. Higher income households tend to use gas and district heating, and the lowest income households use solid fuels. These are the households which have scope to move down the energy ladder to cheaper fuels (but not those in flats).

The questionnaire also included other statements relating to how people believe they will be affected by increasing energy costs; these can be categorised into key issues: family unity, security, health, education, and financial independence (debt avoidance). Respondents were then asked to rank the importance of each of these issues. These two sets of responses were combined to give a set of impact measures.

The results in Table 8 show:

- for the sample as a whole, respondents feel that the greatest impact is likely to be on health.
- The poorest group exhibit the most strongly negative attitudes, indicating that they perceive the greatest adverse impact of cost increases;
- concerns regarding education are linked to wealth, such that the better off believe they will be more negatively affected than the poor;
- even amongst the poorest there is a weak attitude regarding getting into debt i.e. people are not especially concerned that they will encounter serious difficulties when paying increased costs;

Table 8: calculated attitudes (by material position of household) - Kyrgyzstan

		Attitudes regarding:					Overall
	N	family	security	health	education	financial	
range		(-6 to +6)	(-6 to +6)	(-6 to +6)	(-6 to +6)	(-6 to +6)	(-84 to +84)
Difficult to provide the family with food	17	-1.7647	-.2353	-1.7353	-.0588	.0392	-9.6471
Manage to provide food but find it difficult to pay the util	123	-1.5447	-.0894	-1.7967	-.2114	-.0352	-9.6179
afford required foods, clothes and manage to pay the bills	54	.0000	.3472	-.7361	-.2685	.3889	-.9259
Have all we need and made some savings	9	-1.2222	-.1389	-1.4167	-.3889	.3333	-7.2222
Whole sample	214	-1.0514	.0479	-1.3773	-.2150	.1355	-6.3925

As in Albania, the government propose to protect low income families against tariff increases by making compensation payments through the state support mechanisms. However, the system of social protection and privilege is complex, and there are number of reasons why it is difficult top access benefits:

- 85% of respondents have moved from villages looking for a better life, and many are not registered with municipal department yet.
- Procedures for getting social privileges is complex and requires a great deal of bureaucracy e.g. obtaining references, filling out different forms, applying to separate institutions; all of which takes time;
- people are not aware of the benefits they may be eligible for; this is related to a high level of legal illiteracy;
- respondents who receive some allowances point out that social provision is overburdened with time delays and often people get their allowances not in cash but in kind e.g. food, etc.

It is likely, therefore, that some eligible families will not, therefore, receive the protection intended.

5.2.5 Legislative issues

With the advent of a privatised electricity company, consumers are being asked to enter into contracts with the utility. It is becoming evident that consumers are unaware of the rights afforded them under contracts, and within the new laws. For example, people complained residents have to pay for repairs to local distribution pipework because the district heating company does not respond, yet they pay a nominal amount for maintenance in their contract.

There is, therefore, a need to educate people in their legal rights, and the emerging civil society includes a number of organisations which support citizens in asserting their rights (see Case study). However, respondents were of the view that there is little value in lobbying for consumer rights because the legal system is bureaucratic and corrupt. Legal processes need to be made transparent in order to enable people to pursue their rights through the courts, so further attention should be paid to assessing how effectively news laws are implemented.

The recent switch to electricity (and the preference for electricity as an alternative fuel under future coping strategies) reflects not only a perception of electricity as cheap, but also the flexibility it offers in terms of pilfering and non payment. This is confirmed by the preference amongst the poor to make informal arrangements (e.g. bypassing meter, doing deals with inspectors etc.). The utility will, therefore, need to establish robust payment procedures before raising tariffs significantly.

Environmental protection measures need to be enforced in response to the growth in wood fuel use that is likely to take place as a result of increasing energy prices.

5.3 Moldova

5.3.1 Social, Housing and Economic Context of Sample

An understanding of the types of communities sampled can be gained by the following key figures:

- The respondents were predominantly female (74%).

- The average age of all respondents was 47; The majority of respondents (33%) were between 35 and 45 years of age
- The majority of respondents have achieved the equivalent of high school level of education (up to 18 years old)
- The largest group of respondents is pensioners (24%); 20% work in 'other' occupations (e.g. vendors, tailors, occasional workers),
- Only 9% of respondents claim to be unemployed;
- The average size of household was relatively small (mean = 3.6).
- The majority (65%) of the respondents live in flats (one third state owned and two thirds privately owned) and hostels (14%); only 19% live in houses;
- 40% of the respondents live in two rooms, 28% in 3 rooms and 22% in only one room;

People were asked to rate their family income on a subjective scale, and most claimed they did not have enough for essentials (47%). People were also asked how pleased they are with their quality of life, and there is a good correlation between these two indicators.

5.3.2 Current Behaviours

Choice of fuels

The three main fuels used are gas (piped), district heating, and electricity (see Table 9). Vulnerable groups (e.g. those having difficulty paying energy bills) are more inclined to use electricity and wood than gas for cooking, and those in hostels are more likely to use electricity. Only those in private houses have the option to use solid fuels (wood). Although most households use district heating irrespective of poverty status, vulnerable households tend to use solid fuels rather than gas for heating. Only private houses have flexibility in their choice of fuels, and use gas (30%) and solid fuels (35%).

Table 9 Main choice of fuel - Moldova

Percent	*Cooking*	*Space heating*	*Lighting*
Central heating		69.5	
Autonomous system		11.5	
Gas	89.22	9.2	0.5
Wood and coal		7.2	
Electric range	8.02	2.1	98.0
Manufactured woods range	1.50		
Other	1.25	0.5	1.5

Household consumption of gas and electricity is lower amongst poor households, indicating that the poor conserve energy. However, no difference is noted in district heating, which indicates that where the poor are served by district heating they enjoy a quality of service comparable with most households (73% of households in the lowest material position category).

Few low cost options in flats

A family living in a hostel in Moldova have to make do without electricity after the hostel supply was disconnected. The mother has to encourage the children to do their homework when there is still daylight. As the block has no piped gas they are forced to use LPG for cooking, which is not permitted in the block and is a fire hazard, especially with small children.

In another hostel which was disconnected from the electricity supply, a man noted that some of his neighbours installed manufactured stoves (solid fuel) in their kitchens, and pointed out that the chimneys can be seen sticking out near the kitchen windows. However, these installations are very dangerous, because the building was not designed for this kind of heating appliances.

Payment Patterns

People appear to have most difficulty paying for heating bills – almost half of the sample claim to be unable to pay heating bills; electricity bills appear to cause least problems (27% of sample). This is probably because they are relatively low, as people do not use electricity for energy intensive activities.

However, experience of disconnection (mostly from non payment of bills) is somewhat different. Electricity is the energy source from which households have most commonly experienced disconnection (30% of households); second is gas with 13%, and lastly heating with only 6% reporting being cut off in the past. This illustrates the practical problems associated with disconnecting gas and district heating services on a household basis. It also shows that around a third of people have difficulty paying their electricity bills, to the extent of getting cut off at some point. As expected, disconnection (across all three utilities) is more common amongst the poor. Disconnection is most common amongst households living in hostels, which may not only reflect economic position but also problems associated with communal meters which are subdivided by landlords. Private flats are more likely to be disconnected than houses, which probably reflects the higher dependency of people in flats – houses can use a greater choice of fuels.

The proportion of income spent on energy has only a weak link with poverty indicators – households with high occupancy density (people per room) spend a lower proportion of their income on energy, and those living in hostels spend a lower proportion than those in private houses, both of which indicate that the proportion of income spent on energy is directly related to wealth. However, households with meters (linked to ability to pay) tend to spend a lower proportion on energy (but differences are marginal).

The majority of respondents pay for their fuels at a post office or bank (46% and 48% respectively), confirming a preference to pay bills locally.

5.3.3 Changes to date

Despite substantial electricity tariff increases since 1997, only a small number of households (approximately 5%) have responded by changing their choice of main fuels. This is mostly due to the fact that most of the sample lived in flats or hostels where they have little choice over fuels. There is, however, anecdotal evidence of people in flats installing wood stoves illegally.

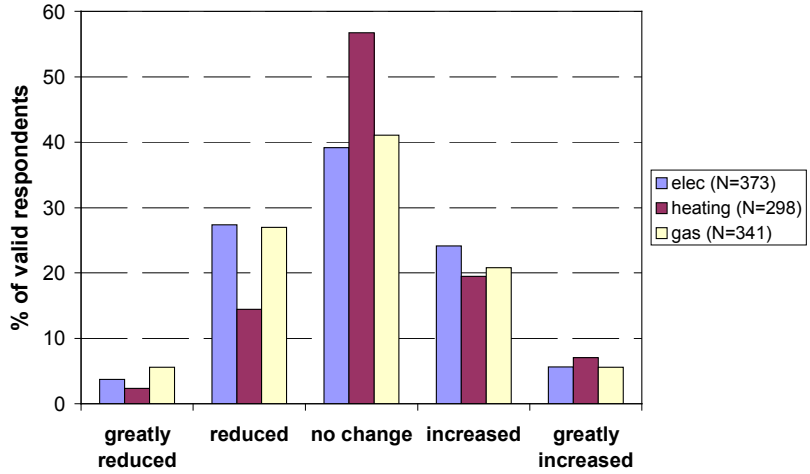

Figure 5 Perceived changes in consumptions of principal fuels (last 5 years) - Moldova

Use of heating appears to be most stable – of the main fuels, this has the highest number of people reporting no change in use over the last five years. Overall, there appears to be an increase in use of heating, no change in the use of electricity, and a modest drop in gas use. When looking at poverty groupings, the poor have made economies in their use of gas and electricity; only the better off feel they have increased their consumption of electricity. Responses indicate that overall, people use domestic appliances less than five years ago. The main reason for reduced use of appliances was increased tariffs, followed by decrease in family incomes. The main reason contributing to increased use is families growing in size and age. Note that people feel that the frequency of disconnections has decreased, implying that their payment performance has improved.

98% of households use electricity, and most are metered supplies (93% of sample); approximately half of the households have a gas meter, and a third have heating meters. Over all three utilities (electricity, gas and heating) the majority of respondents claimed that costs had decreased since installing meters; this was most acute amongst gas users, where 89% of users claimed that costs had decreased. Amongst those who had not installed a meter, the cost of the meter was the main barrier. The installation of meters appears, therefore, to be related to ability to pay rather than choice of fuel.

There is a roughly equal split between those who feel that privatisation of the electricity sector will have no affect, and those who feel it will have a negative impact – there is only a small proportion (16%) who feel the changes will be positive.

5.3.4 Impact of changes in the future

When asked how they would respond to an increase in the cost of energy, reducing energy consumption was clearly the preferred of the three suggested options. Second was paying more or energy, which was marginally more attractive than changing fuels. This trend is more acute amongst the poor – they are more likely to reduce energy use, and less inclined to pay more.

Table 10: Ranking of proposed coping strategies - Moldova

Ranking	Pay more %	Change fuel %	Reduce use %
First	18.7	8.6	71.2
second	1.0	6.6	1.5
third	3.0	0	1.0
% response	22.7	15.2	73.7
Weighted mean (range 0 to 3)	0.61	0.39	2.18

Weighted scores – 1st ranking = 3, 2nd = 2; 3rd = 1; not ranked = 0.

As an alternative means of assessing how people are likely to respond to increased energy costs, respondents were given a number of statements regarding possible responses (which fit with the options discussed above), and asked to what extent they agreed with each statement. Most of the intention statements have negative responses, indicating a general reluctance to change behaviour (see Table 11). The least negative option is to pay more, rather than to reduce consumption; it is proposed that this is likely to be a more accurate assessment, as people tend to be reluctant to declare themselves willing to pay more. This assessment confirms that changing fuels is the option of last resort.

Table 11: Mean calculated coping strategies (by material position of household) - Moldova

Range -2 to +2	N	Pay more	Change fuel	Reduce consumption	Informal arrangements
not enough for necessary things	85	0.0029	-0.6294	-0.1141	-0.2804
enough just for necessary things	91	-0.044	-0.8104	-0.3309	-0.348
enough for livelihood but can't buy expenses	13	-0.1538	-0.6731	-0.3162	-0.4359
succeed to buy expensive things	4	-0.125	-0.5	-0.5556	-0.5
Whole sample	193	-0.0324	-0.715	-0.2391	-0.3273

The poor appear to be the group with the strongest intention to pay more. It is interesting to note that they appear reluctant to steal electricity (making informal arrangements, which is an additional option), although not as reluctant as they are to change fuels.

When asked how they would ***save energy***, the most common responses were through reduced use of appliances and lighting. When asked about energy conservation measures currently taken, preparation of windows (draught proofing and secondary glazing) and using fewer bulbs for lighting are clearly the main measures.

When asked where they would make savings in household budgets in order to ***pay more*** for energy, the priority area is clearly household repairs, although some respondents could also make savings in travel, clothing, and telephone costs.

Similarly, respondents were given a number of statements regarding possible ways in which people will be affected by increased energy costs, and asked to what extent they agree with each. Each statement fitted into a category of issues – family unity, security, health, education, or financial independence (avoiding debt). Results show that people clearly feel that increased costs will have the greatest impact on the health of their family (e.g. lack of heating, stress, not washing in hot water), and that the poor feel more vulnerable to adverse impacts.

5.4 Points of interest from cross country comparisons

5.4.1 Summary of findings (by country)

The following figures present some of the key features arising from analysis of the data, categorised according to the research framework proposed in Figure 1.

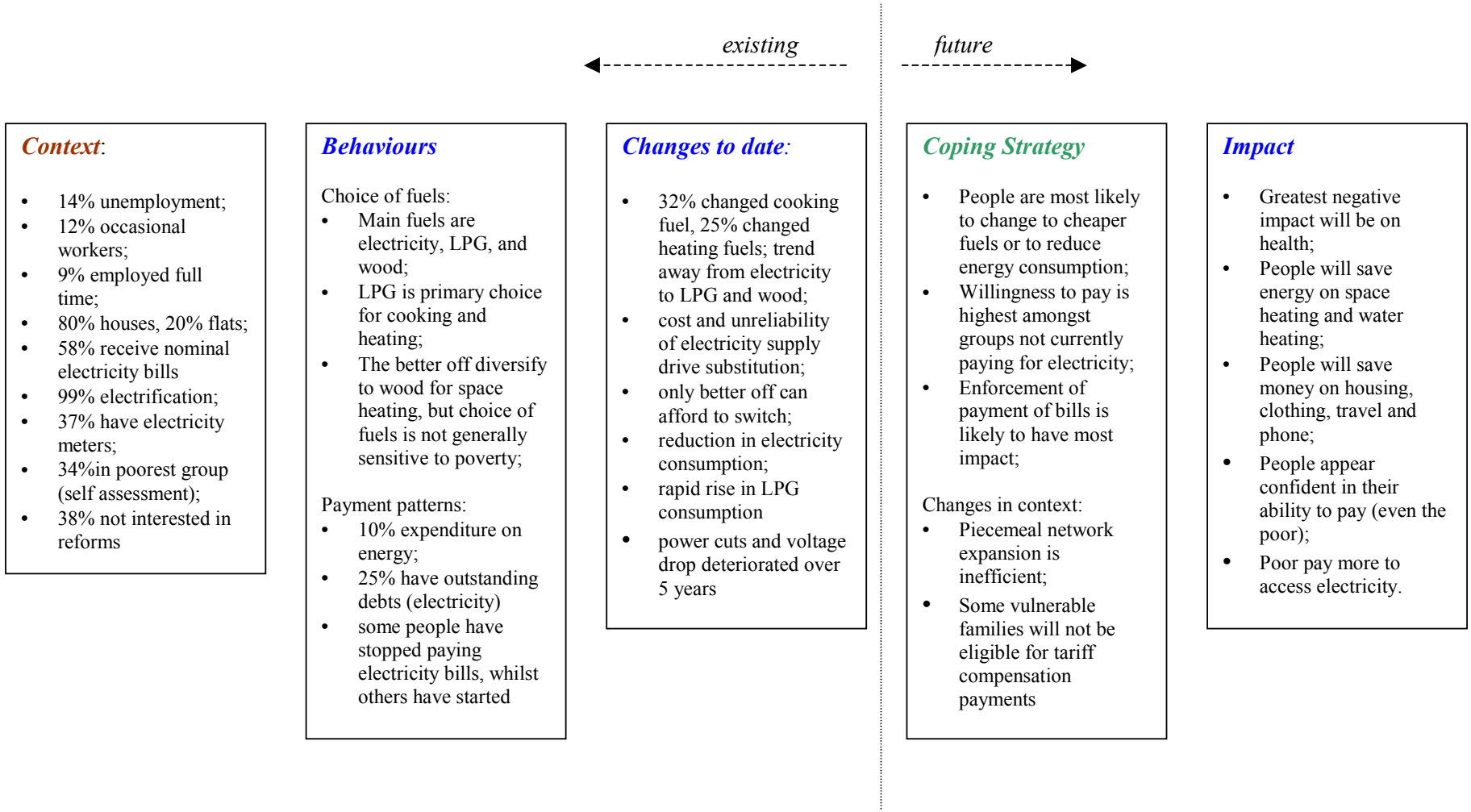

Figure 6 Responses to changes in energy markets – Albania

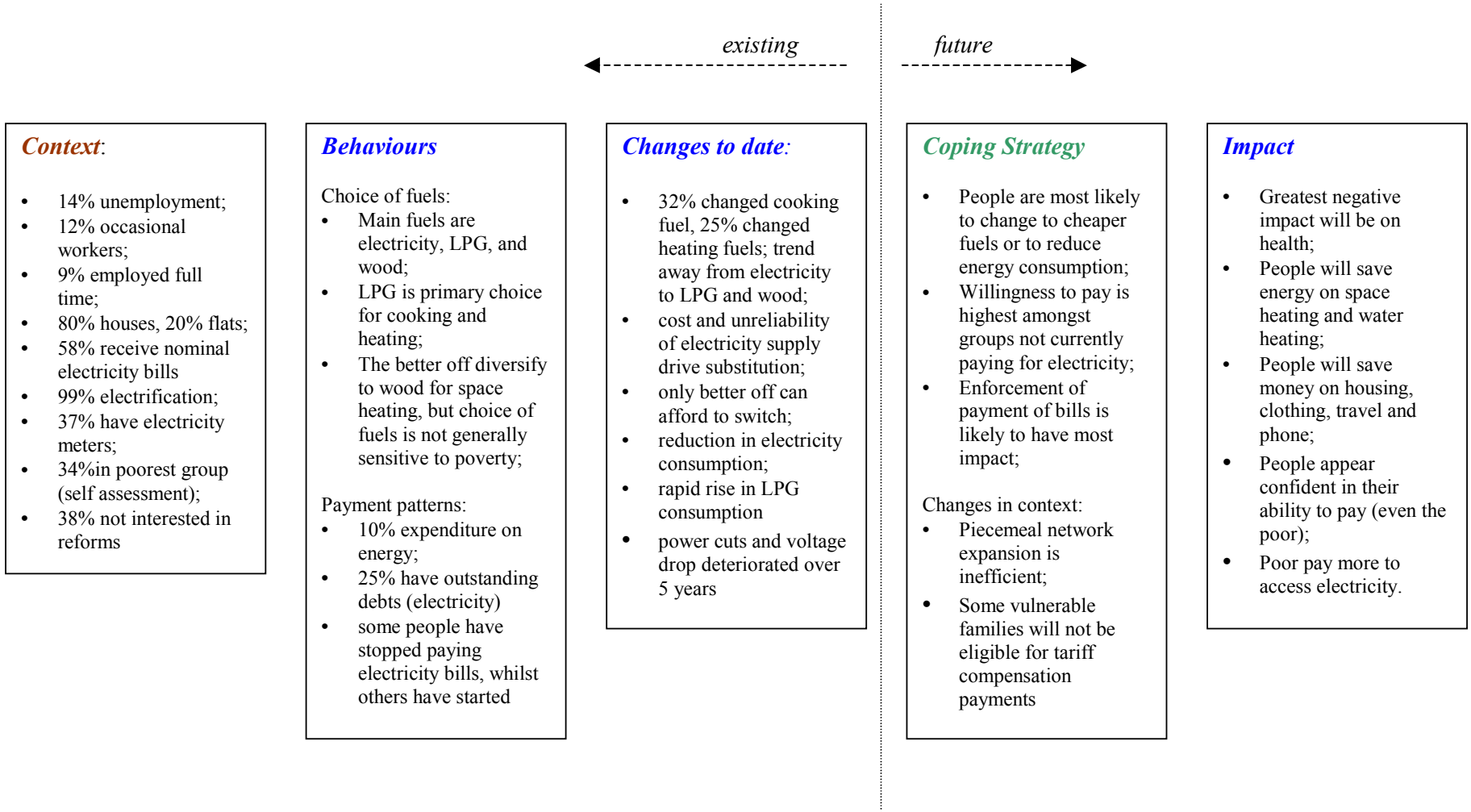

Figure 7 Responses to changes in energy markets – Kyrgyzstan

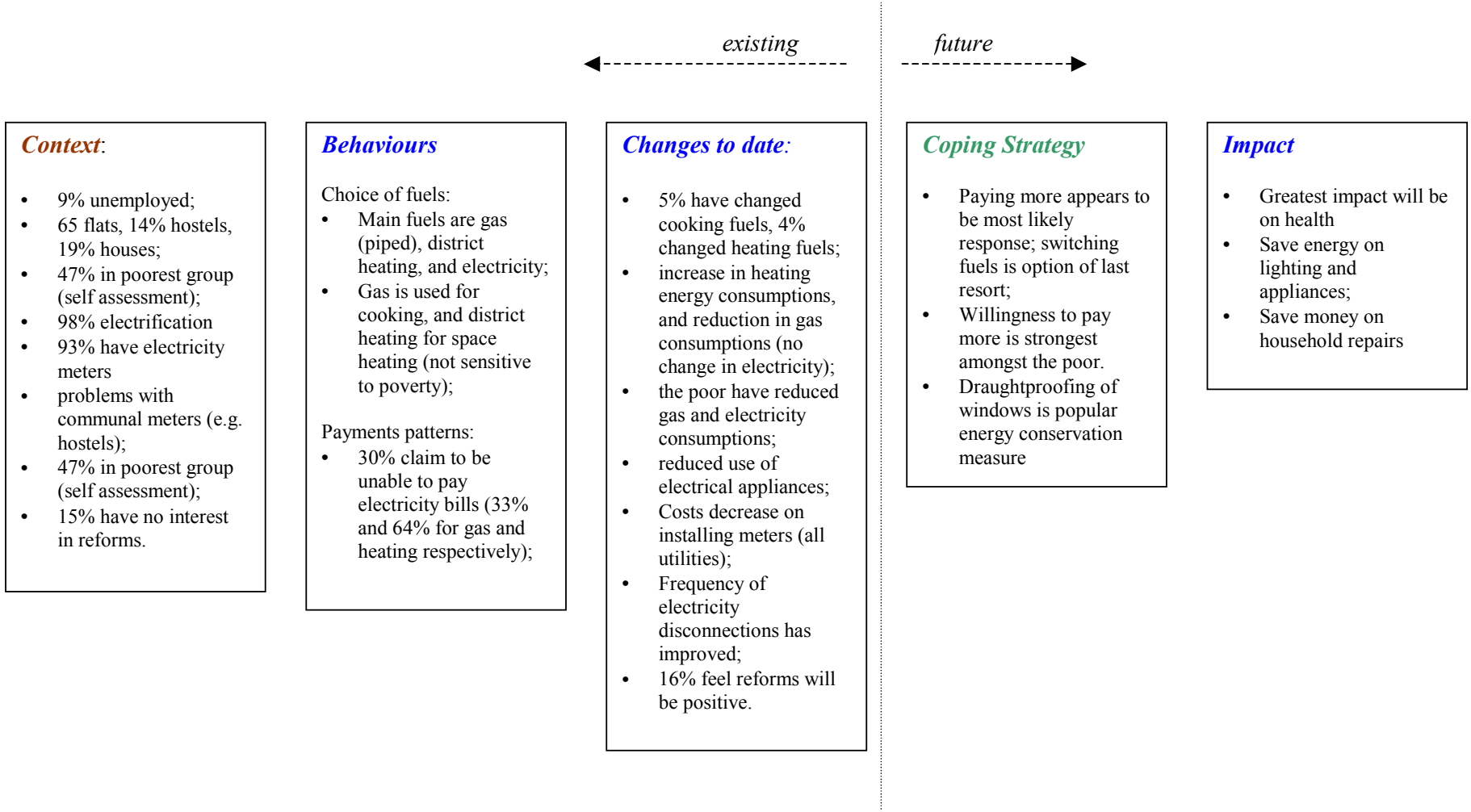

Figure 8 Responses to changes in energy markets – Moldova

5.4.2 Progress with Reforms

Moldova has made more progress along their reform programme than either Albania or Kyrgyzstan, having substantially increased electricity tariffs and attracted investment from a private company. This has resulted in reduced consumption of electricity (i.e. people are saving energy, especially the poor), but this is also the case in the other countries. In Moldova, respondents feel that the frequency of disconnections has decreased, but again this is also the case in Kyrgyzstan. It has resulted in little change in energy choices in Moldova because electricity is not used for energy intensive activities, however, fuel switching is more likely to result in the other countries where certain sections of the community currently use electricity for heating and cooking.

The experience of reforms is also reflected in the fact that only 15% of respondents in Moldova claim to have no interest in reforms, compared with 38% in Albania and a similar proportion in Kyrgyzstan.

5.4.3 Type of housing stock

In Albania most respondents lived in houses (80%), whilst in Moldova most (79%) live in residential blocks (flats and hostels); the sample in Kyrgyzstan is more or less balanced. Type of housing is one of the strongest determinants of choice of fuels, especially when flats are provided with piped services – gas and district heating. Fuel markets are elastic in household markets, but inelastic in flats. This is evident in the low rates of fuel changes in Moldova (5% cooking and 4% heating) compared with Albania (32% and 25% respectively).

5.4.4 Fuel substitution

In Albania the cost of LPG is relatively low, and the cost of wood is relatively high, so as people switch from electricity, they are tending to switch to using LPG. This should also be seen in the context that many local small traders sell LPG cylinders, making it accessible and reliable (although there remain problems with filling cylinders). Bear in mind that in all countries changes are driven primarily by cost, but accessibility follows closely in second place (unreliability of electricity supplies is one reason for switching away from electricity). In Kyrgyzstan, by contrast, when people changed from electricity, they tend to switch to wood (and coal), because the LPG industry is poorly developed (presumably because many households have piped gas). Another factor is the difference in local wood fuel resources – Albania has been badly deforested whilst Bishkek is a remarkably green city.

5.4.5 Metering

There are high rates of metering in Kyrgyzstan (92%) and Moldova (93%), but the use of meters is very low in Albania (37%). It is not surprising, therefore, that it is the likely enforcement of bill payments that causes most concern amongst respondents in Albania, where payments rates are also low (35% claim to make no payment); it is electricity price rises that cause most concern in Kyrgyzstan.

Consumers appear to have a generally positive view of the benefits of meters, especially in Moldova, where they feel that the installation of electricity, gas, and district heating meters has resulted in a reduction in costs.

Where the incidence of meters is low (Albania), low income households tend to become more dependent on electricity, as it presents itself as a relatively cheap fuel. Reforms are, therefore, more likely to have an adverse impact on the poor.

5.4.6 Coping Strategies

The preferred strategy for coping with increasing energy costs are different in each country:

- In Albania people are willing to switch to alternative fuels, notably LPG, and they have the flexibility to do so (given the fact that most live in private houses);
- In Kyrgyzstan people are most likely to make informal arrangements (e.g. bypass meter, do a deal with the inspector) probably because this is their current experience. It is also interesting to note that 13% of the sample do not agree that people should pay for their consumption of electricity;
- In Moldova people are most likely to pay more because, as most live in serviced blocks of flats, they do not have the option to use alternative fuels.

5.4.7 Environmental protection (wood fuel)

Albania suffers from widespread deforestation, and the high rates of use of woodfuel in rural areas will only exacerbate the situation. However, environmental protection legislation exists, and there are national programmes working towards protecting forests (e.g. World Bank). Wood fuel markets appear to be well regulated. By contrast, there is evidence that low income households in Kyrgyzstan collect firewood in summertime, often without the knowledge of the local authorities.

5.4.8 Social protection

In each country, the proposed mechanism for protecting low income families against the affects of electricity tariff increases is to administer some form of compensation payment. Naturally, there is debate over what the benchmark consumption should be, and which loads should be met by electricity. Electricity consumption is low in Moldova because of the widespread use of gas (cooking) and district heating, however, in Albania it is proposed that benchmarks should include an allowance for electric cooking.

5.4.9 Neighbourhood quality of life

When considering subjective quality of life indicators, samples in Albania have a more positive view of recent changes (mean index is 0.18), compared with Kyrgyzstan (mean index is –0.13). In both countries communications is an area of improvement, and unemployment is an issue which has deteriorated. Whilst people feel security has deteriorated in Kyrgyzstan, people in Albania feel security has improved but bear in mind they still remember the civil unrest of 1997.

6 Analysis of Case Studies

The case studies from Kyrgyzstan and Moldova show how NGOs can play an important role in improving access to infrastructure services amongst vulnerable urban communities. In each case they have mobilised communities to engage with government institutions in order to secure the provision of energy services. In Bishkek the NGO developed the capacity of the community to the extent that they were able to successfully lobby institutions to improve

services. In Moldova, the NGO facilitated successful negotiations between a range of stakeholders after progress on a project came to a halt. The case study from Albania presents an alternative approach in which community members approached the utility to request electrical connections, and the utility decided to engage directly with them, working towards a feasible solution.

Each of the case studies demonstrates the extent to which participatory approaches are being mainstreamed into good governance – through NGOs or through good practice on behalf of utilities themselves. They also demonstrate a variety of ways (albeit similar) in which **NGOs can make a valuable contribution** where public institutions lack the capacity and resources to run community mobilisation activities. NGOs play a particularly important role in mobilising communities where civil society is weak, and where citizens are not familiar with democratic governance processes and are not aware of their rights, or how to exercise them.

Although civil society in these former communist countries is relatively young, structures were particularly weak in each of the case study communities because each is composed of migrants who have settled in suburban or peri-urban areas. These communities are, therefore, heterogeneous with a mix of cultures and traditions, often giving rise to a degree of distrust within communities. They lack traditional leadership structures, and may have only weak political structures, especially where migrants have not registered with the authorities. Overcoming these obstacles to community mobilisation generally needs considerable external input, which was provided by the NGOs in Moldova and Kyrgyzstan.

Lack of trust is a major obstacle to instigating projects – both between communities and government structures (as in Moldova), and within communities themselves (as in Kyrgyzstan). NGOs can play a particularly valuable role in promoting transparency, which is needed to help build trust. They can act as 'independent' intermediaries between communities and authorities, or between various social groups within a community. Citizens in former soviet economies tend to have limited understanding of emerging **democratic processes**, and NGOs can help people understand how decision making processes work, and encourage people to engage in democratic processes.

Whilst structures within communities were weak, it is also true that the NGOs were themselves relatively young, and although they had identified the problems that needed addressing, they recognised their lack of knowledge on how to carry out community mobilisation programmes. Each was successful in attracting funding to **build capacity** internally, using the experience from other NGOs.

In contrast to the weakness of civil society structures, the governance structures in these countries was relatively strong. There are well defined planning procedures for urban development, and responsibility for provision of infrastructure is ascribed to various institutions. The problems arose when these institutions were overwhelmed by the numbers of people settling, and by lack of financial resources. Communities were successful in achieving their aims because the **legislative system placed obligations** on the service providers - the lobbying activities were then effective in holding these institutions to account. Only in Moldova did the NGO make a financial contribution to the project, but it is noted that this was minimal, and acted as a token gesture to get the project going. Rather, it was the process of community mobilisation that helped communities raise funds from their own resources.

A feature of the case study countries is the change in energy utility service provision from state service to commercial commodity. The setting up of commercial entities to provide services has been accompanied by the introduction of commercial practices, such as the signing of customer contracts, and the associated legislation. All of this is new to citizens, and there is a need to educate consumers on 'legal literacy'. NGOs can provide the intellectual capacity to interpret consumers' rights, which is essential to ensure that advocacy efforts are successfully targeted.

The case studies are all drawn from former communist countries, and are characterised by a massive and sudden migration of people from rural areas into the capital cities when the communist systems collapsed. Problems with inadequate infrastructure to serve low income urban communities arose because procedures could not cope with the rate of resettlement. Similar problems with inadequate infrastructure occur in cities in other parts of the world, albeit for different reasons. It is proposed that the approaches presented in the case studies could also be of value in **other parts of the world** where these problems are evident, although it is essential that the legislative framework be in place.

Other lessons that can be drawn from the case studies include:

- It doesn't matter where the idea comes from, or who initiates the process – it is the process of community consultation that is important.
- People use wood if other energy infrastructure is inadequate;
- Although the successes of arise from negotiating, lobbying and advocacy activities, each of the NGOs carried out a much broader range of training activities to build capacity of community members;
- Target activities at multiple levels of government – local and national;
- Important role of 'champion' in local government, or traditional leadership structure;
- Providing power to low income communities can be profitable;
- The electrical design load of dwellings in low income communities is higher than previously thought, and people are prepared to pay for a good quality supply;
- Demonstration affect – most case studies started from a point where communities had some prior experience of successful lobbying.

7 Conclusions

7.1 Changes to date

The preliminary surveys confirmed that the energy reform processes in each country will affect the poor. It is also evident that the full implications for the poor of liberalisation are yet to be realised. Tariff increases to date have been minimal (e.g. only nominal increase in lifeline tariff in Albania) and the electricity companies are only just beginning to address the issues of non-payment and theft. There was some debate as to whether it is the urban poor (the subject of this research) who will be most severely affected by changes, as they do not have access to fuelwood and dung, or whether the rural poor will be more at risk as they have less cash income.

Nevertheless, there is evidence that people have already adjusted the fuels they use, and changes have mostly been driven by cost, but also by accessibility (e.g. people switch from electricity because of unreliability of supply). However, whilst in Albania the trend has been to switch from electricity to LPG, in Kyrgyzstan households have tended to switch to

electricity use, and away from wood and piped gas; this indicates that electricity is perceived as having become a cheaper fuel. In Moldova there has been comparatively little fuel switching, primarily because people tend not to use electricity for energy intensive applications, and because the housing stock permits little flexibility in fuel choice. Fuel markets are elastic in household markets, but inelastic in flats; the PSIA study concluded that electricity consumption is highly inelastic in Moldova, especially amongst the poor.

Despite these changes, respondents felt that their consumption of most fuels had increased over the last five years. The notable exception appears to be gas (piped) in Kyrgyzstan and Moldova. Note that this is not true of the poorest, who feel they have reduced consumption. The choice of fuels in Albania is notably different, and consumption of electricity has reduced, whilst consumption of wood and gas especially (LPG) have increased.

These changes in consumption reflect different payment cultures. Most consumers in Kyrgyzstan have metered supplies and collection rates are relatively good (even though flexible payment systems may cause some anomalies), and electricity use can be described as rational – it is used where perceived as cost effective. In Albania, by contrast, most households have nominal bills and non-payment has been high, all of which results in non-rational use of electricity. When payment and metering are introduced, it is not surprising that use will fall.

In the research countries, it is clear that increases in energy costs will be taking place in a context of deteriorating household economic position. In Kyrgyzstan 30% indicated that the main factor affecting ability to pay for household items was unemployment amongst household members; the figure in Albania was higher at 74% of respondents, but this included changing to jobs with lower salaries. These figures are backed up by subjective indicators relating to quality of life. In Albania and Kyrgyzstan respondents felt that employment situation had deteriorated over the last five years, and most of the sample in Moldova expressed dissatisfaction with their quality of life. Any social protection policy will need to consider the potential for more of the population to enter into vulnerable categories.

7.2 Coping Strategies

Coping strategies in each country are different, confirming that there is no generic consistency of response to increasing energy costs. In Albania people are most willing to switch to alternative fuels (houses permit the flexibility to do so); in Kyrgyzstan, people are most likely to make informal (illegal) arrangements, and in Moldova, people are most likely to pay more. In all countries, the poorest appear to have the strongest willingness to pay more for energy. When considering willingness to pay, it is interesting to note that in Albania there is almost universal belief that people should pay for their electrical consumption, yet 13% disagree with this in Kyrgyzstan. This would appear to reflect a greater awareness of commercial realities in Albania, and the need for further education and public relations initiatives in Kyrgyzstan.

In Kyrgyzstan it appears that the most likely means of coping with increased energy costs will be to make informal arrangements. Evidence indicates that people are reluctant to install illegal connections but that they will bypass meters and negotiate with inspectors, so utilities need to be consider how the system of local inspectors will respond to this. In Albania, stealing electricity is negatively viewed, and in Moldova is ranked higher than only fuel switching.

Electricity price increases were regarded as the major threat in Kyrgyzstan and Moldova, whereas enforcement of bill payments is a greater cause for concern in Albania, reflecting the low payment rates at present.

If people are to pay more, then the money will need to be diverted from other household budget items. Expenditure on housing was the main area identified, along with travel in Kyrgyzstan and clothing in Albania. In Moldova (strongest intention to pay more), it is likely that people will also take measures to secure more money e.g. finding extra work, borrowing money.

The energy services where savings could potentially be made included space heating and water heating in Albania, which compares with domestic appliances and lighting in Kyrgyzstan and Moldova. The former, which are responses amongst poorer communities, are more likely to be associated with negative impacts on health, for example.

If the cost of the main fuels in Moldova increases (piped gas and district heating), there may be a growth in the number of people resorting to using solid fuels. This has implications not only for environmental protection, but also for health and safety, especially given the emerging practice of installing wood burning stoves with flues in blocks of flats which are designed for piped services.

In general, the predicted responses of the poor to increasing costs are similar to those of the samples as a whole. A trend evident in Moldova and Kyrgyzstan (but not in Albania) is that the poorest indicate more positive attitudes towards adopting changes than the mid wealth groups. This indicates that it is low income groups that are likely to be most severely affected by electricity price rises in particular - the poorest tend to rely more on alternative fuels and are, therefore, less exposed to price rises. To a certain extent this agrees with the findings of the World Bank's PSIA study, which concludes that the poor in Moldova have not been affected differently by reforms than the non-poor.

Where payment is linked to social relationships (i.e. payment through meter reader in Ky), making some form of informal arrangement to reduce costs is the preferred response. This is not evident in Albania where payment at company offices is the only option. People are reluctant to steal electricity. Anecdotal evidence indicates that people in extreme situations are prepared to accept innovative solutions to reduce costs e.g. flying connection from neighbours, flying connection from common areas supply (pump) by agreement with tenants.

Innovative ways of informal access to electricity

Shortly after KESH (Albania) installed meters at her block of flats, a woman who had been using electricity for years started receiving nominal bills. She had never paid for electricity and, being recently widowed, was unable to start doing so at this point. KESH came and disconnected her. She made an arrangement with a friend in a neighbouring block of flats to take a flying connection from their metered connection and to split the bills 50:50. This worked for a short while until KESH came along and cut the wire. She then made an agreement with residents in the other 17 flats in her stairwell that she could take an illegal wire from the supply to the water pump. Each flat is billed according to their consumption, and energy for the common supply (for the pump) is divided equally between all flats in the stairwell, so her neighbours are effectively paying for her electricity. This supply is quite inconvenient, as she is unable to run appliances when the pump is running, as the voltage drops. She is conscious that she only has electricity as a result of the goodwill of her neighbours, and is careful not to misuse electricity.

7.3 Impact and Social Protection

With regard to the impact of increasing energy costs, there was a good deal of similarity between countries. The greatest negative impacts are likely to be on health (e.g. reduced space heating, stress, inadequate cooking), and education (e.g. reduced heating and lighting). Reductions in household expenditure on housing will have implications in terms of health, and increased energy consumption associated with potential deterioration of housing stock.

There is evidence (particularly from Kyrgyzstan) of an energy gap opening up between the poor and the rest of society – the poor are tending to use more low grade fuels such as coal and wood, whilst the wealthy are tending to use more high grade fuels such as electricity.

Respondents in general, including the poor, appear generally confident that they will be able to pay additional costs e.g. they do not believe they will get into debt, or that they will run into trouble with the utility companies.

Existing social protection systems do not target the poor. The possible exception is pensioners, most of whom received some form of state benefit, but only in as much as pensioners tend to be poor. Pension and invalidity benefits are not inherently designed to target the poor, and very few households in the samples received unemployment benefit. Further research is needed to investigate whether the situation is different in rural areas, but these are communities that have easier access to wood for whom fuel substitution is more feasible.

If sector reform policy is intended to, or likely to result in fuel substitution, there is a need to consider the design of alternative fuel distribution systems. For example, if people change from electricity to wood, this will result in increased pressure on environmental protection systems to restrict unauthorised harvesting, so the relevant authorities must be given the resources to prepare for this. In Albania people are likely to shift to LPG use, so there is a need to ensure a national distribution network is in place.

7.4 NGOs

Case studies from each country demonstrate the role that NGOs can play in infrastructure development. Where legislative frameworks place obligations on utility service providers, NGOs have been successful in mobilising communities to lobby effectively to ensure that adequate infrastructure is provided. NGOs have also been able to help mobilise communities to participate in government (and donor) led infrastructure development projects, providing a valuable source of expertise in participatory processes.

The top priority for household spending is food – by a clear margin. Then come energy, clothing and travel; the order depending on energy prices (eg energy is second in Albania). Civil society in these countries is young and tends to concentrate on issues of governance, agriculture, business, and education. As energy prices increase, NGOs working on poverty reduction and economic development will increasingly need to address energy costs as a factor contributing to household poverty (especially in rural areas where incomes are lower). Another priority area is legal literacy and consumers' rights, which is becoming increasingly important as people are now entering into contracts with commercial utility companies. Where utilities are not providing adequate maintenance, consumers end up paying for repairs

themselves (e.g. district heating pipe repairs), yet the duty for repair may lie with utilities, in which case consumers pay twice.

8 Recommendations

8.1 Management of electricity and distribution networks

- There is some evidence that utilities have explored possibilities for prepaid metering. Whilst this would appear attractive in terms of improving payment discipline, it needs further research to identify ways in which the relatively high equipment costs can be met without penalising consumers, some of whom currently find the cost of installing a meter prohibitive. Further research should be done to explore options for distributing installation costs (and risk). Prepayment is difficult to justify with such low consumptions, but at least populations appear to be stable, which helps minimise risk. Rapidly developing mobile phone markets provide existing models for prepayment that consumers have adopted. Prepayment meters also have serious consequences for health where harsh winter climates exist, especially in premises which are not suited to heating with alternative fuels (e.g. wood, coal).

- Nominal billing leads to non rational use of electricity, and a dependency on electricity amongst the poor in particular. The installation of meters is effective in correcting this distortion (i.e. reduced electricity consumption), and the experience of consumers' experience of meters is generally positive – costs do not increase, and there is a widespread recognition of the justice in paying according to consumption. Meter installation programmes should be a high priority where meter rates are low.

- The most likely response to increasing energy costs is to take illegal steps – bypassing meter, or making arrangements with inspectors. Utilities need to ensure that management and collection procedures are robust before raising prices substantially. Even People who have traditionally paid their bills in full will stop paying bills if they see no sanction for non-payment (Albania). This phenomenon is observed in suburban areas where people move to the city and settle adjacent to established communities.

- Reforms should aim to continue the practice of enabling consumers to pay for bills using third party facilities, particularly post offices. These are well used at present, and are of particular value to the poor and elderly for whom travel is difficult. In the context of deteriorating employment conditions, many people are engaged in seasonal and occasional work, so incomes are erratic. There is, therefore, particular value in providing flexible payment mechanisms to enable households to pay for their consumption over the longer term. For example, these can be combined with post office services e.g. energy stamps.

- The mechanism of installing transformers for small community groups demonstrated in Albania is an effective way of providing access to electricity where the utility lacks access to capital, but leads to sub-optimal network development. Further research should be carried out with the utility (in collaboration with NGOs and microfinance organisations) to develop the model further.

8.2 Communication with consumers

- The data indicates that willingness to pay for electricity is strong, especially amongst the urban poor, and that people appear confident that they will be able to pay additional costs. However, it is also evident that people are prepared to pay for a good quality of supply, so it is important that people experience improvements in supplies if they are expected to pay more. To a certain extent, communication strategies can play a role in supporting this.

- Findings show that people will become more aware of reforms as they progress (as in Moldova), but there is an opportunity to raise awareness (in Albania and Kyrgyzstan) in advance of changes. Campaigns should explain the purpose of reforms, encourage people to pay, and to publish the relative cost of fuels in order to help people make informed fuel choices. Any such strategy should target television as an effective medium for communication with consumers.

8.3 Reform processes

- The greatest impact from increasing energy costs is on health, so government health services need to be prepared to cope with the additional demands that are likely to made on it.

- Although it has been demonstrated that urban residents are constrained in their choice of fuels, the economic conditions in urban environments generally appear positive enough to give people confidence in their ability to cope with increasing costs. However, partners are of the view that it is the rural poor and pensioners who will be most severely affected by reforms, as they have lowest levels of cash income from which to make extra payments. Future work should address the needs of these groups (as is being done by the DFID Tariff Reform Project in Kyrgyzstan).

- Policies which encourage consumers to switch from electricity to clean alternatives (notably LPG) for thermal applications should be encouraged. Whilst electricity is preferred over LPG in Kyrgyzstan and Moldova (LPG is perceived as too expensive), the Albanian government have set an example by implementing a range of measures intended to reduce the price of LPG on the free market. However, benefits have not been passed on to the consumer in terms of cheaper prices, so further investigation is required into ways in which the government can effectively regulate pricing in favour of consumers.

Pensioners as a vulnerable group

A widow who cares for five grandchildren in a suburban area in Moldova was disconnected from the electricity supply a year ago after running up debts. Her debts began to accumulate four years ago when her husband died, and the children were left in her care. When asked how she manages to live without electricity, she replied:

> '*For some years I have been cooking food on the wood stove. I collect branches and sawdust to burn. Often it happens that I have nothing to put on the fire, because in the city it is hard to find dry branches'.*

8.4 Energy conservation

- The minimum household electrical demand is based on lighting and modest use of appliances. Consumption of the poorest households cold, therefore, be reduced by a significant proportion by the introduction of energy efficient lighting. Whilst reducing excise duties would go some way towards overcoming the capital cost barrier, governments should look into innovative ways of reducing the cost to the consumer e.g. government or utility subsidies.

- Space heating is the largest domestic thermal load. Information campaigns should be run to promote the uptake of a number of simple energy conservation measures e.g. draughtproofing of windows, insulation of roof. For new buildings, and blocks of flats in particular, local planning authorities should be trained in the need to ensure that building codes (and thermal insulation requirements in particular) should be enforced.

- A growth in the installation of electric DHW heaters is common to each country, and switching to alternative fuels is particularly difficult in flats which are not suited to burning of solid fuels. Effort should be focused on distributing alternative heaters, particularly LPG heaters.

8.5 Legal environment

- Environmental protection measures need to be in place (and enforceable) to cope with increases in demand for fuelwood that are likely to result from fuels switching behaviour, particularly amongst poorest households.

- Further attention should be paid to assessing how effectively news laws are implemented

Withdrawal of Energy – Kyrgyzstan

R8147 2003

(To be filled by the data entry person before entering the data of this questionnaire)

Questionnaire entry number ☐

Notes:

Where questions involve ticking one box from a list of options (or ranking 3 from a list), try to ask the question as an open question, then see which of the categories best matches the response; only if necessary, prompt the respondent with the given categories.

Note the difference between RANKING and SCORING: ranking is where you put things in order of priority – 1 is most important, then 2 is next most important; scoring is where you consider each item separately and give each an independent score (typical between 1 and 5).

1. Survey Data:

1. Date of interview _____.
2. Name of Interviewer _____ .
3. Name of commune or city _____ .
4. Name of village or neighbourhood _____ .
5. Type of community
   (tick only one box)

   Suburban ***(1)*** ☐

   Urban (city centre) ***(2)*** ☐

6. Type of house?
   (Do not ask, observe and tick box representing your observation)

Temporary Shelter (1)	***Hostel (2)***	***Flat (3)***	***House (4)***	***Other (99)***

If other, please specify: _____

2. Household

7. Respondent gender ***(observe, do not ask)***
(tick only one box)

male	***(1)***	
female	***(2)***	

8. Respondent position in household (relationship to head of household):
(tick only one box)

Head	***(1)***	
Wife / husband of	***(2)***	
Son / daughter	***(3)***	
Son/daughter in law	***(4)***	
Grandchild	***(5)***	
Father / mother	***(6)***	
Brother / sister	***(7)***	
Father / mother-in-law	***(8)***	
Brother / sister in law	***(9)***	
Other	***(10)***	

9. Respondent age

10. Respondent highest educational attainment:
(tick only one box)

Primary	***(1)***	
Secondary uncompleted	***(2)***	
Secondary	***(3)***	
Tertiary uncompleted	***(4)***	
Tertiary	***(5)***	
Tertiary specialised	***(6)***	
Academic degree	***(7)***	

11. Social status of respondent:
(tick only one box)

Worker / government official	***(1)***	
Professional	***(2)***	
Business/entrepreneur	***(3)***	
Pupil/student	***(4)***	
Housewife	***(5)***	
Pensioner	***(6)***	
Invalid	***(7)***	
Other	***(8)***	

12. Respondent's current employment status:
(tick only one box)

Unable to work	***(1)***	
Unemployed	***(2)***	
Occasional work	***(3)***	
Part time	***(4)***	
Full time	***(5)***	

13. Household members – gender (including the respondent)
(complete both boxes)

How many males in household ☐

How many females in household ☐

14. How many household members are in each of the following employment status categories (including the respondent)?
(complete all boxes)

Adults Occasional / unemployed	
Adults Part time employment	
Adults Full time employment	
Pensioners	
Disabled / invalids	
Preschool children	
School children	
Students	
Other	

If other, please specify: _____

15. Which members of your family are abroad?

None ***(0)***	Husband / wife ***(1)***	Son / daughter ***(2)***	Brother / sister ***(3)***	Mother / father ***(4)***

3. Housing

16. How many rooms are in your house? ☐
(Separated by solid walls i.e. not by curtains)

17. What size is the home?

Very small <20 m^2 (1)	***Small 20 - 50 m^2 (2)***	***Medium 51-100 m^2 (3)***	***Large > 100 m^2 (4)***

18. Is your house rented or owned? ***(tick only one box)***

Rented (1)	***Mortgaged (2)***	***Owned (3)***	***Other (4)***

If 'Other', please specify: _____

19. Is your house registered with the municipal authorities or not? ***(tick only one box)***

Registered (legal) (1)	***Not registered (illegal) (2)***

20. How long have you lived in this house? ☐ (years)

21. Where did you live before moving to this house?

House on same site (1)	***Same neighbourhood (2)***	***Elsewhere in this city (3)***	***Other city (4)***	***Other Village (5)***

22. How long did you stay in your previous house? ☐ (years)

all the time ☐

23. How have your housing conditions changed in the last 5 years?

Much worse ***(-2)***	Worse ***(-1)***	No change ***(0)***	Better ***(+1)***	Much better ***(+2)***

24. How would you rate the material position of your household?
(tick only one box)

Difficult to provide the family with food but cannot pay utility bills	***(1)***	
Manage to provide food but find it difficult to pay the utility bills and rent	***(2)***	
Can afford required foods, clothes and manage to pay the bills	***(3)***	
Have all we need and made some savings	***(4)***	
Can afford valuables	***(5)***	
Don't know what to answer	***(6)***	

25. How has the health of your children changed in the last 5 years? *(0 if no children)*

Much worse ***(-2)***	Worse ***(-1)***	No change ***(0)***	Better ***(+1)***	Much better ***(+2)***

26. How have employment opportunities for household members changed in the last 5 years?

Much worse ***(-2)***	Worse ***(-1)***	No change ***(0)***	Better ***(+1)***	Much better ***(+2)***

27. How has your access to water and sanitation changed in the last 5 years?

Much worse *(-2)*	Worse *(-1)*	No change *(0)*	Better *(+1)*	Much better *(+2)*

28. How has education opportunities for your children changed in the last 5 years? *(0 if no children)*

Much worse *(-2)*	Worse *(-1)*	No change *(0)*	Better *(+1)*	Much better *(+2)*

29. How have communications changed in the last 5 years? (e.g. phones, transport)

Much worse *(-2)*	Worse *(-1)*	No change *(0)*	Better *(+1)*	Much better *(+2)*

30. How has general security in your neighbourhood changed in the last 5 years?

Much worse *(-2)*	Worse *(-1)*	No change *(0)*	Better *(+1)*	Much better *(+2)*

31. How has the quality of food eaten in the household changed in the last 5 years?

Much worse *(-2)*	Worse *(-1)*	No change *(0)*	Better *(+1)*	Much better *(+2)*

32. How have entertainment facilities changed in the last 5 years? (e.g. TV, billiards)

Much worse *(-2)*	Worse *(-1)*	No change *(0)*	Better *(+1)*	Much better *(+2)*

4. Household Energy Use

33. Which of the following energy supplies does your house have?

None ***(0)***	***District heating (1)***	***District hot water (2)***	***Piped gas (3)***

34. What type of electrical connection do you have?:

Not connected (0)	***Illegal (1)***	***Legal disconnected (2)***	***Legal (3)***

35. If not connected, why not?

_____

36. What type of electricity bill do you receive?

None	*(1)*	
Nominal	*(2)*	
Metered	*(3)*	

37. For each of the following household activities which is your main source of energy / fuel and where appropriate, which is your secondary source of energy / fuel?

(Note in each column the main and second fuels used – it is IMPORTANT to get second fuel)

(Code: main source of energy / fuel = 1, second source of energy / fuel = 2)

		Cooking		Space heating	Water heating		Lighting	Clothes washing	
		S	***W***		***S***	***W***		***S***	***W***
1	Electricity								
2	Piped gas								
3	LPG								
4	central heating								
5	central hot water								
6	Mazut (fuel oil)								
7	Kerosene								
8	Wood								
9	Dung								
10	Coal								
11	Charcoal								
12	Candles								
13	Dry cells								
14	Generators								
15	Other								

If "other", please specify: _____

38. Have you changed your main fuel for COOKING over the last 5 years?
(Write in each response box the appropriate coded response)

(a) Changed main fuel for cooking? Code: Yes = 1 No = 2	(b) What fuel did you use before? Code: 1 Electricity 2 piped gas 3 LPG 4 central heating 5 central hot water 6 mazut (Fuel Oil) 7 Kerosene 8 Wood 9 dung 10 Coal 11 Charcoal 12 Candles 13 Dry cells 14 Generators
Response:	Response:

Ask question 39 only if they have changed their main cooking fuel

39. If you changed type of fuel, why did you change from what you were using before for COOKING?
(tick only one box)

Economical	***(1)***	
Less polluting	***(2)***	
Convenient	***(3)***	
Access	***(4)***	
Safety	***(5)***	
Other	***(6)***	

If 'Other' please specify: _____

40. Have you changed your main fuel for HEATING over the last 5 years??
(Write in each response box the appropriate coded response)

(a) Changed main fuel for cooking? Code: Yes = 1 No = 2	(b) What fuel did you use before? Code: 1 Electricity 2 piped gas 3 LPG 4 central heating 5 central hot water 6 mazut (Fuel Oil) 7 Kerosene 8 Wood 9 dung 10 Coal 11 Charcoal 12 Candles 13 Dry cells 14 Generators
Response:	Response:

Ask question 41 only if they have changed their main heating fuel

41. If you changed type of fuel, why did you change from what you were using before for HEATING?
(tick only one box)

Economical	***(1)***	
Less polluting	***(2)***	
Convenient	***(3)***	
Access	***(4)***	
Safety	***(5)***	
Other	***(6)***	

If 'Other' please specify: _____

42. How many rooms did you heat in the 2002/2003 winter? ☐

43. When chosing fuels for your household, how important do you feel each of the following issues is, on a scale of 1 to 5
(SCORE 1 for not at all, to 5 for very important)

Accessibility	
Cost	
Pollution	
Convenience	
Safety	

44. Consumption and cost of most important fuels:
(Ask questions a, b, and c and note the responses against each type of fuel)

	(a) How much do you use in an average SUMMER month on each fuel type? (e.g. units)	(b) How much are you charged in an average SUMMER MONTH on each type of fuel? (som)	(c) How much do you use in an average WINTER month on each fuel type? (e.g. units)	(d) How much are you charged in an average WINTER month on each type of fuel? (som)	(e)Where do you pay for fuel? Code: Company……..….1 Local inspector……..2 Local shop / merchant...3 Neighbour……..4 Occasional seller……..5 Post office ……6 Government department.7 No payment……8
Monthly					
Electricity	Units:		Units:		
Piped gas	Units:		Units:		
District heating	Units:		Units:		
District hot water	Units:		Units:		
seasonally	(a) How much do you use in an average SUMMER	(b) How much are you charged in an average SUMMER (som)	(c) How much do you use in an average WINTER	(d) How much are you charged in an average WINTER (som)	
Mazut (fuel oil)	Litres:		Litres:		
Kerosene	Litres:		Litres:		
Wood	load:		load:		
Dung	Cakes:		Cakes:		
Coal	Kilos:		Kilos:		
bottle	(a) How long does a cylinder last in SUMMER (weeks)	(b) How much are you charged for a cylinder in SUMMER (som)	(c) How long does a cylinder last in WINTER (weeks)	(b) How much are you charged for a cylinder in WINTER (som)	
LPG					

Tick box if respondent does not know about household expenditure: ☐

45. How has your consumption of electricity changed over the last 5 years?

Greatly reduced ***(-2)***	Reduced ***(-1)***	No change ***(0)***	Increased ***(+1)***	Greatly increased ***(+2)***

Explain why this is: _____

46. How has your consumption of wood changed over the last 5 years?

Greatly reduced *(-2)*	Reduced *(-1)*	No change *(0)*	Increased *(+1)*	Greatly increased *(+2)*

Explain why this is: _____

47. How has your consumption of gas (piped or LPG) changed over the last 5 years?

Greatly reduced *(-2)*	Reduced *(-1)*	No change *(0)*	Increased *(+1)*	Greatly increased *(+2)*

Explain why this is: _____

48. How has your consumption of coal changed over the last 5 years?

Greatly reduced *(-2)*	Reduced *(-1)*	No change *(0)*	Increased *(+1)*	Greatly increased *(+2)*

Explain why this is: _____

49. Which of the following best describes your payment of electricity bills?
(tick only one box)

Unable to pay	*(1)*	
Make part payment – arranged with local inspector	*(2)*	
Pay in instalments	*(3)*	
Pay in full	*(4)*	

50. Do you agree that consumers should pay for their consumption of electricity

Strongly disagree *(-2)*	Disagree *(-1)*	No opinion *(0)*	Agree *(+1)*	Strongly agree *(+2)*

51. How many of each of the following appliances do you normally use in the household?:

		No. of items
1	Colour TV	
2	B&W TV	
3	Video player	
4	Tape / CD player	
5	Camera / video camera	
6	Fridge	
8	Washing machine	
10	Electric/gas cooker	
11	Kerosene stove	
12	Wood / coal stove	
13	Electric hob (manufactured)	
14	Electric heater (home made) – cooking and/or heating	
15	Gas cooking hob	
16	Electric radiator / fan heater	
17	Gas space heater	
18	Generator	
19	Sewing / knitting machine	
20	Water boiler	
21	Satellite dish	
22	Electric iron	
23	Vacuum cleaner	
24	Fan	
25	Radio	
26	Kerosene lamps	
27	Gas lamps	
28	Fluorescent light tubes	
29	Compact fluorescent lamps	
30	Light bulbs	
31	Electric kettle	
32	Microwave cooker	

Other: _____

53. Business activities in the house. *(Ask questions b and c if they have a business in their home - write in the appropriate code or responses in each box)*

(a) Do you run any business activities in your house? Yes = 1 No = 2	(b) Type of business if yes?	(c) Types of fuel used in business? 1 Electricity 2 piped gas 3 LPG 4 central heating 5 central hot water 6 mazut (Fuel Oil) 7 Kerosene 8 Wood 9 dung 10 Coal 11 Charcoal 12 Candles 13 Dry cells 14 Generators 15 Other
Response (a):	Response (b):	Response (c):

5. Impact of Tariff Reforms

54. How likely is it that electricity prices will increase in the next 5 years?

Very unlikely *(-2)*	unlikely *(-1)*	No opinion *(0)*	likely *(+1)*	Very likely *(+2)*

55. How likely is it that coal prices will increase in the next 5 years?

Much worse *(-2)*	Worse *(-1)*	No change *(0)*	Better *(+1)*	Much better *(+2)*

56. How likely is it that central heating prices will increase in the next 5 years?

Much worse *(-2)*	Worse *(-1)*	No change *(0)*	Better *(+1)*	Much better *(+2)*

57. How likely is it that piped gas prices will increase in the next 5 years?

Much worse *(-2)*	Worse *(-1)*	No change *(0)*	Better *(+1)*	Much better *(+2)*

58. How likely is it that Energosbyt will enforce payment of bills in the next 5 years?

Much worse *(-2)*	Worse *(-1)*	No change *(0)*	Better *(+1)*	Much better *(+2)*

59. Which of the following would have the greatest impact on your household?
(RANK 1 = greatest, then 2 and 3)

Electricity price increase	
Coal price increase	
Central heating price increase	
Piped gas price increase	
Enforcement of payment of electricity bills	

60. If you will have to pay more for energy, how will you cope?
(rank 1 = main option, then 2 and 3)

pay more	
Change to cheaper fuels	
Reduce your energy consumption	

61. If you have to pay more for energy, where would you make savings in order to pay the extra **(*rank 1 = most savings, then 2 and 3)*?**

Housing (e.g. rent, repairs, improvements)	
Food	
Travel & Transport (including holidays)	
Debt payments (e.g. paying back loans, credit payments)	
Education	
Clothing	
Telephone	
Medical care (e.g. doctor, drugs)	
Other	

If 'Other', please specify: _____

62. If you have to pay more for energy, where would you make savings in your energy budget in order to pay the extra (*rank 1 = most savings, then 2 and 3)*?

Lighting	
Cooking	
Heating	
Hot water & washing	
Entertainment e.g. TV, radio	
Domestic appliances e.g. vacuum cleaner, fridge	
Business activities	

63. If the cost of your current HEATING fuel increases, which would be your prefered alternative fuel (*RANK 1 = first choice, then 3 and 3)*:

Electricity	
Piped gas	
LPG	
Central heating	
Mazut	
Kerosene	
Wood	
Dung	
Coal	

Give reasons for your choice:

1. _____

2. _____

3. _____

64. If the cost of your current COOKING fuel increases, which would be your prefered alternative fuel (*RANK 1 = first choice, then 3 and 3)*:

Electricity	
Piped gas	
LPG	
Mazut	
Kerosene	
Wood	
Dung	
Coal	

Give reasons for your choice:

1. _____

2. _____

3. _____

65. How much information do you have on the current electricity reform processes
(tick only one box)

Can't answer (0)	***None (1)***	***A little (2)***	***A lot (3)***

66. What is the main source from which you have heard information about the electricity reforms?
(tick one box only)

Press	*(1)*	
TV	*(2)*	
Radio	*(3)*	
Friends and family	*(4)*	
neighbours & colleagues	*(5)*	

67. What is your opinion on the current electricity reform processes

Very negative *(-2)*	negative *(-1)*	No opinion *(0)*	positive *(+1)*	Very positive *(+2)*

6. Outcome Statements

The following statements have been made by people (sometimes in other countries); please indicate the extent to which you agree or disagree with each statement, based on your own household situation.

68. If energy costs increase we will reduce the number of hours that we heat the house

Strongly disagree *(-2)*	Disagree *(-1)*	No opinion *(0)*	Agree *(+1)*	Strongly agree *(+2)*

69. If electricity costs increase we will use candles for lighting

Strongly disagree *(-2)*	Disagree *(-1)*	No opinion *(0)*	Agree *(+1)*	Strongly agree *(+2)*

70. If electricity costs increase we will use kerosene lamps for lighting

Strongly disagree *(-2)*	Disagree *(-1)*	No opinion *(0)*	Agree *(+1)*	Strongly agree *(+2)*

71. If electricity costs increase we will be able to continue using the fridge in summer

Strongly disagree *(-2)*	Disagree *(-1)*	No opinion *(0)*	Agree *(+1)*	Strongly agree *(+2)*

72. If we are disconnected from the electricity, we will cook at our neighbours

Strongly disagree *(-2)*	Disagree *(-1)*	No opinion *(0)*	Agree *(+1)*	Strongly agree *(+2)*

73. If energy costs increase we will change to eating food that does not need to be cooked

Strongly disagree *(-2)*	Disagree *(-1)*	No opinion *(0)*	Agree *(+1)*	Strongly agree *(+2)*

74. If energy costs increase we will cook outside (using wood)

Strongly disagree *(-2)*	Disagree *(-1)*	No opinion *(0)*	Agree *(+1)*	Strongly agree *(+2)*

75. If electricity costs increase we will stop watching TV

Strongly disagree	Disagree	No opinion	Agree	Strongly agree
(-2)	***(-1)***	***(0)***	***(+1)***	***(+2)***

76. If energy costs increase we will heat fewer rooms

Strongly disagree	Disagree	No opinion	Agree	Strongly agree
(-2)	***(-1)***	***(0)***	***(+1)***	***(+2)***

77. If energy costs increase we will be abel to continue using hot water

Strongly disagree	Disagree	No opinion	Agree	Strongly agree
(-2)	***(-1)***	***(0)***	***(+1)***	***(+2)***

78. If energy costs increase we will cut woods by ourselves

Strongly disagree	Disagree	No opinion	Agree	Strongly agree
(-2)	***(-1)***	***(0)***	***(+1)***	***(+2)***

79. If electricity costs increase some people we will make an arrangement with the inspector to cover our debt

Strongly disagree	Disagree	No opinion	Agree	Strongly agree
(-2)	***(-1)***	***(0)***	***(+1)***	***(+2)***

80. If we are disconnected from electricity, we will arrange to take electricity from a neighbour's supply

Strongly disagree	Disagree	No opinion	Agree	Strongly agree
(-2)	***(-1)***	***(0)***	***(+1)***	***(+2)***

81. If energy costs increase we will send our children to live with relatives to reduce energy consumption [S1]

Strongly disagree	Disagree	No opinion	Agree	Strongly agree
(-2)	***(-1)***	***(0)***	***(+1)***	***(+2)***

82. If energy costs increase our whole family will move into a relative's house to save energy [S2]

Strongly disagree	Disagree	No opinion	Agree	Strongly agree
(-2)	***(-1)***	***(0)***	***(+1)***	***(+2)***

83. If energy costs increase some people will move to a new house to escape from debts [S3]

Strongly disagree	Disagree	No opinion	Agree	Strongly agree
(-2)	***(-1)***	***(0)***	***(+1)***	***(+2)***

84. If electricity costs increase lighting in public places will reduce, so level of crime will increase [P1]

Strongly disagree	Disagree	No opinion	Agree	Strongly agree
(-2)	***(-1)***	***(0)***	***(+1)***	***(+2)***

85. If electricity costs increase the electricity company will take things from our house to pay for debts [P2]

Strongly disagree	Disagree	No opinion	Agree	Strongly agree
(-2)	***(-1)***	***(0)***	***(+1)***	***(+2)***

86. If we are not able to pay increased electricity costs the electricity company will get a court order against us [S1]

Strongly disagree	Disagree	No opinion	Agree	Strongly agree
(-2)	***(-1)***	***(0)***	***(+1)***	***(+2)***

87. If energy costs increase we will get sick because of lack of heating [H1]

Strongly disagree	Disagree	No opinion	Agree	Strongly agree
(-2)	***(-1)***	***(0)***	***(+1)***	***(+2)***

88. If electricity costs increase our inability to pay bills will cause psychological illness [H2]

Strongly disagree *(-2)*	Disagree *(-1)*	No opinion *(0)*	Agree *(+1)*	Strongly agree *(+2)*

89. If electricity costs increase inability to pay bills will cause conflicts in the family [S4]

Strongly disagree *(-2)*	Disagree *(-1)*	No opinion *(0)*	Agree *(+1)*	Strongly agree *(+2)*

90. If electricity costs increase we will be disconnected because of our neighbour's debts. [S4]

Strongly disagree *(-2)*	Disagree *(-1)*	No opinion *(0)*	Agree *(+1)*	Strongly agree *(+2)*

91. If energy costs increase we will get sick because of not cooking properly [H4]

Strongly disagree *(-2)*	Disagree *(-1)*	No opinion *(0)*	Agree *(+1)*	Strongly agree *(+2)*

92. If electricity costs increase our children's education will be affected by poor lighting [H5]

Strongly disagree *(-2)*	Disagree *(-1)*	No opinion *(0)*	Agree *(+1)*	Strongly agree *(+2)*

93. If energy costs increase our children's education will be affected by not enough heating at home [H5]

Strongly disagree *(-2)*	Disagree *(-1)*	No opinion *(0)*	Agree *(+1)*	Strongly agree *(+2)*

94. If energy costs increase our health will be affected by not having hot water e.g. for washing [H6]

Strongly disagree *(-2)*	Disagree *(-1)*	No opinion *(0)*	Agree *(+1)*	Strongly agree *(+2)*

95. If electricity costs increase we will buy food on credit [F1]

Strongly disagree *(-2)*	Disagree *(-1)*	No opinion *(0)*	Agree *(+1)*	Strongly agree *(+2)*

96. If electricity costs increase we will borrow money [F2]

Strongly disagree *(-2)*	Disagree *(-1)*	No opinion *(0)*	Agree *(+1)*	Strongly agree *(+2)*

97. If electricity costs increase we will be able to find extra work to pay the extra money [F2]

Strongly disagree *(-2)*	Disagree *(-1)*	No opinion *(0)*	Agree *(+1)*	Strongly agree *(+2)*

98. If electricity costs increase our close family will help with paying bills [F2]

Strongly disagree *(-2)*	Disagree *(-1)*	No opinion *(0)*	Agree *(+1)*	Strongly agree *(+2)*

99. If electricity costs increase we will get into debt with Energosbyt [F2]

Strongly disagree *(-2)*	Disagree *(-1)*	No opinion *(0)*	Agree *(+1)*	Strongly agree *(+2)*

100. If electricity costs increase some people will use beetles [F2]

Strongly disagree *(-2)*	Disagree *(-1)*	No opinion *(0)*	Agree *(+1)*	Strongly agree *(+2)*

101. If electricity costs increase our house will be disconnected

Strongly disagree *(-2)*	Disagree *(-1)*	No opinion *(0)*	Agree *(+1)*	Strongly agree *(+2)*

102. Which of the following issues do you feel are most important?
(RANK 1 = most important, then 2 and 3)?

Keeping the family together	
Being secure in our home	
good health	
Education	
Financial independence (not getting into debt)	

7. Problems with electrical supplies

103. Of the following list of problems could you indicate if any of these have occurred in your house in the past 6 months, the frequency of that occurrence, and how the severity of the problem has changed over the last 5 years. *(Ask questions **a**, and then questions **b** and **c** if the problem has occurred.*)

Problems	(a) Has the problem occurred in the past 6 months? *Code:* *Yes = 1* *No = 2*	(b) How often has it occurred? *Code:* *Only once or twice = 1* *Frequently (several times a month). = 2* *Very frequently (several times a week) = 3* *All the time (every day = 4*	(c) How has the problem changed over the last 5 years *Much worse = -2* *Worse = -1* *No change =0* *Better =1* *Much better =2*
1. Power cuts			
2. The supply becomes too weak to run the appliances (e.g. TV)			
3. Appliances have fused due to surges in the electrical supply			
4. central heating is not hot enough ***(if connected)***			

104. How often has your household been disconnected from the electricity supply?

Not connected (0)	***Never (1)***	***Only rarely (2)***	***Occasionally (3)***	***Most months (4)***	***Continuously (5)***

105. ***If you have been disconnected***, why were you disconnected?
(tick one box only)

We have not paid bills	***(1)***	
Neighbours don't pay	***(2)***	
Technical problems	***(3)***	
Illegal connection was cut	***(4)***	
Other	***(5)***	

If 'Other', please specify: _____

106. ***If you have been disconnected***, how did you manage to get reconnected to an electricity supply?

We paid the money by ourselves	*(1)*	
We borrowed money to pay	*(2)*	
We arranged to pay in installments	*(3)*	
We sold some things from our house	*(4)*	
We made an illegal connection	*(5)*	
Other	*(6)*	

If 'Other', please specify: _____

107. How has the frequency of disconnections changed over the last 5 years

Much more rare *(-2)*	more rare *(-1)*	No change *(0)*	more frequent *(+1)*	Much more frequent *(+2)*

8. Expenditure and Income

108. Household expenditure: How much do you spend in a month on average on each of the following?

Monthly	Average **monthly** spend (som)	Average **annual** spend (som)
Housing (e.g. rent, repairs, improvements)		
Food		
Travel & Transport (including holidays)		
Telephone		
Communal services e.g. water & sanitation		
Education		
Clothing		
Debt payments (e.g. paying back loans, credit payments)		
Medication and medicare		
Other major expenditure		

If "other", please specify: _____

Tick box if respondent does not know about household expenditure: ☐

109. Does your household have any debts at present,
(tick as many boxes as necessary)

Electricity	*(1)*	
Food	*(2)*	
Other	*(3)*	

If other, please specify _____

110. How frequently are you unable to pay bills?

	Frequency: ***Never ……=0*** ***Only rarely …= 1*** ***Occasionally.. = 2*** ***Often ……..... = 3*** ***Continually ...= 4***
Electricity	
Food	
Other	

111. How have your living conditions changed in the last 5 years?

Much worse ***(-2)***	Worse ***(-1)***	No change ***(0)***	Better ***(+1)***	Much better ***(+2)***

112. Earned income: Which household members contribute to household income, and what is the total average monthly amount that they contribute?
(Indicate who are the main income earners contributing to the household income, the average monthly income of each and frequency of payment)

(a) Income earners: State who they are	(a) How much per month? <200 som……..1 200 – 500 som ……2 501 – 1,000 som.…..3 1001 – 2000 som…..4 2001 - 4000 som…..5 4001 - 6000 som.….6 >16000 som……..7	(c) Frequency of payment? Monthly …….1 Weekly……2 Irregular …….3
1		
2		
3		
4		
5		

113. What is the average monthly income received from the following sources by the household?

Types of income	How much? <200 som……..1 200 – 500 som ……2 501 – 1,000 som.…..3 1001 – 2000 som…..4 2001 - 4000 som…...5 4001 - 6000 som..…6 >16000 som……..7
Senior citizens pension	
Disable / invalid assistance	
Unemployment benefit	
Other MLSA assistance	
Rental income	
Gifts from family members	
Other	

If 'other', please specify: _____

114. How much agricultural land do you own (at any location)? (sotka) ☐

115. Have you sold any land in the last 5 years?
(tick only one box)

Yes ***(1)*** ☐

No ***(2)*** ☐

116. How many livestock do you own?

Cattle ☐

Sheep ☐

Goat ☐

Hens ☐

If other, please specify: _____

117. If you do not receive social assistance from the government, why not:
(tick one box only)

N/A – we do receive assistance	***(0)***	
Not registered yet	***(1)***	
System is too bureaucratic	***(2)***	
We don't know what we can apply for	***(3)***	
Assistance is given in kind e.g. food	***(4)***	
We do not need government assistance	***(5)***	
Other	***(6)***	

If 'other', please specify: _____

118. Which of the following has had the greatest affect on your ability to pay for household items
(RANK 1 = greatest affect, then 2 and 3)

Household members have become unemployed	***(1)***	
Death or separation of household member	***(2)***	
Sickness / invalidity	***(3)***	
Retirement (changing from salary to pension)	***(4)***	
Prices increase	***(5)***	
Changing to a job with lower salary	***(6)***	
Other	***(7)***	

If 'other', please specify: _____

119. Name of Respondent _____ .

Thank the respondent

9. Any other observations:

Appendix 2

Country Survey Analysis – Albania

The sample

A randomised cluster sampling process was applied involving 210 households within urban and suburban neighbourhoods of Tirana. 26% of all households sampled came from urban neighbourhoods will 74% were determined to be in suburban areas.

The household was the sampling unit. A representative of each household was interviewed. The respondents were asked to provide information regarding their individual status, as well as that of the household in general. The following descriptive information therefore initially represents the respondent's status and then that of the household.

The respondent

The majority (76%) of the respondents were heads of their respective households or the spouse of the head (13%). A further 9.5% were sons or daughters and only 1.5% claimed to be in-laws to or parents of the head of household.

The respondents were predominantly male (85%). The low representation of female respondents (32 or 15%) may mean that if a differential female perspective exists the respective sub-sample may not be sufficient to capture this adequately. The sampling process was not stratified by gender, the head of household or closest available representative being the objective of the sampling process. Of the respondents claiming to be heads of their households, only 3 (2%) were female.

The average age of all respondents was 45 while this increased slightly when the mean age of the heads of household are considered (48). The majority of respondents (40%) were between 35 and 45 years of age (Table 1).

Table 1 Age of all respondents compared to age of heads of household

	All	H/h only
N	210	160
Mean	45.37	48.04
Median	44.5	46.0
(IQR)	38 to 50	40 to 60
Age group	Percent	Percent
<35	17.10	8.10
35 to 45	40.00	40.00
46 to 55	22.9	26.30
56>	20.00	25.60
Total	100	100

The majority of all respondents and heads of households have a tertiary or higher level of education (Table 2). The level of educational achievement is slightly higher when the whole sample is considered. Interestingly, there is no significant difference between the genders regarding educational attainment. However, as would be expected there is a significant difference when age is considered ($p = 0.000$), the younger respondent demonstrating the higher mean attainment.

The majority of all respondents claim to be unskilled workers (60%). The percentage of unskilled workers increases to 66% when the heads of households' responses are compared (Table 3). However, the incidence of those claiming to be professionals is higher amongst heads of household (27%) when compared to the response of the whole sample (60%). Of the whole sample 13% claim to be housewives compared to only 3% of the heads

of households. Of spouses of heads of households 84% indicated that their main occupation to be housewife whilst 16% are involved in some form of unskilled paid labour (Table 3).

Surprisingly few of the respondents claimed to be involved in running their own enterprise, only 1% of the heads of household.

Respondents that claimed not to have an occupation because of a disability -invalid- head two of the households.

Table 2: Level of educational achievement

	Whole sample		Head of Household	
Level of Education	Frequency	Percent	Frequency	Percent
primary	12	5.70	11	6.90
secondary not completed	7	3.30	6	3.80
secondary	63	30.00	47	29.40
tertiary not completed	13	6.20	10	6.30
tertiary	87	41.40	65	40.60
tertiary specialised	24	11.40	17	10.60
academic degree	4	1.90	4	2.50
Total	210	100	160	100

Table 3: Occupation

	Whole sample		Heads of households		Spouses	
Profession	Frequency	Percent	Frequency	Percent	Frequency	Percent
worker	121	60.20	101	66.00	4	16.00
professional	43	21.40	41	26.80		
business / entrepreneur	2	1.00	1	0.70		
housewife	26	12.90	3	2.00	21	84.00
invalid	2	1.00	2	1.30		
other	7	3.50	5	3.30		
Total	201	100	153	100	25	100

When the current employment status of the respondents is considered 36% of all respondents claim to be either unemployed, unable to work or to be pensioners. In contrast 30% of those that are heads of households are not in employment (Table 4).

Only 9% of the whole sample and 10% of the heads of households claim to be in fulltime employment. Similarly, 25% of respondents and heads of households claim to be self-employed. However, there is a difference with regard to part-time or occasional employment between the whole sample and the heads of household (30% and 35% respectively).

Table 4: Employment status

	Whole sample		Heads of Household	
Employment status	Frequency	Percent	Frequency	Percent
unemployed	29	14.10	7	4.40
unable to work	8	3.90	6	3.80
occasional	24	11.70	20	12.60
part time	38	18.50	36	22.60
full time	18	8.80	16	10.10
pensioner	36	17.60	35	22.00
self employed	52	25.40	39	24.50
Total	205	100	159	100

As indicated in Table 7, several of the respondents that claim to be pensioners are not receiving pensions. It is important to note that Table 7 includes all members of the household in receipt of assistance in each row.

Household

The average size of household was relatively small (mean = 5.09). There was a slightly higher number of males to females per household (mean = 2.65 to 2.44 respectively). The average number of children per household was 1.66 children, giving a mean of 4.26 adult units per household (Table 5).

Table 5: Size of household and gender and child distribution

	Mean	Median	IQR
number of males in household	2.65	3	2 to3
number of females in household	2.44	2	2 to 3
Total in household	5.09	5	4 to 6
Total children in household	1.66	2	1 to 2
Adult units per household [a]	4.26	4	3 to 5

[a] The adult unit is calculated by a treating children as 50% of an unit

It is assumed that there are on average 3.43 adults per household (Table 5). Of these on average 1.82 are unemployed. 0.93 have and 0.37 are pensioners (Table 6). This indicates that on average one person per household is in part or fulltime employment.

Table 6: employment status of each household

n =210 households	Number	H/H mean
adults normally unemployed	382	1.82
adults part-time employed	133	0.63
adults full time employed	64	0.30
pensioners	78	0.37
disabled / invalids	8	0.04
Totals	665	3.16

On average there are 4 adult units per household when the children are calculated as half an adult. Therefore, on average 29% of the adult units per household are engaged in fulltime employment[1]. Alternatively, of those heads of household whole responded to the survey, 30% are unemployed, unable to work or pensioners, 35% are in part-time employment and 35% have fulltime employment.

Overall approximately 27% of households are receiving some form of additional support in the form of pension, disability allowance or other benefits (Table 7). 59% of pensioners in the sampled households are receiving a pension and 75% of the disabled are also receiving some form of contribution. However, only 8 adults are receiving some other form of supplement due to their unemployed status. This could be the equivalent of 6% of adults unemployed that are not housewives, invalids or pensioners, e.g. 125 adults.

Very few of the households (13%) claimed to have relatives living abroad, and therefore the possible influence of remittances on household income will be minimal. The most frequently reported were children living abroad (8%).

[1] The percentage is calculated by taking sum of those employed per household weighted by the nature of employment.

Table 7: Benefit receipts by employment status

	Employment status							
Benefits	unemployed	unable to work	occasional	part time	full time	pensioner	self employed	Total
Pension	4	1	2	1	6	24	8	46
Disability	1	0	2	0	1	2	0	6
Unemployment	1	0	1	0	2	1	0	5
Other benefits	1	1	0	0	0	1	0	3
Sub-Total	7	2	5	1	9	28	8	60
Percent	24.14	25.00	20.83	2.63	50.00	77.78	15.38	29.27
Total	29	8	24	38	18	36	52	205

Housing

The majority (80%) of the respondents live in individual houses, 18% in flats and only 2% in hostels or shacks[2] (Table 8). All those living in flats (18%) were in the urban as opposed to suburban neighbourhoods.

Table 8: Type of housing

	Suburban	Urban	Total	Valid Percent
Shelter	2	0	2	1.00
Hostel	2	0	2	1.00
Flat	7	30	38	18.10
House	144	24	168	80.00
Total	155	54	210	100.00

The mean number of rooms of the sampled houses was 3. Approximately 28% of the respondents live in two room houses, 50% in 3 rooms and a further 19% in 4 rooms. A separate estimate of house size was also made based on the floor area from small medium and large (Table 9). As would be expected there was a significant correlation between the number of rooms and the estimated size of house. However, the number of rooms is the more sensitive variable. There is a strong correlation between age and the number of rooms ($p = 0.000$).

Table 9: Size of house

	Frequency	Percent
small (<20m2)	21	10
medium (50 - 100 m2)	168	80
large (>100 m2)	21	10
Total	210	100

The majority (98%) of respondents claim to own their houses. Only one respondent claimed to be paying rent and 3 others had mortgaged their property. This is surprisingly low given the urban context and does cast some doubt on the validity of the response to this particular variable.

In contrast the respondents appeared to have no difficulty in stating whether their house was recognised by the authorities or not. 55% claimed their properties had legal status while, in contrast, 45% claimed their houses were not recognised by the municipal authorities. There is a positive though not significant correlation between the length of stay and legal recognition of the house as indicated in Table 10, the longer the residency the more likely the house is to have legal recognition. However, there is not a significant relationship between age and legal tenure as might have been expected.

[2] Defined by the interviewer by observation

The majority of the respondents (75%) claimed to have moved at some time from a rural village to Tirana. 20% have moved from another city or within Tirana while 5% have never moved. There is a difference regarding tenure and origin, those moving from rural villages demonstrating greater tendency to lack legal tenure (χ p = 0.003) (Table 11). The movement from the countryside to the city has been constant amongst those sampled, although there was an increase between 6 and 7 years ago. I.e. 32% moving in the last five years, 36% between 6 and 6 years ago and 32% eight or more years ago.

Table 10: Legal status * (banded) length of stay in house cross-tabulation

		(banded) length of stay in house			
		<6 years	6 to 7 years	7> years	Total
legal status	legal	28	34	51	113
	illegal	29	31	35	95
Total		57	65	86	208

Table 11: legal status * live before moving to this house Cross-tabulation

		live before moving to this house				Total
		Same neighbourhood	Elsewhere in Tirana	Other city	other village	
legal status	legal	8	0	21	51	80
	illegal	1	2	9	64	76
Total		9	2	30	115	156

Changes in the neighbourhood during the last five years

A number of questions were asked regarding observed changes in the living conditions of their respective neighbourhoods. These involved housing, health (child), employment, water and sanitation, education (schooling), communications, security, food and entertainment. An index of perceived neighbourhood improvement, was developed by taking the mean of the responses to the above indicators, each measured on a 5 point bi polar scale presented in Table 12. (This scale of nine indicators was found to have an Alpha coefficient [3]of 0.6). The neighbourhood index is compared with a more general measure of perceived improvement in living conditions over the same period. These two measures correlate closely (p = 0.000)

Overall the general feeling is that general living conditions have improved slightly (mean = 0.12, range of scale -2 to +2) (Table 12). The majority (61%) of the respondents did not feel that their living conditions have changed over the past five years, however, 26% felt that they have improved compared to 13% that expressed the opposite opinion.

- Regarding living condition improvement, it is interesting to note that those without legal tenure expressed a slightly more positive opinion (ns) their counterparts with legal tenure.
- The size of dwelling has a significant influence on the general perception of improved living conditions, those with larger homes expressing a positive response compared to the negative score recorded by those occupying the smallest dwellings.

The neighbourhood quality index expresses a slightly more positive opinion regarding improvement (mean = 0.18, range of scale -2 to +2). When the sample is taken as a whole the most noticed positive changes relate to security, communications and education. In contrast deterioration is noted regarding employment and water and sanitation services (Table 12).

- Those with legal tenure also expressed a significantly more positive response than those with illegal tenure. This is based on significantly more positive responses of those with legal tenure regarding improvements in child health, access to food and educational facilities.

[3] Cronbach's Alpha coefficient is a measure of a scale's reliability. A coefficient of >0.6 normally indicates reliability.

- Those with medium and large dwellings also registered significantly more positive mean neighbourhood index score than those with smaller homes. This is based on significantly more positive responses of those with medium or larger hoses regarding child health, communications, housing and food. In each case those with medium sized dwellings recorded the most positive mean scores (Table 12).
- The size of household does not appear to influence the respondents' perception of improvement in neighbourhood or living conditions. As demonstrated in Table 12 no significant differences were noted in the neighbourhood index or general perception of living condition improvement. The only significant difference was regarding the perception of improved communications. In this instance those with larger households (over 5 adult units) expresses a less positive opinion.

Table 12: Neighbourhood quality of life indicators comparing tenure status and size of dwelling

	All	Tenure			Size of dwelling				Household Size (adult units[4])			
		Legal	Illegal		Small	medium	Large		small	medium	large	
n	210	114	95		21	168	21					
Range (-2 to +2)	Mean	Mean	Mean	**MW Sig**	Mean	Mean	Mean	**KW Sig**				**KW Sig**
housing	0.25	0.34	0.15		-0.35	0.33	0.24	**0.019**	0.27	0.20	0.30	
child health	0.42	0.58	0.24	**0.000**	0.00	0.48	0.38	**0.000**	0.40	0.45	0.41	
Employment	-1.19	-1.26	-1.11		-0.95	-1.23	-1.14		-1.13	-1.27	-1.17	
water / sanitation	-0.72	-0.65	-0.8		-0.81	-0.71	-0.67		-0.79	-0.79	-0.57	
Education	0.50	0.61	0.37	**0.020**	0.60	0.50	0.45		0.63	0.53	0.37	
Communications	0.76	0.76	0.77		0.24	0.85	0.57	**0.000**	0.81	0.84	0.63	**0.047**
security	0.93	0.91	0.95		0.86	0.92	1.05		1.00	0.95	0.85	
food	0.30	0.44	0.13	**0.000**	-0.05	0.36	0.14	**0.025**	0.24	0.33	0.32	
Entertainment	0.33	0.50	0.13	**0.000**	0.19	0.33	0.48		0.32	0.33	0.34	
Mean index	0.18	0.25	0.09	**0.000**	-0.06	0.20	0.16	**0.004**	0.19	0.17	0.17	
General living conditions	0.12	0.09	0.16		-0.38	0.12	0.62	**0.000**	0.05	0.15	0.15	

- MW Sig = p values resulting from the Mann Whitney U Test
- KW Sig = p values resulting from the Kruskal Wallis H Test
- Household size: small = 3 or less AUs, medium = 3.5 to 4.5 Aus, Large = 5 or more AUs

Electrical connection and billing

All but three of the sampled households have access to electricity. 203 (96%) households claim to have a legal connection to the grid. Only 3 households admitted to having an illegal connection and one respondent living in a hostel had been disconnected.

When the different forms of billing are considered a similar response is noted. Only 10 (5%) of the respondents claim not to be receiving a bill. Of these four households are either not or illegally connected. The forfeit is the most common form of billing (58%) with 37% of the households possessing a metered connection.

- When the perception of neighbourhood improvement is considered between those billed by forfeit or meter the significant difference noted was regarding health. Those paying by forfeit registered a significantly stronger improvement in child health ($p = 0.004$). Those connected to a meter expressed a far more positive impression regarding the improvement in the security of their neighbourhood security (ns).

From this finding it does not appear that the choice of connection to the grid or form of payment has any real relevance to the respondents perception of living conditions.

Economic

For measuring the economic status of the household the ability to meet the needs of the household, frequency of inability to pay utility and food bills, household expenditure and household income are considered.

[4] An adult unit is calculated by attributing a value of 50% for children, usually below 15)

When these different variables are correlated with each other the material position of the household correlates significantly with all the other variables considered as demonstrated in Table 13. However, frequency of inability to pay for food appears to be the most sensitive of those considered.

Table 13: Correlation of economic indicators

	Material position of h/h	Frequency of inability to pay electricity	Frequency of inability to pay for food	Total annual expenditure	Total household income
Material position of h/h	1	.364(**)	.446(**)	.362(**)	.211(**)
Frequency of inability to pay electricity	.364(**)	1	.572(**)	.	.301(**)
Frequency of inability to pay for food	.446(**)	.572(**)	1	.326(**)	.319(**)
Total annual expenditure	.362(**)		.326(**)	1	.318(**)
Total household income	.211(**)	.301(**)	.319(**)	.318(**)	1

** Correlation is significant at the 0.01 level (2-tailed)

When the material position of the whole family is considered, 34% indicated that they have difficulty providing food for the family. Although the majority can meet the food needs of the household they are finding it difficult to pay for utilities such as electricity. Only 10% claim to be in a position of sufficient financial security to meet the basic household needs (Table 14).

Table 14: Material position of the household

	Frequency	Percent
Difficult to provide the family with food	71	33.8
Manage to provide food but find it difficult to pay the util	119	56.7
afford required foods, clothes and manage to pay the bills	15	7.1
Have all we need and made some savings	5	2.4
Total	210	100

However, when the respondents were asked to indicate their inability to pay for electricity, 19% claim to continually experience an inability to pay, compared to 31% that are often unable to pay. Only 7% of the households sampled claim to always to be able to pay their electricity bill. At the time of the survey 25% claimed to have outstanding electricity debts (Table 15).

Table 15: frequency of inability to pay for electricity and food and current incidence of debt

Frequency of inability to pay	Electricity %	Food %
Continually	18.60	2.40
Often	31.00	2.40
Occasionally	28.60	11.40
Rarely	4.80	16.70
Never	7.10	27.10
Total	90.10	60.00
% Currently in debt	25.20	6.20

Reasons given for the inability to pay related mainly to employment problems (74%), either loss of employment or changing to jobs with lower salaries. Increased prices were mentioned by 19% and only 7% mentioned problems related to health or retirement.

Household expenditure

The mean household expenditure per year is Lek 409,503. Those in the third of households spending least (mean Lek 333,811) compared to the third of the sample spending most (mean = Lek 519,579) (Table 16 and Table 17).

Item	N	Mean (leke/year)
food	210	266920
energy	187	38575
clothing	210	21617
travel	210	20216
telephone	210	17726
housing	210	13663
education	210	11514
medication and care	210	11114
debt payments	210	2011
water & sanitation	210	1064
Total expenditure	187	409503

- It is interesting to note that those without legal tenure reported a significantly higher mean annual expenditure.
- As would be expected there is a significant increase in expenditure between those that reported a stronger material position of the household. However, as can be observed regarding the reported material position there is only a slight increase between the weakest and average groups compared to the significant increase from the average to strongest group.
- The number of household members also as a significant impact on total expenditure. Those with the largest houses and strongest material position recording the highest expenditures of the categories considered. Likewise the larger the dwelling the greater the annual expenditure. However, the expenditure of those with the largest dwellings is notably greater than the mean of the largest households (Table 16 and Table 17).

Table 16: Influence of tenure, household status and house size on energy expenditure

	All	Tenure			Material Position				Size of dwelling			
		Legal	Illegal		weak	average	strong		small	medium	large	
n	210	108	81		60	111	16		17	155	18	
	Mean	Mean	Mean	**MW Sig**	Mean	Mean	Mean	**KW Sig**				**KW Sig**
total expenditure	409503	369984	454922	**0.003**	366313	395891	665900	**0.000**	269520	392636	701291	**0.000**
% on energy	10.20	10.86	9.43		11.03	9.88	9.26		10.36	10.44	7.81	
% electrical	32.65	38.90	24.73	**0.000**	26.80	34.99	36.48		17.99	33.06	40.24	**0.044**
% Gas	37.75	43.55	30.28	**0.001**	38.43	38.27	31.78		42.93	37.51	35.95	
% Wood	26.53	14.95	41.97	**0.000**	28.89	25.58	24.02		31.75	27.26	15.63	

- MW Sig = p values resulting from the Mann Whitney U Test
- KW Sig = p values resulting from the Kruskal Wallis H Test

Table 17: Influence of billing, household size and household expenditure on energy expenditure

	Type of bill			Household Size (adult units)				Total h/h expenditure			
	Forfeit	metered		Small	medium	Large		low	medium	high	
n	122	78		58	69	62		64	70	53	
Range (-2 to +2)	Mean	Mean	**MW Sig**	Mean	Mean	Mean	**KW Sig**	Mean	Mean	Mean	**KW Sig**
total expenditure	412134	417587		325558	400689	497913	**0.000**	333811	395365	519579	**0.000**
% on energy	10.70	9.71		9.59	9.87	11.13		5.98	10.89	14.38	**0.000**
% electrical	26.53	44.45	**0.001**	30.07	31.57	36.20		19.39	40.48	36.32	**0.000**
% Gas	42.53	30.80		40.90	40.16	32.28		65.14	28.70	23.62	**0.000**
% Wood	27.62	22.58		26.53	26.14	26.96		15.48	30.82	37.55	**0.000**

- MW Sig = p values resulting from the Mann Whitney U Test
- KW Sig = p values resulting from the Kruskal Wallis H Test
- Household size: small = 3 or less AUs, medium = 3.5 to 4.5 AUs, Large = 5 or more AUs

Expenditure on energy

Overall the average proportion of total household expenditure spent energy was 10% (Table 16). The percentage of expenditure on energy significantly increases in line with increased total household expenditure. I.e. Those with the lowest household expenditure are only spending 6% on energy in contrast to 14% by those with the highest overall expenditure (Table 17). This is surprising as the opposite might have been expected and suggests that the poor are applying strategies to reduce proportional energy expenditure.

In contrast, those reporting a weaker household material position and smaller dwellings are paying on average a greater proportion of total expenditure on energy (ns) (Table 16). The size of household also appears to make little difference to proportional energy expenditure.

The three main fuels used are electricity, gas (LPG) and wood. The proportional expenditure on these fuels depends on the status of the household.

- Tenure has a significant influence of the proportional use of all three fuels. Those with legal tenure spend a higher percentage of household energy expenditure on electricity and gas. In contrast those with illegal tenure spend a higher proportion on wood.

  In the case of those with legal tenure most is spent on gas followed by electricity. Those without legal tenure spend most of their energy budget on wood, followed by gas (Table 16).

- In the case of the material position of the household no significant differences are noted regarding the proportional expenditure on the three fuel types. However, the trend is to spend more of the energy budget on electricity the more secure materially the household. In contrast expenditure on gas and wood tends to decline (ns).

  For those in the weakest and average material status categories gas accounts for the largest proportion of the household energy budget. In contrast, the most materially secure spend the largest proportion of the energy budget on electricity (Table 16).

- The size of dwelling has a significant influence on the proportion electricity expenditure only. The largest houses are spending most of their energy budget on electricity compared to those with small and average sized homes were gas is the primary fuel cost. In the case of those with the smallest dwellings wood accounts for the second largest proportion of energy expenditure (Table 16).

- The type of bill also has a influence the proportion of the household energy spent on electricity, those with metered connections a significantly higher proportion than those paying via forfeit. Those paying via forfeit spend most of their energy budget on gas (Table 17).

- Household size does not appear to have a significant influence on the proportions of expenditure on the three fuels considered. The smallest and medium size households spend most on gas in contrast to the larger households' proportionally higher electrical expenditure (Table 17).

- Total household expenditure has a significant influence on the proportional expenditure of all three fuel-types (Table 17).

  - The households with the lowest total expenditure indicated that although their energy consumption was the lowest spent over half of this proportion on gas (65%). This is followed by gas.

  - Those households within the medium category of total expenditure spend most of their energy budget on electricity (40%). Gas accounted for the next highest proportion of spending for this category.

  - Interestingly, the households registering the highest level of total expenditure are not only spending most on energy (14%) but are also spending most of this energy outlay on wood (38%).

The findings presented in Table 16 and Table 17 indicate that generally gas accounts for the main expenditure of the households that consider themselves in a weak or average material position and have the small or average size dwellings. In contrast electricity accounts for the largest proportion of the energy budget of those in the strongest material position and those occupying the largest houses. However, as indicated above the households with the largest overall household expenditure who also spend the largest proportion of their budget on energy are spending more on wood in comparison to gas or electricity. This may indicate that these households have the ability to indulge in additional energy expenditure over and above the essentials, which is represented in their

consumption of wood. One of the most interesting observations is the positive influence of legal tenure and metered payment on the consumption of electricity.

Behaviour

Fuel choice

Although the proportional expenditure on the different fuels is a strong indicator of fuel use, the choice of fuel is also influenced by the purpose to which the fuel is to be applied. In the survey respondents were asked to indicate their current primary and secondary fuels regarding cooking, space heating, lighting and clothes washing. The primary and secondary fuels used for these activities are presented in Table 18.

When the whole sample is considered:

- Gas is the primary fuel for cooking followed by electricity. Only one respondent mention light fuel oil as a secondary source of fuel for cooking and a further respondent a generator as a backup source of power. However, four respondents claimed to have generators.
- In the case of space heating, gas is the most used fuel, followed by wood. Only one respondent claimed to heat more than one room, in this instance two rooms. Overall 139 (66%) of the respondents had a gas space heater compared to 49% of households with wood stoves and only 13% with electric space heaters.
- Electricity is used as the primary source of lighting by the whole sample with candles being the alternative option. Surprisingly only four respondents mentioned gas as the secondary source of lighting.
- The main source of energy for clothes washing surprisingly was electricity. This may indicate that several are using machines. This corresponds with more than half the respondents claiming to have washing machines (61%). Many (64%) also use electrical boilers for heating water. (71% claimed to use electricity as the main energy to heat water).

Table 18: Primary and secondary fuel use by activity

*Primary and secondary fuels used	Cooking		Space heating		Lighting		Clothes Washing	
	Freq	%	Freq	%	Freq	%	Freq	%
Electricity 1	**48**	**22.9**	**21**	**10.0**	**208**	**99.0**	**139**	**66.2**
Elect 2	95	45.2	88	41.9			26	12.4
Gas 1	**137**	**65.2**	**122**	**58.1**			**29**	**13.8**
Gas 2	36	17.1	19	9.0	4	1.9	72	34.3
Wood 1	**29**	**13.8**	**66**	**31.4**			**43**	**20.5**
Wood 2	62	29.5		15.2			31	14.8
Light fuel oil 1							**2**	**0.10**
Light fuel oil 2	1	0.05						
Candles 2					176	83.4		
Generator 2	1	0.05						

*Primary fuel used indicated by bold print

Fuel use by social and economic status

As demonstrated earlier, the proportional expenditure on fuel is dependent on both social and economic characteristics of the household and the types of activity to which they are applied. Table 19 and Table 20 present the proportional use of fuels by application and socio-economic characteristic.

Education and employment status of the head of household, size of household and tenure are social factors, which appear to have a significant influence of the choice of fuel for different activities. However, other factors such as age and origin of household were found not to have a significant difference on the choice of fuel. The main economic indicator applied was the total household expenditure and the proportional energy expenditure. (The level of total annual expenditure is taken to be the guide to the household's economic status.) As can be noted, the most frequent differences in fuel choice by the socio-economic characteristics considered is related to cooking, followed by space heating, clothes washing and to a lesser extent water heating (Table 19 and Table 20).

- With regard to cooking, significant differences are noted regarding education, employment, size of household. Legality of tenure, type of utility billing and the proportion of expenditure spent energy. Gas across all categories is the most commonly used fuel for cooking.
  - The households headed by individuals with lower levels of *educational attainment* use significantly less electricity and more wood for cooking than their more educated counterparts (Table 19).
  - The *employment status* of the head of household has a similar influence. The lower the employment status the greater the use of wood and the lower use of electricity. The use of gas is marked greater amongst those with fulltime employment (Table 19).
  - The larger the *household size* the lower the use of electricity and the greater dependency on wood when compared to the smaller households (Table 19).
  - The *tenure* of the household also surprisingly has a significant influence on the choice of fuel for cooking. Interestingly those with legal status use significantly less electricity and wood for cooking than those with illegal tenure (not recognised). Twice the proportion of legal households depend on gas as their primary cooking fuel (Table 19).
  - With regard to the type of utility bill received, a significantly lower dependency on electricity is noted amongst those receiving metered billing compared to those paying by forfeit. Those not being billed are reliant on wood and gas equally as their main cooking fuel (Table 20).
  - Although no significant difference in choice of cooking fuel is observed regarding total household expenditure or the perceived material status, a significant difference is noted regarding proportional energy expenditure. Those spending the highest *proportion on energy* register a significantly lower use of electricity for cooking and a higher dependency on gas and wood than those spending the lowest proportion of total expenditure of energy (Table 20).
- With regard to space heating, employment, tenure, total household expenditure and proportional energy expenditure are influential. As in the case of cooking, gas is the principle space heating fuel across most considered categories.
  - Electricity is the least used fuel for space heating across all states of *employment*, particularly with those in fulltime employment. Wood is the most used space heating fuel with those in part-time employment, although gas is the most frequently used fuel for those without or in fulltime employment (Table 19).
  - As in the case of cooking those with legal *tenure* are less reliant on electricity particularly and wood for space heating than those without legal tenure (Table 19).
  - Those households with the highest overall *annual expenditure* registered a significant lower dependency on electricity and gas and higher reliance on wood particularly for space heating than their lower spending counterparts (Table 20).
  - The same significant difference in fuel choice for space heating is noted when *the proportional energy expenditure* is considered. Those spending proportionally least on energy demonstrate a far greater reliance on electricity and lower reliance on gas and wood (Table 20).
- With regard to the washing of clothes, education, employment, size of household and the material position of the household are influential regarding the choice of fuel for washing. Electricity is the most common fuel used for washing clothes.
  - Those with a lower *educational attainment* use less electricity and significantly more (Table 19).
  - Those not *employed* use significantly more wood than their counterparts. Electricity is used most by those in part-time work (Table 19).

Table 19: Promotional use of fuel type by social and economic descriptor (a)

		Cooking (% fuel use)			Space heating (% fuel use)			Water heating (% fuel use)			Clothes washing (% fuel use)		
		Tertiary <	>Tertiary		Tertiary <	>Tertiary		Tertiary <	>Tertiary		Tertiary <	>Tertiary	
	Electric	18.00	30.00								55.56	72.62	
Education*	Gas	55.00	64.00								11.11	10.71	
	Wood	27.00	6.00								33.33	16.67	
	Significant	**0.001****			**NS**			**NS**			**0.037**		
		None	Part time	Fulltime	None	Part time	Fulltime	None	Part time	Fulltime	None	Part time	Fulltime
	Electric	8.33	44.64	16.36	8.51	19.64	3.64				52.17	78.57	60.38
Employment*	Gas	56.25	44.64	80.00	59.57	28.57	72.73				8.70	7.14	16.98
	Wood	35.42	10.71	3.64	31.91	51.79	23.64				39.13	14.29	22.64
	Significant	**0.001**			**0.000**			**NS**			**0.011**		
		Small	Medium	Large	Small	Medium	Large	Small	Medium	Large	Small	Medium	Large
	Electric	33.33	19.74	14.08							78.69	68.42	52.17
Adult units per h/h	Gas	63.49	63.16	66.20							9.84	14.47	14.49
	Wood	3.17	17.11	19.72							11.48	17.11	33.33
	Significant	**0.009**			**NS**			**NS**			**0.012**		
		Legal	Illegal		Legal	Illegal		Legal	Illegal		Legal	Illegal	
	Electric	9.57	36.84		3.51	17.89							
Legal tenure	Gas	80.87	44.21		70.18	44.21							
	Wood	9.57	18.95		26.32	37.89							
	Significant	**0.000**			**0.000**			**NS**			**NS**		

* Takes into account the response of the heads of household only

** Significance represents the results of Chi -square tests. The value is only presented when p = <0.05

Table 20: Promotional use of fuel type by social and economic descriptor (b)

		Cooking (% fuel use)			Space heating (% fuel use)			Water heating (% fuel use)			Clothes washing (% fuel use)		
		Weak	Average	Strong	Weak	Average	Strong	Weak	Average	Strong	Weak	Average	Strong
Material position of h/h	Electric										54.93	71.43	75.00
	Gas										21.13	10.08	0.00
	Wood										23.94	18.49	25.00
	Significant	**NS**			**NS**			**NS**			**0.000**		
		None	Forfeit	Metered	None	Forfeit	Metered	None	Forfeit	Metered	None	Forfeit	Metered
Bill type	Electric	20.00	28.69	11.54									
	Gas	40.00	61.48	71.79									
	Wood	40.00	9.84	16.67									
	Significant	**0.005****			**NS**			**NS**			**NS**		
		Low	Average	High	Low	Average	High	Low	Average	High	Low	Average	High
Total h/h expenditure	Electric				16.13	7.94	8.20						
	Gas				67.74	55.56	49.18						
	Wood				16.13	36.51	42.62						
	Significant	**NS**			**0.018**			**NS**			**NS**		
		Low	Average	High	Low	Average	High	Low	Average	High	Low	Average	High
% energy expenditure	Electric	40.32	11.11	14.52	25.81	4.84	1.61	76.67	79.37	59.68			
	Gas	50.00	76.19	69.35	46.77	69.35	56.45	18.33	14.29	16.13			
	Wood	9.68	12.70	16.13	27.42	25.81	41.94	5.00	6.35	24.19			
	Significant	**0.001**			**0.000**			**0.007**			**NS**		

** Significance represents the results of Chi -square tests. The value is only presented when p = <0.05

- Significantly more of those with the largest *households* rely on wood as their main fuel for washing. In contrast, electricity is used more as the fuel of choice by the smallest households (Table 19).
- A significant difference is also noted in the type of fuel used for clothes washing depending on the household's perceived material status. The most notable difference is with regard to the use of gas. The households with the weakest material state had a significantly greater reliance on gas for this activity than the materially more secure (Table 20).

- In the case of water heating as with lighting electricity is the predominant fuel across most socio-economic descriptors. However in the case of water heating a significant difference is noted in fuel choice when the proportion of expenditure on energy is considered.
  - Those with the highest proportional energy expenditure tend to use more wood and less electricity than their more economical counterparts (Table 20).

When the proportion of total household expenditure spent on energy is considered a similar pattern is evident. In this instance a significant difference is noted regarding fuels used for cooking, space and water heating. In each instance, although gas is the predominant fuel apart from water heating, the lower the proportion of total expenditure spent on energy the greater the reliance on electricity. In contrast the higher the proportional energy expenditure the greater the use of gas and wood. Therefore, greater electricity dependency appears to correspond with greater fuel economy. In contrast the use of wood appears to be associated with higher levels of energy expenditure.

Change of fuels used

Questions were asked regarding the deliberate decision to change the type of fuel used for cooking and space heating and the reason for this change (No time frame was set for this change apart for it occurring during the current occupancy.

- With regard to cooking, 32% of the respondents claim to have made a change in the fuel used for cooking. The majority of those that have changed were using electricity before and have now changed to gas (Table 21).
- Of all the respondents 25% have changed the fuel commonly used for space heating. As in the case of cooking the majority of those that have changed were using electricity previously for space heating, while 24% were using wood. Gas appears to be the fuel most commonly adopted, i.e. the lowest percentage have changed from gas to another fuel for both cooking and space heating (Table 21).

Table 21: Fuel used for cooking and space heating prior to change

	Cooking		Space heating	
	Frequency	Valid Percent	Frequency	Valid Percent
electricity	56	83.6	35	70.0
LPG	2	3.0	3	6.0
wood	9	13.4	12	24.0
Total	67	100.0	50	100.0

What fuel did you use before - cooking * main cooking fuel Crosstabulation

Count

		main cooking fuel			Total
		elec	LPG	wood	
What fuel did you use before - cooking	elec	9	45	2	56
	LPG	0	2	0	2
	wood	0	9	0	9
Total		9	56	2	67

What fuel did you use before - heating * main space heating fuel Crosstabulation

Count

		main space heating fuel		
		LPG	wood	Total
What fuel did you use before - heating	elec	26	9	35
	LPG	3	0	3
	wood	12	0	12
Total		41	9	50

The respondents that had changed the fuel used for cooking and space heating were asked to identify the main reason for the change from the list presented in Table 22.

- With regard to cooking the most frequently mentioned reasons were *cost* and *accessibility* of the fuel chosen (Table 22). Convenience is the third most frequently mentioned issue but notably fewer respondents.
- When considering space heating, *cost* was the predominant consideration followed closely by accessibility. Convenience is less of an issue while slightly safety appears to be slightly more influential when considering space heating (Table 22).

These issues of cost and access appear to dominate the rational supporting the change of fuel. Logically convenience is important for cooking. However, safety and particularly pollution appear to have minimal influence.

Table 22: Reasons given for change of fuel for cooking and space heating

	Cooking		Space heating	
	Frequency	Percent	Frequency	Percent
Less cost	28	41.2	28	56.0
less polluting	1	1.5	1	2.0
convenient	6	8.8	2	4.0
access	28	41.2	17	34.0
safety	1	1.5	2	4.0
other	4	5.9	0	0.0
Total	68	100	50	100.0

When the whole sample were asked to place a value on each of the issues listed in Table 23, the same attributed levels of importance are observed. Cost is the most important issue followed by accessibility, safety, convenience and pollution respectively.

Table 23: Mean and median importance attributed issues influencing fuel choice

	Accessibility	Cost	Pollution	Convenience	Safety
N	194	208	197	193	197
Mean	3.50	4.59	1.82	2.54	2.64
Median	4	5	1	3	3
IQR	(3 to 4)	(4 to 5)	(1 to 3)	(2 to 3)	(2 to 3)

Impact of fuel change on energy expenditure

It could be assumed that those that have made fuel changes would demonstrate a lower proportion of total household income spent on fuel. When the proportional energy expenditure of those that have changed their fuel for cooking and space heating are compared with those that have not, a reduction is noted though not a significant one. However, the total household expenditure of those that have changed their cooking fuel is still significantly higher. This could indicate that those that have greater means are more likely to change their source of energy.

Table 24: Impact of fuel change on fuel and total household expenditure

	Cooking			**Space heating**		
	Changed	No change		Changed	No change	
n	62	141		50	154	
	mean	mean	**MW Sig**	mean	mean	**MW Sig**
electrical expenditure	15132.13	12842.28		16877.16	12507.45	**0.045**
Gas expenditure	14706.06	11041.13	**0.001**	15436.00	11257.14	**0.002**
Wood expenditure	8624.24	14419.86		6104.00	14550.65	**0.005**
% expense spent on energy	9.16	10.61		9.74	10.21	
Total h/h annual expenditure	453193	390236	**0.002**	436876	404152	
Total h/h expenditure per AU	110423	96817	**0.003**	102036	100936	

- MW Sig = p values resulting from the Mann Whitney U Test

- With regard to cooking those that have changed fuel are spending significantly more on gas than those that have not. They are also spending more on electricity but less on gas though these differences are not significant in the case of cooking.
- In the case of space heating significant differences are noted with regard to expenditure on each of the three fuels considered. Those that have changed fuels are spending significantly more on gas and electricity but less on wood than those that have not changed their energy source for space heating are.

Perception of change in energy consumption

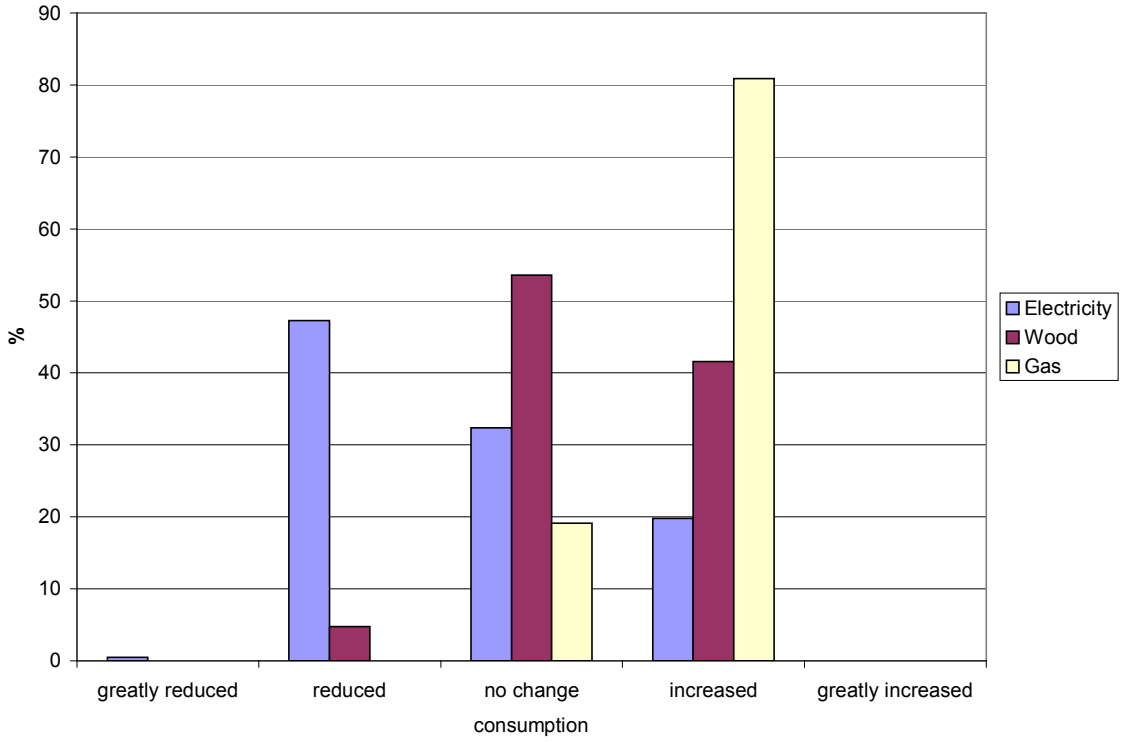

Figure 1: Perceived change in fuel consumption over last 5 years

As illustrated in Figure 1, the respondents' perception is that their consumption of electricity over the past 5 years has decreased, while the use of gas and wood has increased.

- The main reason given for the decrease in the use of electricity is the lack of access and unreliability of supply. The installation of a meter also appears to have had a negative impact on the use of electricity. The adoption of an electrical boiler (water heater seems to be the main driver of electrical consumption mentioned. (64 responses)
- With regard to wood the lack of access to electricity is the main driver mentioned regarding increased consumption. It is also considered to provide more heat by some respondents as well as being accessible. (18 responses)
- Problems of accessing electricity are mentioned as the main drivers for the increased gas consumption. The installation of electrical meters was also mentioned as a reason for gas consumption as well as using gas for cooking. (46 responses)

The main perception for the decline in electricity consumption and increase in other fuels is based primarily on the poor supply and what would appear to be a lack of trust in the meters. Cost was rarely mentioned in response to these open questions.

When the change in consumption of the three fuels is correlated with the different socio-economic descriptors significant correlations are observed regarding the indicator of neighbourhood improvement and the changed consumption of wood and gas ($p = 0.000$ respectively). This also suggests that increased gas and wood consumption is related to improvements in the living environment but not necessarily in the material position of the household.

Payment of utilities

Out the outset of this section it is worth noting that 99.5% of the respondents feel that consumers should pay for their electrical consumption.

Various different questions were posed to enquire into utility payment behaviour. One question enquired into where payments for each type of fuel were made. The other enquired into the frequency of paying electricity bills in particular.

- With regard to the payment of electricity, the majority (63%) pay the company, while 2% claimed to pay the meter reader. A further 35% make no payment. The payment of gas and wood is usually made to a local shop (private provider). 99% in the case of gas and 80% in the case of wood. Surprisingly, only 1% of those using wood claim not to be paying for it.
- When the above response regarding electricity payment is compared with the response to the specific question regarding electricity payment behaviour, there was a significant ($p = 0.000$) correlation between the two response demonstrated in Table 25. The main discrepancy is with respect to 4 respondents who claim to pay the company but have stopped paying.
    - Of all respondents 13% have never paid while 22% have stopped paying. 16% have stopped paying within the past 5 years. However, a small group (4%) claim to have stopped paying within the previous year. Only 2% claimed to have not being paying longer than 5 years.
    - Of those paying for their electricity 29% have recently started to pay whilst 30% claim to have always paid. Of those that have recently started to pay the majority (16%) have done so within the previous year. This is an encouraging trend.

Table 25: Cross tabulation of responses regarding payment of electricity

		Payment of electricity bills					Total
		Have never paid	Have stopped paying	Sometimes pay	Have started paying	Have always paid	
Where do you pay for electricity	company	1	4	6	53	56	120
	meter reader	0	1	1	0	1	3
	no payment	23	37	5	2	0	67
Total		24	42	12	55	57	190

The payment of electricity is sensitive to both social and economic status as demonstrated in Table 26. Education is the only social descriptor observed that does not appear to make influence payment behaviour, although age does both not presented in the table. The response is logical in that those in what would be described a weaker socio-economic tend to demonstrate weaker payment behaviour. I.e.:

- 16% of those not employed have never paid compared to 6% of those in fulltime employment. However, 23% of those in fulltime employment have stopped paying compared to 13% of the unemployed (Table 26).
- Respondent with legal tenure are significantly less likely to have stopped paying and to have started paying. Therefore tenure does have an influence on payment.
- Those with a metered supply are significantly more likely to have paid or begun paying when compared to those paying via forfeit. The presence of a meter therefore appears to positively influence payment.
- Those who feel materially secure and those that reported higher household expenditure tend to pay for electricity compared to their less secure counterparts. Also those spending a greater proportion of their overall household budget on energy also tend to pay compared to those whose proportional expenditure is lower. This may suggest that lower proportional energy expenditure may reflect non-payment rather than more efficient household energy management.

Table 26: Payment of fuel by social and economic characteristics (%)

		None (%)	Part-time (%)	Fulltime (%)
	Have never paid	15.49	12.90	5.71
	Have stopped paying	12.68	29.03	22.86
Employment*	Sometimes pay	8.45	3.23	8.57
	Have started paying	21.13	45.16	28.57
Significance (0.000)	Have always paid	42.25	9.68	34.29
		Small	Medium	High
	Have never paid	19.05	12.00	7.14
Adult units per h/h	Have stopped paying	22.22	25.33	14.29
	Sometimes pay	0.00	4.00	15.71
	Have started paying	34.92	28.00	28.57
Significance (0.006)	Have always paid	23.81	30.67	34.29
		Legal	Illegal	
	Have never paid	10.53	14.89	
Legal tenure	Have stopped paying	11.40	31.91	
	Sometimes pay	8.77	4.26	
	Have started paying	35.96	23.40	
Significance (0.002)	Have always paid	33.33	25.53	
		Weak	Average	Strong
	Have never paid	21.74	7.56	10.00
Material position of h/h	Have stopped paying	21.74	21.85	10.00
	Sometimes pay	4.35	7.56	10.00
	Have started paying	18.84	40.34	10.00
Significance (0.001)	Have always paid	33.33	22.69	60.00
		None	Forfeit	Metered
Bill type	Have never paid	80.00	13.22	2.60
	Have stopped paying	20.00	33.88	0.00
	Sometimes pay	0.00	11.57	0.00
	Have started paying	0.00	18.18	53.25
Significance (0.000)	Have always paid	0.00	23.14	44.16
		Low	Average	High
Total h/h expenditure	Have never paid	26.98	4.76	4.29
	Have stopped paying	20.63	25.40	20.00
	Sometimes pay	3.17	4.76	10.00
	Have started paying	26.98	47.62	18.57
Significance (0.000)	Have always paid	22.22	17.46	32.86
		Low	Average	High
% energy expenditure	Have never paid	27.87	4.76	4.84
	Have stopped paying	32.79	15.87	20.97
	Sometimes pay	4.92	6.35	8.06
	Have started paying	18.03	41.27	37.10
Significance (0.000)	Have always paid	16.39	31.75	29.03

* Takes into account the response of the heads of household only ** Significance represents the results of Chi -square tests. The value is only presented when p = <0.05

Perceived impact of tariff reforms

The perceived impact of an increase in fuel prices and the enforcement of payment for electricity is explored on various levels.

- Firstly, the respondents' awareness of possible changes in the cost of fuel and payment of tariffs, their main sources of information and ranking of impact attributed to increases in the prices of electricity and wood and the enforcement of payment. They were also asked to indicate how they would respond to the increase of fuel, i.e. their coping strategies.
- Secondly, the respondents' outcome beliefs and attitudes regarding price increases were identified. These are then correlated with intentions regarding future fuel management behaviour to identify probable response and key beliefs governing future fuel management behaviour. These assumptions are based on the partial application of the 'Theory of Reasoned Action', which claims that intent is a strong predictor of future behaviour if supported by attitude and or perceived social pressure related to the behaviour in question.

Awareness of Tariff reform process

The respondents are generally aware of the electricity reform process -only 14% claimed they were not aware. Over 85% of the respondent believe that electricity will increase in the next 5 years. Although the majority believes wood will also cost more this is not so strongly expressed as in the case of electricity. However, 92% believe that the authorities will enforce the payment of bills (Table 27). Enforcement of utility payment is therefore generally expected and the majority of respondents (99%) believe that the consumers should pay. Therefore enforcement would appear to be seen an appropriate response of the authorities.

Table 27: Likely increase in prices and enforcement during the next 5 years

	Electricity %	Wood %	Enforcement %
Very unlikely	0.00	0.00	0.00
unlikely	6.20	2.40	2.40
no opinion	9.00	22.90	5.20
likely	78.10	69.00	55.70
very likely	6.70	5.70	36.70
Mean	0.85	0.78	1.27

Source of information

The majority of respondents claim to have learnt about the reforms from the television (59%). Very few mentioned the press or family and friends as their main source of information. However, it is important to note that a significant proportion (38%) of those that responded to this question indicated that they were not interested in the issue. A significant degree of apathy therefore exists and this may not change until the reform process directly effects them. A cross-tabulation of source of information by perceived material status indicates that those that consider themselves to be in a weaker economic position are significantly ($p = 0.000$) more likely to express a lack of interest in the reform process.

Perceived Impact (ranking)

The respondents were asked to rank three options by the perceived impact on their households, electricity price increase, wood price increase and the enforcement of payment (electricity). As can be observed in Table 28, the prospect of the enforcement of electricity payments will have the greatest impact followed by electrical price increases. However, a rise in the price of wood was ranked second by 67% of those that responded. As can be noted the degree of interest in the three issues is also mirrored in the proportion of the sample responding to each, enforcement generating the largest response.

Table 28: Impact of price increases and enforcement

Ranking	Electricity %	Wood %	Enforcement %
First	30.50	8.60	45.20
second	7.60	22.90	1.00
third	6.70	2.90	13.30
% response	44.80	34.40	59.50

The perceived impact of price increases and enforcement is sensitive to only some of the socio-economic indicators and these vary depending on the issue addressed. For example:

- The degree to which electricity price increases will impact the household is sensitive to the employment status, size of household, tenure, type of billing and perceived material status of the household. In each instance Chi-square tests demonstrated a significant difference.
  - The *unemployed* are more likely to rank most highly the impact of increased electricity prices ($p = 0.16$). Those in part-time employment are least likely to rank this issue highest.
  - The *larger the household size* the more highly ranked is the probable impact of electrical price increase ($p = 0.048$).
  - Interestingly, those with *legal or recognised tenure* attribute a higher rank to electrical price increases than do those without recognised tenure ($p = 0.000$). This may be as a result of being more exposed due to the nature of their tenure.
  - Those with *metered electrical supplies* are also more likely to rank highly this issue compared to those paying by forfeit ($p = 0.000$). Again this may be due to being more exposed than those paying by forfeit.
  - Those that hold the *most secure* perspective regarding the material position of their households are more likely to rank the impact of electricity price increase most highly ($p = 0.002$).
- The prospective impact of increases in wood prices appeared was sensitive to the age, tenure and billing system of the respondents.
  - The *older* the respondent the more highly they are to rank the impact of increased wood prices ($p = 0.000$).
  - Those with *legal tenure* also ranked the impact of wood price increase than those whose tenure is not recognised ($p = 0.024$).
  - Interestingly, those that have a metered electrical supply also feel more suceptable to wodd price increase ($p = 0.006$). This may be related to the fact that metered households are more likely to have legal tenure. However, the rational behind the connection between tenure and the price of wood is unclear, as economic status does not appear to be influential.
- The issue of electrical price enforcement generated the greatest interest and concern. However, the perception of the impact of enforcement is only sensitive to age and tenure amongst the different socio-economic descriptors considered.
  - The younger the respondent the more likely they are to feel threatened by enforcement of payment ($p = 0.040$). However, those ages 35 to 45 are the most concerned.
  - Interestingly those with illegal tenure are significantly more likely to rank the perceived impact of enforcement than those with legal tenure ($p = 0.004$).

Coping strategies

Of the three suggested coping strategies, changing to a cheaper fuel is clearly the favoured option by the majority of the respondents. This is followed by a reduction in energy consumption. Very few intend to pay more if prices increase (Table 29).

Table 29: Ranking of proposed coping strategies

Ranking	Pay more %	Change fuel %	Reduce use %
First	1.00	57.10	25.20
second	1.90	32.40	22.40
third	21.00	2.40	3.30
% response	23.80	91.90	51.00

When the different socio-economic categories are considered, significant differences are observed regarding the ranking awarded to the three issues.

- With regard to paying more, the origin, type of bill and household expenditure appear to be influential. (However, note needs to be taken of the relatively small numbers that generally opted for this option.)
  - Those that have moved to the city *from rural villages* are more likely to pay more (p = 0.000).
  - Those that have *not been receiving bills* are also more likely to pay more (p = 0.001)
  - The households with the *lowest general expenditure* also generally ranked the option of paying more highly (p = 0.015).
- Changing to a cheaper fuel only appears to be influenced by the level of overall household expenditure of the different descriptors considered. Those that are in the lowest third regarding *household expenditure* are more likely change to a cheaper fuel than those households that have a higher expenditure are (p = 0.042).
- Reducing fuel consumption as the main coping strategy is influenced by employment status, size of household, tenure and origin.
  - Those that are in full *employment* are more likely to reduce consumption as their main coping strategy than those with less secure employment (p = 006).
  - The *largest households* also demonstrate a significant tendency to reduce fuel consumption (p = 0.034).
  - Those with legal or recognised *tenure* are more likely to reduce fuel consumption when compared to those with uncertain tenure (p = 0.001).
  - Interestingly the *origin* of the respondent appears to be influential regarding the option of reducing consumption. Those that claim to have moved from rural villages are more likely to reduce their consumption (p = 0.000).

Saving strategies regarding household expenditures other than energy consumption

If the proportional response to the seven options for making savings in the household budget, in order to pay more for energy are considered, the priority areas for making savings in order of importance are: housing repairs (80%), telephone use (66%), travel (64%), clothes (54%) and food (18%). The reduction of debt repayments and educational expenditure are options only considered by one or two individuals of the whole sample (1% and 0.5% respectively) (Table 30). However, if the options are considered on the basis of primary ranking only, housing repairs still remains the primary area for savings, but in this case followed by clothing and then travel and telephone expenditure.

Figure 2 presents the proportional response to the saving options of the whole sample and the different levels of perceived household security. As can be noted those households with the weakest sense of material security present the strongest proportional responses regarding housing, telephone, clothing and travel savings respectively. Those in the strongest material category demonstrated the greatest proportional response regarding making savings on the food, debt repayment and education.

The alternative, and possibly more accurate comparative measure of preferred saving options is to compare the mean response to each of the ranked options, i.e. where the most favoured is awarded a

value of 3, the third 1 and those not ranked 0). Table 31 presents the comparative means. When the whole sample is considered the order of preference of the options is housing, travel, clothing and telephone and food. However, the order of preference changes depending on the economic security of the household and employment status of the respondent. Therefore basing policy measures on the general response could prove detrimental to the least economically secure.

Table 30: Ranking of areas where savings would be made in the household budget (%)

Ranking	Housing repairs %	Food %	Travel %	Debt payment %	Education %	Clothing %	Telephone %
First	62.90	3.30	9.50	1.00	0.50	13.30	9.50
second	10.00	8.10	43.30	1.00	0.50	19.50	14.30
third	7.10	6.20	11.00	1.00	3.30	21.40	42.40
% response	80.00	17.60	63.80	2.90	4.30	54.30	66.20

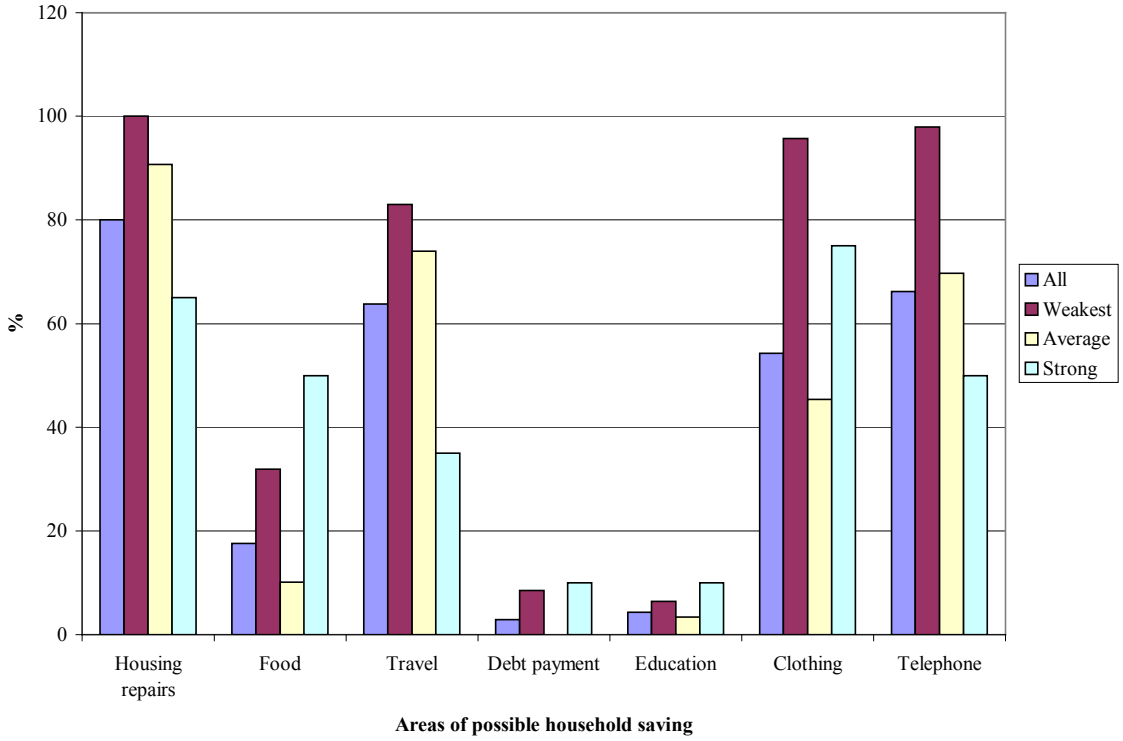

Figure 2: Proportional response to different saving options by h/h material status

A cross tabulation of the various socio-economic indicators by the ranked saving options indicated that employment status of the respondent and household material position are the two most sensitive categories.

When the mean responses are compared between the levels of material position significant differences can be observed regarding all but two of the saving options (Table 31). However, in the case of employment status significant differences are only noted regarding four of the options.

- With regard to perceived material position or economic security of the household significant differences are noted regarding housing, food, travel, debt payment and clothing (Table 31).
    - *Housing* is the most highly ranked saving option with respect to the households of weakest and average economic security. However, the most secure households only rank housing

savings second. Those of average material status registered highest mean score regarding housing savings followed by the weakest and lastly the strongest households.

- *Food* is the fourth highest rated saving option for the strongest households registering a significantly higher mean score than the less secure households.
- *Travel* is the second highest rated saving option for households of average security and fourth with those from the weakest category. Both registered significantly higher mean scores than that registered by the most secure.
- In the case of *debt repayment* only four respondents considered this a viable option and although the most secure households registered the highest mean score the level of significance is discounted.
- *Clothing* is the most favoured saving option of the most economically secure households. This would seem logical. However, it is also the second option with the least secure households. The mean score of this saving option is significantly lower with households of average economic security.
- *Telephone* is the third ranked option for all the three categories of household material status. However, no significant difference in the mean scores of these groups is noted.

- The significant differences with regard to employment status of the respondents relate to housing, food, clothing and telephone as saving options (Table 31).
  - *Housing* is the preferred saving option for all respondents irrespective of their employment status. However, those in full time employment are significantly more likely to make savings in housing costs in order to meet increased fuel prices than those with less secure employment.
  - *Food* as an area for making household savings was not one of the four most highly ranked options by any of the employment categories considered. However, the unemployed indicated that they are significantly more likely to make savings in their household food budget than those that are in some form of employment.
  - *Clothing* is significantly more likely to be chosen as an area for making savings by the unemployed compared to than those in some form of employment. For the unemployed it is also the second most highly favoured of the various options of the considered.
  - *The telephone* is ranked the four most favoured saving option by both the unemployed and those in fulltime employment. However, those in part-time employment registered a significantly higher mean score than both the unemployed and fully employed regarding this saving option.

Table 31: Comparative mean[5] differences in saving options by material position and employment

	All	Material Position				Employment			
		Weak	Average	Strong		Unemployed	Part-time	Fulltime	
n	210	71	119	20		73	62	70	
	Mean	Mean	Mean	Mean	**KW Sig**	Mean	Mean	Mean	**KW Sig**
(b) Housing	**(1)** 2.16	**(1)** 1.87	**(1)** 2.45	**(2)** 1.45	**0.000**	**(1)** 1.85	**(1)** 2.06	**(1)** 2.59	**0.001**
(b) Food	0.32	0.38	0.23	**(4)** 0.70	**0.000**	0.51	0.21	0.19	**0.005**
(b) Travel	**(2)** 1.26	**(4)** 1.00	**(2)** 1.53	0.60	**0.000**	**(3)** 1.05	**(2)** 1.47	**(2)** 1.29	
(b) Debt payments	0.06	0.08	0.00	0.30	**0.010**	0.08	0.00	0.09	
(b) Education	0.06	0.04	0.06	0.10		0.07	0.00	0.10	
(b) Clothing	**(3)** 1.00	**(2)** 1.27	**(4)** 0.70	**(1)** 1.90	**0.000**	**(2)** 1.32	**(4)** 0.73	**(3)** 0.91	**0.005**
(b) Telephone	**(3)** 1.00	**(3)** 1.07	**(3)** 0.96	**(3)** 0.95		**(4)** 0.99	**(3)** 1.27	**(4)** 0.80	**0.011**

- The numbers in parenthesis represent the 4 most highly ranked mean scores
- MW Sig = p values resulting from the Mann Whitney U Test

[5] The means represent the responses weighted by the attributed rank (possible range = 0 to 3, where 3 represents the most favoured option)

- KW Sig = p values resulting from the Kruskal Wallis H Test (p is only presented when it = <0.05)

There appears to be some contradiction between the perceived material status of the household and the employment status of the respondent responses. For example with respect to food the least economically secure household registered a significantly lower mean score than the more secure households. In contrast the unemployed registered a significantly higher mean than those with employment. Logic would suggest that the direction of the unemployed and weakest material status household would be similar[6]. A similar difference can be observed with regard to clothing option.

In summary

If the material status or economic security of the household is considered, the least secure, apart from the issue of housing expenditure, are most likely to make savings on clothing, telephone and travel costs. Food is only a distant fifth option. In contrast the most secure are most likely to make savings in their clothing expenditure followed by housing cost savings. Telephone and food and travel respectively are given relatively lower consideration by the most economically secure.

Areas for reducing fuel consumption

A number of areas for energy reduction were presented and the respondents asked to rank the three areas in which they would be most likely to reduce their energy consumption. These are listed in Table 32. As noted in Table 29, 51% of the respondents indicated that the reduction in energy consumption would be a coping strategy they would consider and for 25% this would be the most preferred strategy.

When the proportional responses to each of the options for reducing energy consumption of the whole sample are observed, (Table 32) and (Figure 3), the option most favoured is space heating followed in reducing order of preference by water heating, lighting and electrical appliance use. The two options least favoured as areas for reducing consumption are cooking and entertainment.

As shown in Figure 3 based on the proportional response to each issue, the most materially secure households consider cooking as the third most likely area where reduction in energy consumption can take place, after space heating and lighting. In contrast the most materially insecure households indicate that cooking is the least likely option where savings in consumption will be made. In the case of the least secure as with those of average security water heating after space heating is the most likely area of conservation.

However, the mean scores weighted according to the ranking attributed to each option are considered to be the more accurate reflection of preferred energy reduction options. When the mean scores are considered of the whole sample, the most favoured options are the same as those indicated by the proportional response, namely space heating, water heating, lighting and cooking respectively (Table 33).

A cross tabulation of the conservation options with the different descriptive categories indicated that there are significant differences between the sub groupings within each category. The most sensitive of these categories are the household's material position, the type of utility billing received and the nature of tenure. Table 33 and Table 34 present the comparative mean scores for each of these categories by conservation option. A comparison is also presented of the scores of those that claimed that fuel conservation would be one of their coping strategies in the event of price increases.

- Willingness to reduce energy consumption represents those that indicated that this would be a coping strategy. Significant differences are noted on all but one of the options presented between those that did and did not indicate a willingness to reduce consumption (Table 33).
    - *Lighting* is significantly more strongly favoured as an area for energy saving with those proposing to reduce consumption than with their counterparts. In fact lighting is the second most highly ranked option with the 'willing' compared to being only the fourth option for those that are not.
    - *Cooking* as an are for energy reduction is also more strongly favoured by the 'willing' compared to those not proposing to reduce consumption.

[6] A significant correlation between employment status and household material position was observed (p = 0.001)

- *Space heating* is the most favoured option for achieving reductions by all the categories considered apart for the most economically secure. However, the 'willing' registered a significantly higher mean score than the 'not so willing'.
- *Water heating* is more highly ranked with those not proposing to reduce consumption but no significant difference between the mean scores was noted.
- *Entertainment* is significantly less likely to be an option for reducing energy consumption in the case of the 'willing' than is the case with their counterparts. However, either group only ranks entertainment as the fifth option.
- *Domestic appliance use* is the area least likely to be an option for energy consumption reduction for the 'willing' who registered a significantly lower mean score than those that did not a indicate a willingness to reduce. In comparison this option was ranked 3 by those that did not demonstrate willingness to reduce.

Table 32: Ranking regarding energy consumption reduction options

Ranking N = 210	Lighting %	Cooking %	Space heating %	Water heating %	Entertainment %	Appliances %
First	22.90	9.00	51.40	9.00	3.80	3.30
second	13.30	8.10	20.50	39.00	8.60	8.60
third	19.50	6.70	12.90	17.60	11.40	17.60
% response	55.70	23.80	84.80	65.70	23.80	29.50
Ranking	**3**	**5**	**1**	**2**	**5**	**4**

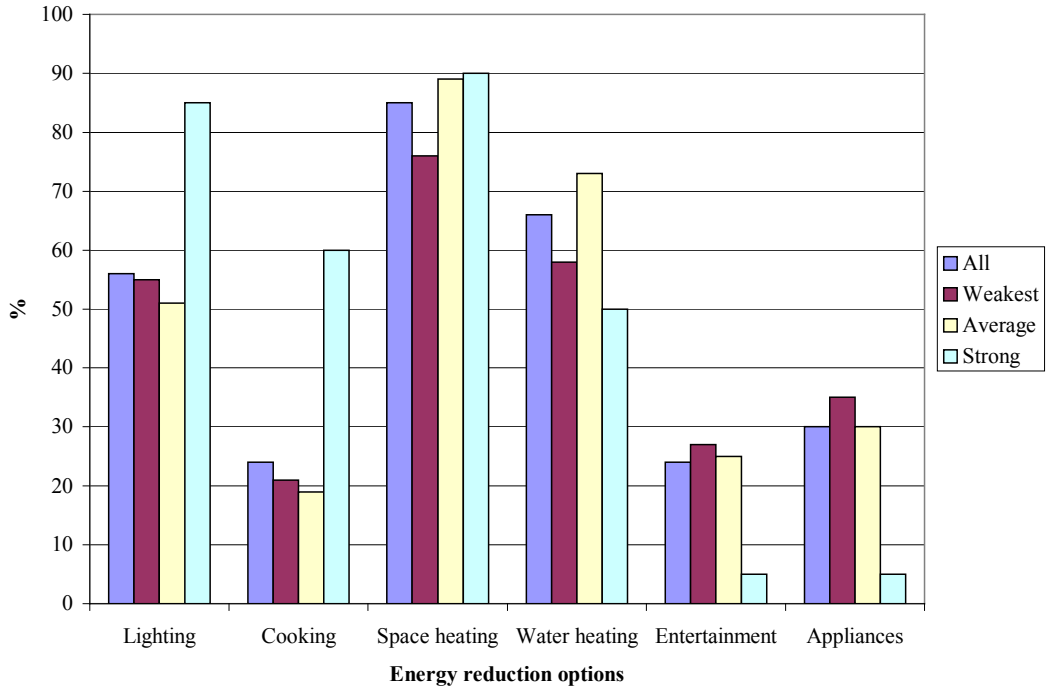

Figure 3: Proportional response to the energy reduction options by household material position

- With regard to the influence of the household's material position or perceived economic security on the possible options for reducing energy consumption, significant differences are noted with regard to four of the six options presented for consideration (Table 33).

- *Lighting* is the second most favoured option for the least secure households compared to being the strong first option for the most secure and the third for those of medium security. The most secure registered a significantly stronger mean regarding this option followed by the least secure.
- *Cooking* as an option for reducing energy consumption reflects the security of the household. The more secure the more highly ranked the option and the greater the mean score. For the least secure cooking is the least favoured option while it is ranked third with the most secure households.
- *Space heating* is ranked as the most favoured option for reducing consumption by households of least and medium economic security but second with the most secure. Those of medium security registered a significantly stronger mean score than the other two groups. The most secure registering the lowest score.
- *Water heating* is the second favoured option by household of medium security, third by the least secure and fourth by the most secure. However, no significant difference is noted between the mean scores.
- *Entertainment* is the least favoured option by all groups registering no significant difference in the mean scores.
- *Domestic appliance use* is the fourth most favoured option reducing energy consumption by the economically least secure who also registered a significantly higher mean score regarding this area of energy reduction than the most secure households.

Table 33: Comparative mean differences in conservation options by willingness to reduce consumption and material position of household

		Willingness to reduce consumption			Material Position			
	All	Will reduce	Won't reduce		Low	Medium	High	
n	210	107	103		71	119	20	
Options	Mean	Mean	Mean	**MW Sig**	Mean	Mean	Mean	**KW Sig**
Lighting	**(3)** 1.15	**(2)** 1.67	**(4)** 0.60	**0.000**	**(2)** 1.21	**(3)** 0.93	**(1)** 2.20	**0.000**
Cooking	**(4)** 0.50	**(4)** 0.68	0.31	**0.001**	0.39	**(4)** 0.46	**(3)** 1.10	**0.001**
Heating	**(1)** 2.08	**(1)** 1.92	**(1)** 2.25	**0.001**	**(1)** 1.87	**(1)** 2.29	**(2)** 1.55	**0.002**
Hot water	**(2)** 1.23	**(3)** 1.13	**(2)** 1.33		**(3)** 1.18	**(2)** 1.30	**(4)** 0.95	
Entertainment	0.40	0.18	0.63	**0.000**	0.48	0.41	0.05	
Appliances	0.45	0.15	**(3)** 0.76	**0.000**	**(4)** 0.55	0.45	0.10	**0.036**

- The numbers in parenthesis represent the 4 most highly ranked mean scores
- MW Sig = p values resulting from the Mann Whitney U Test
- KW Sig = p values resulting from the Kruskal Wallis H Test (p is only presented when it = <0.05)

- The type of utility bill appears to have significant influence on only one of the options when the weighted mean scores are compared (Table 34). Those households with a *metered supply* are more likely to opt for reductions in space heating.
- The tenure of the house in contrast has a significant influence on four of the presented options for reducing consumption (Table 34).
  - *Lighting* is the second most favoured option for those with illegal tenure that also registered a significantly higher mean score than those with legal tenure.
  - *Space heating* is the option most favoured irrespective of tenure. However, those with legal tenure registered a significantly higher mean score.
  - *Hot water* is the second most highly ranked option for those with legal status compared to a third ranking with illegal tenured households. However, there is no significant difference in the mean scores.

- *Entertainment* is more likely to be an option for those with legal tenure. However, although ranked fifth.
- *Domestic appliance use* is the least favoured option of energy reduction for respondents with illegal tenure, although it is the fourth option for those with recognised tenure. Those with unrecognised tenure registered a significantly lower mean score than those with secure tenure.

Table 34: Comparative mean differences in conservation options by type of bill and tenure

	Type of bill			Tenure		
	Forfeit	Metered		Legal	Illegal	
N	122	78		115	95	
Options	Mean	Mean	**MW Sig**	Mean	Mean	**MW Sig**
Lighting	**(2)** 1.27	**(3)** 0.95		**(3)** 0.70	**(2)** 1.68	**0.000**
Cooking	**(4)** 0.57	**(4)** 0.33		0.51	**(4)** 0.48	
Heating	**(1)** 1.93	**(1)** 2.49	**0.000**	**(1)** 2.21	**(1)** 1.93	**0.019**
Hot water	**(3)** 1.16	**(2)** 1.33		**(2)** 1.25	**(3)** 1.20	
Entertainment	0.46	0.32		0.49	0.29	**0.022**
Appliances	0.52	0.32		**(4)** 0.67	0.18	**0.000**

- The numbers in parenthesis represent the 4 most highly ranked mean scores
- MW Sig = p values resulting from the Mann Whitney U Test
- KW Sig = p values resulting from the Kruskal Wallis H Test (p is only presented when it = <0.05)

In summary

Space heating is the most likely area for reductions in energy consumption to take place followed by water heating and lighting. In contrast the most economically secure will tend to opt for lighting and cooking as the main areas for reducing consumption. Legal tenure and metered billing appear to influence the choice of space heating as the main area of energy saving.

Use of a cheaper fuel as a coping strategy

Of the whole sample 92% indicated that the adoption of a cheaper fuel would be an option for coping with the impact of price increases and 57% considered this as their primary strategy (Table 29). The study only looks at the alternative fuel preferences for space heating and cooking.

Alternative space heating fuel choice

Table 35 presents the proportional response regarding alternative fuel choices for space heating. Only three fuels are given consideration by a significant proportion of the sample, electricity, LPG and wood respectively. Electricity is primary alternative fuel for 75% of the respondents. Other fuels such as coal, kerosene and oil are only considered as options by 1% of the whole sample and even in these instances as the third option.

Figure 4 presents the proportional response by level of perceived household economic security (material position). Those from the more secure households appear to favour LPG over electricity and give far greater consideration to wood when compared to the less secure households.

Table 35: Proportional response regarding alternative fuel for space heating

Ranking	Electricity	LPG	Coal	Wood	Kerosene	Oil
	%	%	%	%	%	%
First	75.20	15.20	0.00	9.50	0.00	0.00
Second	11.90	63.80	0.50	17.60	0.00	0.00
Third	4.80	7.60	1.00	26.20	0.50	1.00
% response	91.90	86.70	1.40	53.30	0.50	1.00
Ranking	**1**	**2**		**3**		

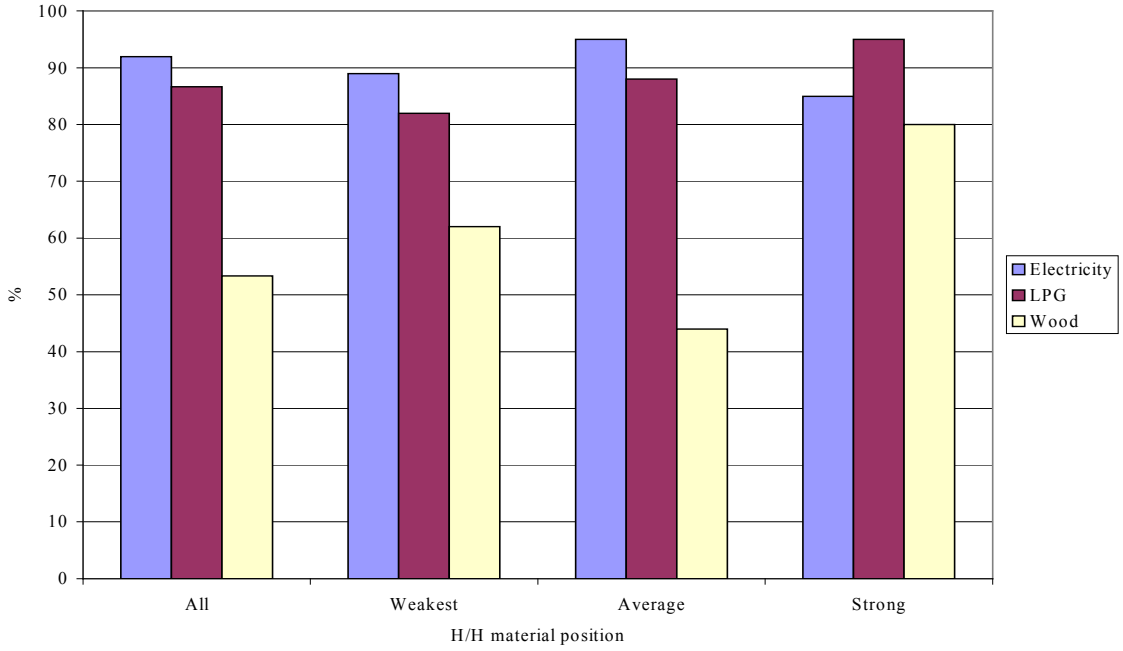

Figure 4: Proportional space heating fuel choice by household material position

When the different social categories were cross-tabulated very few appeared to have an influence of alternative fuel choice for space heating. The main exception to this ids with regard to the material position of the household. Table 36 presents the comparative means of alternative fuel for space heating choices by those that have already changed their fuel, the household's material position.

- Those that have <u>previously changed</u> their space heating fuel represent 24% of the whole sample. As can be observed there is little difference regarding the mean scores registered for each of the fuels between the two groups. (no significant differences are noted) (Table 36).
- <u>The material position</u> of the household has an influence on the choice of electricity and wood.
  - In the case of *electricity* the less secure households are more likely to opt for this fuel for space heating as their preferred option. In the case of the most secure household's electricity is the second alternative option for space heating.
  - *LPG or gas* is the preferred alternative of the most economically secure, although there is not a significant difference between the different levels of security.

- *Wood* is the third option for all, however, the most secure registered a significantly stronger mean score especially when compared with those of average security.

Table 36: Comparative mean responses regarding alternative fuels for space heating

	All	Changed fuel			Material Position			
		Changed fuel	Not changed		Weak	Medium	Strong	
	210	50	154		71	119	20	
	Mean	Mean	Mean	**MW Sig**	Mean	Mean	Mean	**KW Sig**
Electric	2.54	2.62	2.52		2.52	2.65	2.00	**0.001**
LPG	1.81	1.90	1.78		1.68	1.83	2.15	
Wood	0.90	0.86	0.90		1.01	0.75	1.40	**0.009**

- MW Sig = p values resulting from the Mann Whitney U Test
- KW Sig = p values resulting from the Kruskal Wallis H Test (p is only presented when it = <0.05)

Reasons given for choice of alternative space heating fuel choice

The reasons and proportional response are presented in Table 37. The main reason is with regard to the cleanness of the fuel, (none polluting). The economic consideration is the second most mentioned reason followed by the effectiveness of the fuel. However, the numbers mentioning these last two reasons are significantly lower those mentioning cleanness.

Table 37: Reasons for choice of alternative space heating fuel

Reason for choice	Frequency	Percent	Rank
No access to electricity	1	0.5	
Efficient	4	1.9	
Economical	17	8.1	**2**
Safe	6	2.9	
Effective	9	4.3	**3**
Clean	55	26.2	**1**
Adequate	6	2.9	
Accessible	5	2.4	
OTHER	1	0.5	
Total	104	49.5	

In summary

The alternative choice for space heating does not appear to be influenced by pervious fuel changes. Generally the most preferred option is electricity except in the case of the most economically secure who prefer case as opposed to electricity. Other social characteristics do not appear to be influential regarding the choice of an alternative fuel for space heating. The cleanness of the fuel is the most mentioned reason for its choice.

Alternative fuel choice for cooking

As noted earlier cooking is not one of the primary options for making reductions in fuel consumption. However, when asked to indicate which would be the preferred alternative fuel for cooking the proportional response is very similar to that for space heating (Table 38). The most favoured option is electricity followed by LPG and wood respectively with 75% of the respondents indicating electricity as the first option. Only 1% of the respondents mentioned kerosene and a similar percentage fuel oil.

Table 38: Proportional response to cooking fuel alternatives

Ranking	Electricity	LPG	Coal	Wood	Kerosene	Oil
	%	%	%	%	%	%
First	75.70	19.00	1.00	4.30	0.00	0.00
Second	15.70	64.80	0.50	13.30	1.00	0.00
Third	2.90	6.20	0.00	32.90	0.00	1.00
% response	94.30	90.00	1.40	50.50	1.00	1.00
Ranking	**1**	**2**		**3**		

Table 39 and Table 40 present the comparative means weighted by attributed rank regarding alternative cooking options. These do not contradict the previous observations regarding the proportional response. However, it is possible to observe significant differences between the different respondent characteristics considered. Those groupings between which significant differences were note on more than one fuel choice were, the household's material position and size and the legality of tenure.

- When those that claim to have changed their cooking option were considered a significant difference was only noted regarding LPG. Those that had already adopted an alternative for cooking were significantly more likely to opt for gas in future. However, electricity remains the most favoured choice for both those that have and have not changed (Table 39).
- In the case of the material position of the household, significant differences are noted on all three fuels (Table 39).
  - *Electricity* is the most favoured option for the least secure while those in the medium category registering the highest mean score.
  - *LPG* is the favoured option for the most economically secure. The comparative means indicating that the lower the perception of economic security the less likely the household is to opt for gas as an alternative for cooking.
  - *Wood* is significantly more likely to be an alternative for cooking with the most secure.

With regard to the size of household significant differences are noted in the case of electricity and wood as the future option for cooking (Table 40).

- *Electricity* is the most favoured by all sizes of household considered. However, the largest are less likely to opt for this option than the smaller households.
- *Wood* is more likely to be an option with the largest households. However, it remains the third favoured choice regardless of the size of household considered.

- Tenure status also appears to have an influence when an alternative fuel for cooking is being considered, particularly with regard to LPG and wood. LPG is more likely to be considered by those with a secure tenure than those without. In contrast those with doubtful tenure are more likely to consider wood. Although this is an interesting finding it is difficult to explain the rational behind it.

Table 39: Comparative means regarding alternative cooking fuels (changed, material position)

	All	Changed cooking fuel			Material Position			
		Changed	Unchanged		Weak	Medium	Strong	
n	210	66	141		71	119	20	
Fuels	Mean	Mean	Mean	**MW Sig**	Mean	Mean	Mean	**KW Sig**
Electric	2.61	2.67	2.61		2.58	2.72	2.10	**0.000**
LPG	1.93	2.14	1.82	**0.013**	1.79	1.96	2.25	**0.040**
Wood	0.72	0.62	0.76		0.79	0.57	1.40	**0.000**

- MW Sig = p values resulting from the Mann Whitney U Test
- KW Sig = p values resulting from the Kruskal Wallis H Test (p is only presented when it = <0.05)

Table 40: Comparative mean responses regarding alternative cooking fuels (h/h size and tenure)

	Size of Household				Tenure		
	Small	Medium	Large		Legal	Illegal	
n	63	76	71		115	95	
Fuels	Mean	Mean	Mean	**KW Sig**	Mean	Mean	**MW Sig**
Electric	2.67	2.78	2.39	**0.010**	2.63	2.60	
LPG	2.00	1.84	1.96		2.09	1.74	**0.010**
Wood	0.46	0.82	0.86	**0.007**	0.57	0.91	**0.024**

- MW Sig = p values resulting from the Mann Whitney U Test
- KW Sig = p values resulting from the Kruskal Wallis H Test (p is only presented when it = <0.05)

Reasons given for choice of alternative space heating fuel choices

Table 41 presents the main reasons given for the choice of the alternative fuel for cooking. As in the case of space heating, the predominant reason given in response to an open question is the fuel's cleanness. Cost is the second most mentioned reason followed by efficiency but both are of significantly lower importance when compared to the issue of cleanness.

When the two categories that demonstrated a significantly higher preference for wood are considered, no clear differences in the attribution of importance is be noted when compared to the response of the whole sample.

The issue of cleanness is clearly important but was not picked up in the earlier closed question regarding pollution. The distinction between the two concepts would appear to be related to the impact of using the fuel on the personal and household ambient (cleanness) and the impact on the wider public environment (pollution). Therefore, while people are concerned with keeping their person and immediate environment clean there is little account taken of the wider environmental impact of using a particular fuel for either cooking or heating.

Table 41: Reasons for alternative fuel choice for cooking

	Whole sample n = 210		
Reasons of choice for cooking	Frequency	Percent	Rank
Safety	7	3.3	
No electricity	2	1.0	
Economic	11	5.2	**2**
Cleanness	53	25.2	**1**
Effective	5	2.4	
Adequate	4	1.9	
Efficient (quick)	8	3.8	**3**
Total	90	42.9	

In summary

There is little difference in choice and rational as to whether the fuel is for space heating or cooking.

Generally, the most favoured alternative fuel for cooking is electricity followed by gas and wood respectively. Other fuels are very rarely considered. The fact that people claim to have already changed their cooking fuel made little difference. However, the economic security and size of household as well as security of tenure do appear to influence choice of an alternative cooking fuel. The more economically secure, the large household and those with dubious tenure all demonstrated a significantly stronger tendency to consider wood as a possible option for cooking when compared with their respective counterparts.

By far the most predominant reason given for fuel choice was its cleanness (to use) rather than the economic consideration, which might have been expected. In fact if the issues of effectiveness and efficiency are grouped together these would outweigh the issue of cost. Those that mentioned safety tend to be concerned about gas. The cleanness of a fuel to use is the major consideration rather than atmospheric pollution, which has little to no influence when considering alternative fuels.

Overall it would appear that people may be prepared to pay more if they are assured of receiving a fuel that is clean to use and is efficient.

Outcome beliefs attitudes and intentions

Questions were posed to assess the strength of belief and the importance given to a number of possible outcome statements [7] regarding the impact of increased energy costs. Each statement was presented with a bi polar 5 point scale exploring the degree of agreement or disagreement with each.

In all 10 outcome statements were used. These represented five key issues, family unity, security, health, education, debt avoidance. The issues of health and education refer specifically to children of school age and below.

Table 42 presents the mean, median and IQR for each of these statements for the whole sample. The statements that were most strongly agreed with related the negative impact of price increases on, education and health. Respondents generally do not agree with the belief that the utility company will late personal property to cover bad debt nor that they will be disconnected. Overall the respondents strongly agreed with the statements apart from the issue of bad debt and disconnection.

The possible negative consequences of a failure to pay do not appear to be influential. However, the outcomes of increased prices are a concern and indicate that households will have to reduce the use of electricity, negatively impacting education and health.

Table 42: Outcome beliefs regarding impact of electricity price increase ranked by strength

Outcome statements N = 210 Possible range = -2 to +2	Mean	Median	IQR
Children's education will be affected by not enough heating	1.24	1	(1 to 2)
Children's education will be affected by poor lighting	1.21	1	(1 to 2)
Our health will be affected by not having hot water	1.18	1	(1 to 1)
Will get sick because of not cooking properly	1.14	1	(1 to 1)
Will get sick because of lack of heating	1.11	1	(1 to 1)
Inability to pay bills will cause arguments in the family	1.08	1	(1 to 2)
Lighting in public places will reduce, so thefts and crimes will increase	1.06	1	(1 to 2)
Our inability to pay bills will cause psychological illness	1.06	1	(1 to 1)
Our house will be disconnected	-0.57	-1	(-1 to 0)
Company will take things from our house to pay for debts	-0.91	-1	(-2 to -1)

When the different categories of respondent are considered, differences in outcome beliefs are noted. The economic status of the household, employment status of the respondent and legality of tenure are the most influential regarding the number of significant differences observed per statement (Table 43 and Table 44). However, age, education, size of household and type of billing appear to have little influence (Table 44).

[7] These statements represented opinions expressed by representative groups in a prior open ended study which was used to inform the development of the main questionnaire. Those opinions that were repeated were included across different groups were included in the structured questionnaire.

- Those from materially stronger households reflect weaker beliefs, particularly with regard the negative impact of price increases on education, health and family unity. However, the more economically secure are less likely to discount the possibility of repossession due to a failure to pay (Table 43).
- Those without employment tend to express weaker beliefs than those in employment. Those in part-time employment expressed the strongest agreements with the outcome statements. The main differences relate to health, education, family unity and the consequence of none-payment (loss). However, the unemployed were also less concerned about the impact on security and the possibility of disconnection than their employed counterparts (Table 44)
- The security of tenure appears to be the most influential of all the descriptive categories considered regarding the strength of outcome beliefs (Table 44).
    - Those with *uncertain tenure* expressed stronger beliefs regarding the negative impacts of price increases. The issues of possible family strive and increased insecurity are ranked more highly with regarded with this group.
    - However, those with *secure tenure* are less ready to reject the possibility of disconnection and seizure of property for failure to pay.
- The issue of the type of bill received surprisingly does not appear to make much difference to the strength of beliefs expressed. Significant differences were noted on only two of the beliefs. Those that are not billed expressed a weaker belief that they will not being able to cook properly and are less likely to reject the possibility of disconnection (Table 44).

Table 43: Comparative means of outcome beliefs re material position and employment

Outcome statements	All	Material Position				Employment of respondent			
		Weak	Medium	Strong		None	Part-time	Fulltime	
n	210	71	119	20		73	62	70	
Range -2 to +2	Mean	Mean	Mean		**KW Sig**	Mean	Mean	Mean	**KW Sig**
Children's education will be affected by not enough heating	1.24	1.23	1.29	0.95	**0.039**	1.08	1.48	1.20	**0.000**
Children's education will be affected by poor lighting	1.21	1.21	1.25	0.95		1.07	1.48	1.13	**0.000**
Our health will be affected by not having hot water	1.18	1.21	1.21	0.85	**0.032**	1.05	1.42	1.11	**0.001**
Will get sick because of not cooking properly	1.14	1.13	1.20	0.80	**0.020**	0.89	1.40	1.17	**0.000**
Will get sick because of lack of heating	1.11	1.20	1.12	0.75	**0.008**	1.01	1.26	1.11	
Inability to pay bills will cause arguments in the family	1.08	1.13	1.13	0.60	**0.036**	0.82	1.26	1.19	**0.001**
Lighting in public places will reduce, so thefts and crimes will increase	1.06	0.99	1.16	0.70		0.78	1.48	1.06	**0.000**
Our inability to pay bills will cause psychological illness	1.06	1.15	1.06	0.75	**0.046**	0.95	1.18	1.06	
Our house will be disconnected	-0.57	-0.41	-0.69	-0.50		-0.19	-1.10	-0.57	**0.000**
Company will take things from our house to pay for debts	-0.91	-1.04	-0.94	-0.25	**0.004**	-0.73	-1.13	-0.99	**0.024**

- KW Sig = p values resulting from the Kruskal Wallis H Test (p is only presented when it = <0.05)

Table 44: Comparative means of outcome beliefs re material position and employment

	Tenure			Type of bill			
	Legal	Illegal		none	forfeit	metered	
n	115	95		10	122	78	
	Mean	Mean	**MW Sig**	Mean	Mean	Mean	**KW Sig**
Children's education will be affected by not enough heating	1.06	1.45	**0.000**	1.10	1.25	1.24	
Children's education will be affected by poor lighting	1.03	1.42	**0.000**	1.20	1.18	1.26	
Our health will be affected by not having hot water	1.02	1.37	**0.000**	1.30	1.17	1.18	
Will get sick because of not cooking properly	0.97	1.34	**0.000**	0.60	1.16	1.17	**0.005**
Will get sick because of lack of heating	0.99	1.25	**0.000**	1.00	1.13	1.09	
Inability to pay bills will cause arguments in the family	0.83	1.38	**0.000**	0.60	1.16	1.01	
Lighting in public places will reduce, so thefts and crimes will increase	0.84	1.32	**0.000**	0.40	1.02	1.19	
Our inability to pay bills will cause psychological illness	0.96	1.19	**0.001**	1.00	1.04	1.10	
Our house will be disconnected	-0.25	-0.97	**0.000**	-0.30	-0.40	-0.88	**0.003**
Company will take things from our house to pay for debts	-0.67	-1.20	**0.000**	-0.20	-0.98	-0.88	

- MW Sig = p values resulting from the Mann Whitney U Test
- KW Sig = p values resulting from the Kruskal Wallis H Test (p is only presented when it = <0.05)

Attributed importance of outcomes regarding price increase

The attitudes regarding the consequences of increasing the price of electricity are calculated by taking the product of the means of grouped outcome beliefs and the attributed importance. Table 45 indicates the importance attributed to the five issues considered. Health and freedom from debt or resulting loss are the two most important issues.

Table 45: Importance of issues

Issues N = 210 Range (0 to 4)	Mean	Median	IQR
Health	3.60	4	(3 to 4)
Freedom from debt (loss)	2.28	2	(1 to 3)
Family unity	2.08	2	(1 to 3)
Education	1.64	1	(1 to 2)
Security	1.36	1	(1 to 1)

Attitudes regarding the impact of electricity price increase

The attitudes, in order of their strength are presented in Table 46. The overall attitude to price increases is negative but not strongly so.

As can be seen when the strength of belief is weighted by the importance attributed to the issue, the negative impact on health is the strongest attitude followed by the negative impact on family unity. The freedom from debt and possible loss is also an important issue but the belief that they will not loose property or be cut-off resulted in a positive attitude.

Table 46: Attitudes regarding the impact of price increases

Attitudes N = 210 Range (-8 to +8)	Mean	Median	IQR
(att6c) attitude re health (weighted mean)	-4.03	-4	(-5 to -4)
(att10c) attitude re family (weighted mean)	-2.14	-2	(-3 to -1)
(att9c) attitude re education (weighted mean)	-1.86	-2	(-2 to -1)
(att8c) attitude re security (weighted mean)	-1.52	-1	(-2 to -1)
(att7c) attitude re loss (debt) (weighted mean)	1.93	1	(0 to 3)
Overall attitude (sum) (range -40 to +40)	-7.64	-8	(-10 to -6)

Intentions regarding possible changes in fuel related behaviour

The intention to take a particular action is often associated with the attitudes related to the possible outcome of the proposed action and the values attributed to these. Various theories link attitudes to behaviour, e.g. the theory of reasoned action.

Table 47 presents the strength of intent to undertake five separate coping strategies if faced with increases in the price of electricity. As can be observed only one strategy registered a positive mean score, the intention to reduce consumption. Interestingly, the general response to using a cheaper fuel was negative confirming the previous finding regarding the adoption of cheaper fuels.

The respondents were strongly opposed to moving to a new area if faced with a price cut as they were to stealing electricity.

Although, the response to go into debt to manage a price increase was negative, it was not strongly so suggesting that may it be a consideration for some of the respondents.

Table 47: Intentions regarding changes in fuel related behaviour

Intentions N = 210 Range (-2 to +2)	Mean	Median	IQR
(i2b) Intent to move	-1.23	-1	(-2 to -1)
(i4b) Intent to steal electricity	-1.05	-1	(-1 to -1)
(i3b) Intent to use cheaper fuel	-0.64	-1	(-1 to 0)
(i5b) Intent to go into debt	-0.55	-1	(-1 to 0)
(i1b) Intent to reduce consumption	0.25	0	(0 to 1)

The intents to reduce consumption or adopt a cheaper fuel did relate closely with the overall attitudes, i.e. no significant correlations were noted. Therefore the stated intent to adopt one of these coping options cannot be taken as a reliable indicator of future behaviour.

When the attitudes and intentions of the various descriptive categories were compared, the most sensitive appear to be education, employment, tenure, type of bill and household expenditure.

Of these the most sensitive to the intention to reduce consumption and /or adopt a cheaper fuel are the type of bill and total household expenditure. Table 48 and Table 49 present the comparative means for the type of bill and household expenditure.

- The perceived material position of the household has little impact on the attitudes and intentions. The exceptions relate to loss and security. Interestingly those from the most secure households hold the weakest though positive attitude toward possible loss due to price increases. In contrast those from the least economically secure households a expressed significantly more negative attitude toward the issue of a deterioration of security.
- The level of total household expenditure has an impact on the intention to reduce consumption and adopt cheaper fuels. There is also a significant difference regarding attitudes regarding the impact on health and security.
  - The *intent to reduce consumption* is most strongly expressed by those households reporting the highest expenditure. The weakest intent is expressed by households with an average expenditure.
  - The i*ntent to adopt a cheaper fuel* is generally negative across all three levels of expenditure. However, the least negative intent is expressed by the highest spenders, while the average spenders are the most negative to this option.
  - Regarding *the impact on health* the average spenders expressed the most negative attitude.
  - The highest spenders are the most sensitive to the possible *deterioration of security* expressing the most negative attitude regarding this issue.

Table 48: Comparative intention and attitude means (material position and h/h expenditure)

	All	Material Position				Household expenditure			
Outcome statements		Weak	Medium	Strong		Low	Average	High	
n	210	71	119	20		73	62	70	
Range -2 to +2	Mean	Mean	Mean		**KW Sig**	Mean	Mean	Mean	**KW Sig**
(i1b) Intent to reduce consumption (mean)	0.25	0.30	0.23	0.26		0.21	0.16	0.33	**0.009**
(i3b) Intent to use cheaper fuel (mean)	-0.64	-0.62	-0.70	-0.37		-0.71	-0.80	-0.44	**0.026**
(att6c) attitude re health (weighted mean)	-4.03	-4.15	-4.14	-2.90		-3.88	-4.56	-3.83	**0.007**
(att7c) attitude re loss (weighted mean)	1.93	2.11	2.01	0.78	**0.042**	1.59	2.30	2.34	
(att8c) attitude re security (weighted mean)	-1.52	-1.41	-1.69	-0.95	**0.017**	-1.24	-1.57	-1.89	**0.018**
(att9c) attitude re education (weighted mean)	-1.86	-1.87	-1.92	-1.45		-1.98	-1.94	-1.74	
(att10c) attitude re family (weighted mean)	-2.14	-2.06	-2.29	-1.50		-2.21	-2.37	-1.85	

- KW Sig = p values resulting from the Kruskal Wallis H Test (p is only presented when it = <0.05)

Table 49: Comparative intention and attitude means (tenure and h/h type of bill)

	Tenure			Type of bill			
	Legal	Illegal		none	forfeit	metered	
n	115	95		10	122	78	
	Mean	Mean	**MW Sig**	Mean	Mean	Mean	**KW Sig**
(i1b) Intent to reduce consumption (mean)	0.24	0.27		0.23	0.32	0.15	**0.000**
(i3b) Intent to use cheaper fuel (mean)	-0.59	-0.70		-0.23	-0.55	-0.83	**0.004**
(att6c) attitude re health (weighted mean)	-3.76	-4.35	**0.017**	-3.03	-4.00	-4.20	**0.022**
(att7c) attitude re loss (weighted mean)	0.71	3.38	**0.000**	0.55	1.90	2.14	
(att8c) attitude re security (weighted mean)	-1.10	-2.03	**0.000**	-1.70	-1.30	-1.86	
(att9c) attitude re education (weighted mean)	-1.97	-1.72		-1.55	-1.97	-1.72	
(att10c) attitude re family (weighted mean)	-1.68	-2.69	**0.000**	-0.60	-2.39	-1.95	

- MW Sig = p values resulting from the Mann Whitney U Test
- KW Sig = p values resulting from the Kruskal Wallis H Test (p is only presented when it = <0.05)

- Although the security of tenure does not have an influence on intentions to reduce consumption or adopt a cheaper fuel it has a significant impact on the attitudes held to ward the outcomes of possible price increases. As can be observed in Table 49.
  - Those with *less secure* tenure expressed significantly more negative attitudes regarding the impact on health, security, and family unity.
  - In contrast those with *secure tenure* less certain about the issue of resulting loss and hold a significantly more negative view regarding the impact on education.
- The type of bill or lack of one has a significant influence on both the intention to reduce consumption and adopt cheaper fuel. However, there is little impact on attitudes, the only exception being with regard to the perceived negative impact on health.
  - Those paying by *forfeit* are most likely to reduce their consumption.
  - Those who have a *metered supply* are the least likely to adopt a cheaper fuel.
  - Those with a *metered* supply are also the most concerned regarding the negative impact electricity price rises will have on health.
- Gender has no significant influence on the intention to reduce consumption or adopt alternative cheaper fuel. Significant differences are only noted regarding the attitudes related to possible loss / disconnection and security. The women hold a weaker attitude regarding possible loss or disconnection. Men on the other hand, surprisingly, express significantly stronger attitudes regarding the possible deterioration in local security.

Appendix 3

Country Survey Analysis – Kyrgyzstan

1 Introduction

The electricity supply industries in former soviet economies have been identified as a priority for economic development. Governments, supported by incentives of loans and investments from international institutions, have implemented policies of liberalisation and privatisation. Such policies are primarily based on macro economic considerations, but the authorities recognise the gravity of the potential consequences of increased electricity costs, especially on the poor.

In a DFID[1] funded project bringing together NGOs and energy institutions in Albania, Kyrgyzstan, and Moldova, Gamos have conducted field research aimed at helping policy makers and CSOs understand the likely impact of changes in energy supplies on the urban poor.

The research uses statistical analysis to identify how people's behaviour with respect to energy use has already changed, and how they are likely to cope with forthcoming changes. A stakeholder meeting was held in May 2004, at which delegates requested the project publish a detailed country report including a comprehensive analysis of the household data – this document has been written in response to that request.

2 Research Methodology

The project process comprised preliminary surveys in Tirane (Albania), Biskek and Osh (Kyrgyzstan), and Chisnau (Moldova), which provided opportunities to interview policy makers and stakeholders. Focus group discussions with residents were held in subsequent visits, and helped identify salient issues in each country context, which were used in the design of household questionnaires. Detailed household surveys have been conducted in each city, and analysis of the data has been completed.

The questionnaire comprised the following sections:

- Household descriptors, including employment and housing status
- Household energy use and changes in fuels
- Impact of tariff reforms, including likely coping strategies and outcomes
- Problems experienced with electrical supplies
- Household financial.

The analysis aims to assess how people will react to changes in energy markets – increases in prices, and enforcement of payment (electricity). The options are illustrated in Figure 1:

- Pay more
- Change to cheaper fuels
- Reduce energy consumption

[1] UK Department for International Development (DFID)

It goes on to consider the possible implications of each of these.

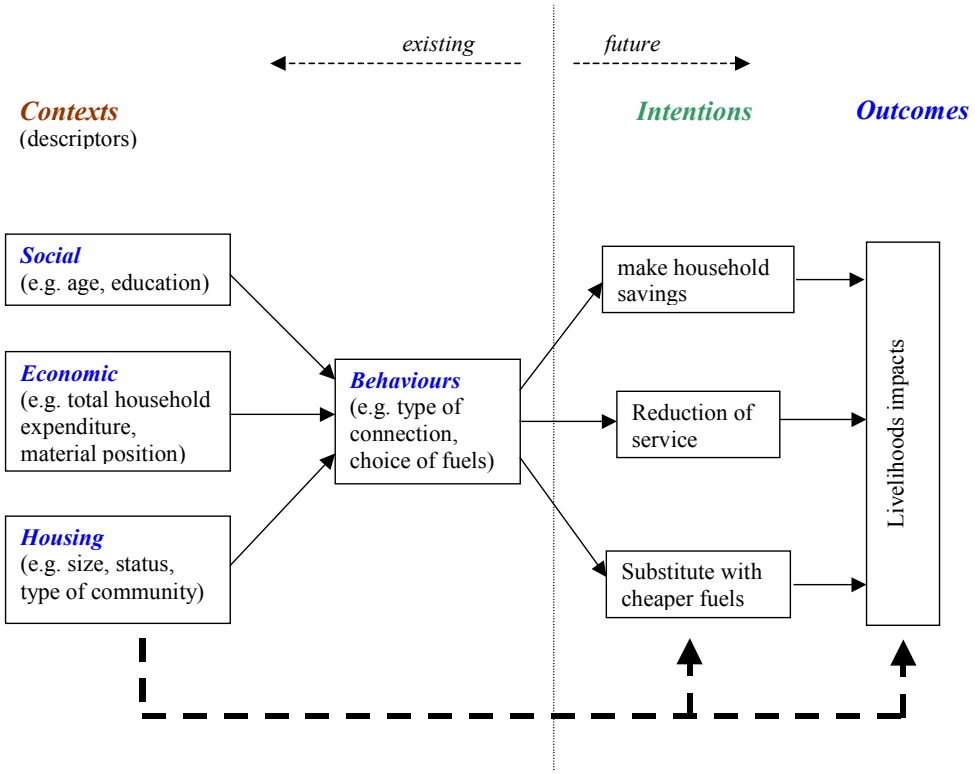

Figure 1 Links between indicators and behaviour

In Kyrgyzstan, a sample of 216 households was surveyed within urban (67%) and suburban (33%) neighbourhoods of Bishkek (capital city in the north of the country) and Osh (district capital in the south). The analysis uses non parametric statistical tests to look for the influence of various social groupings on behaviour and coping strategy[2].

3 Description of Sample

3.1 General

An understanding of the types of communities sampled can be gained by the following key figures:

- The gender of respondents was balanced: 47%:53% male:female;
- The average age of all respondents was 35; most (64%) are in the 20 to 40 age group.
- The majority of respondents (58%) have a tertiary or higher level of education (up to 18 years old)
- 45% of respondents are workers or government officials, 7% are professionals, 14% claim to be housewives;

[2] The Mann-Whitney U test has been used to test for differences between two groups, and tests present the probability (p value) that differences between two groupings have occurred by chance - differences with a probability of less than 0.05 have been taken to indicate a relationship. Similarly, when considering correlations between two variables, only where the p value associated with a Spearman Rank Order Correlation Coefficient is less than 0.05, and the correlation coefficient itself is greater than 0.2, has it been assumed that a valid relationship exists.

- 27% of respondents are in full time employment, although 15% claim to be unemployed, only 3% claim to be unable to work; 44% work on an occasional basis;
- The average size of household was relatively small (mean = 4.03). The average number of children per household was 1.11 children
- There was a roughly equal balance of respondents living in flats (almost entirely in urban areas) and those living in houses (equally split between urban and suburban areas); 10% live in temporary shelter (e.g. mud block house which has yet to be plastered and decorated);
- The mean number of rooms was 3.14; 31.5% live in 3 rooms, and 29.6% live in two rooms;
- 84% of houses are registered with the municipal authorities;
- The majority of people moved to their current house from within the city (43% from elsewhere in the city and 13% from the same neighbourhood). 15% have moved from other cities, and only 17% have moved from rural villages; the movement of people from rural villages into cities has only become more common within the last five years.

3.2 Employment

The average household size was quite small at 4.03. There was an even gender balance of 2.00 males to 2.04 females. The average number of children per household was 1.11, giving a mean of 3.28 adult units[3] per household.

Table 1: employment status of each household

n =216 households	Number	H/H mean
adults occasional / unemployed	163	0.75
adults part-time employed	53	0.25
adults full time employed	225	1.04
Pensioners	61	0.28
disabled / invalids	5	0.02
Students	70	0.32
Other	11	0.05
Totals	588	2.71

The employment status of adults is presented in Table 1; note that the average number of adults given in this table is marginally lower than the figure of 2.72 from the above figures (average of 3.28 adult units, less 1.11 children given 2.72 adults per household) because some respondents have been reluctant to disclose their employment status. The table indicates that each household has an average of 1.29 adults in employment, and most of these are full time; note that the additional 0.75 adults are likely to bring income additional income through occasional work. If the working potential of adults is weighted according to the employment status[4], then the average 'work potential' is 1.35 work units.

An alternative view of employment conditions can be seen by looking at the status of respondents – see Table 2 (bear in mind the gender balance of the sample at 47:53

[3] The adult unit is calculated by treating children as 50% of an adult; all others including pensioners and invalids are regarded as one adult unit.
[4] Weighted full time = 1; part time = 2; occasional = 0.25

male:female). Note that 60% of respondents are either unemployed or occasional workers, and 27% are full time, whilst Table 1 indicates that 28% of household members are occasional workers or unemployed, and 38% are in full time employment. This reflects the fact that interviews were conducted with home carers.

Table 2: employment status of respondents

n =216 households	Frequency	Percent
unable to work	7	3.2
unemployed	33	15.3
ocassional	96	44.4
part time	16	7.4
full time	58	26.9
Totals	210	97.2

3.3 Housing

The sample includes an equal balance of respondents living in flats (almost entirely in urban areas) and those living in individual houses (equally split between urban and suburban areas).

Table 3: Type of housing - by type of community

	Suburban	Urban	Total*	Valid Percent
Shelter	19	4	23	10.6
Hostel	1	6	8	3.7
Flat	1	90	93	43.1
House	48	42	92	42.6
Total	69	142	216	100.0

* suburban / urban indicator missing from 5 records

Table 4 shows the similarity between the samples in Bishkek and Osh, with the notable exception that temporary shelters (the poorest category of accommodation) was more common in Bishkek.

Table 4: Type of housing - by city

	Bishkek	Osh	Total	Valid Percent
Shelter	20	3	23	10.6
Hostel	7	1	8	3.7
Flat	55	38	93	43.1
House	54	38	92	42.6
Total	136	80	216	100.0

The mean number of rooms of the sampled houses was 3.14; most have only 2 or 3 rooms – see Table 5.

Table 5: Number of rooms

Number of rooms	Frequency	Percent
1	17	7.9
2	64	29.6
3	68	31.5
4	34	15.7
>4	33	15.3
Total	216	100.0

A separate estimate of house size was also made based on the floor area from small medium and large (Table 6). As would be expected there was a significant correlation between the number of rooms and the estimated size of house. However, the number of rooms is the more sensitive variable.

Table 6: Size of house

	Frequency	Percent
very small (<20m2)	22	10.2
small (20 - 50 m2)	70	32.4
medium (51 - 100 m2)	101	46.8
large (>100 m2)	18	8.3
Total	211	97.7

Several characteristics of the sample show that it reflects the trend of unplanned urban resettlement that is typical of population movement:

- The majority (87.4%) of respondents claim to own their houses. A significant proportion were renting (8.9%), and only 1.4% have a mortgage (i.e. make regular payment on a loan secured on their house). Whilst the proportion of households renting is similar in urban and suburban neighbourhoods, it is clear that a greater proportion of rented households are not recognised by the authorities (50% are illegal, compared with 12% of owned houses).
- The mean length of stay in houses was 10.5 years. Table 7 shows that people in houses that are not recognised by the authorities tend to have lived in them for a relatively short period of time.
- Most temporary shelters (70%) are not recognised and are found in suburban areas (83%).
- Table 8 shows that 48% of people in temporary shelters moved from outside of the city, compared with only 32% of those living in flats and houses.

When looking at movement of people, data indicates a trend of increasing mobility:

- Table 10 shows that a greater proportion of the sample who moved a long time ago (>10 years) moved from within the neighbourhood (29%), compared with only 12% of those moving more recently.
- The proportion of people moving from outside the city has increased from 29% amongst those who mover over 10 years ago, to 38% of those moving within the last 5 years i.e. the movement of people from rural villages into cities has become more common in recent years;
- Note that most people move from within the city.

Table 7: Legal status * (banded) length of stay in house cross-tabulation

Frequency		(banded) length of stay in house			Total
		<5 years	5 - 10 years	>10 years	
legal status	legal	65	39	74	178
	illegal	28	4	2	34
Total		93	43	76	212

Table 8: Where people lived before moving * type of dwelling cross-tabulation

Frequency		type of house				Total
		temporary shelter	hostel	Flat	house	
location before moving to this house	House on same site	1	0	2	3	6
	Same neighbourhood	2	0	11	16	29
	Elsewhere in this city	9	4	43	37	93
	Other city	3	0	18	11	32
	other village	8	4	10	14	36
Total		23	8	84	81	196

Table 9: location before moving * (banded) length of stay in house cross-tabulation (whole sample)

Frequency		(banded) length of stay in house			Total
		<5 years	5 - 10 years	>10 years	
location before moving to this house	House on same site	2	0	4	6
	Same neighbourhood	9	5	15	29
	Elsewhere in this city	45	21	27	93
	Other city	11	6	15	32
	other village	24	8	4	36
Total		91	40	65	196

Table 10: location before moving * (banded) length of stay in house cross-tabulation (only those in residences NOT recognized by authorities)

Frequency		(banded) length of stay in house			Total
		<5 years	5 - 10 years	>10 years	
live before moving to this house	House on same site	1	0	0	1
	Same neighbourhood	3	0	1	4
	Elsewhere in this city	13	2	0	15
	Other city	2	0	1	3
	other village	9	2	0	11
Total		28	4	2	34

84% of houses are registered with the municipal authorities, but this does not correspond with ownership of houses – 12% of owned houses are not registered.

The majority of people moved to their current house from within the city (43% from elsewhere in the city and 13% from the same neighbourhood). 15% have moved from other cities, and only 17% have moved from rural villages. This means that, broadly speaking, the sample will have urban living habits and are not likely to have strong links with rural communities. During soviet times, urban people kept strong links with relatives in rural areas as they were a source of food, but this is changing as conditions in villages is getting poorer.

Of those who had always lived in their previous house (33% of sample), 45% moved within the last 5 years. Of other respondents (62% of sample), the average length of stay in their previous house was 10 years. This indicates that there is not a culture of moving house frequently.

Table 11: Correlation of household indicators

	number of rooms (text)	size of house	rented or owned	legal status	length of stay in house
number of rooms (text)		.700(**)	.276(**)	-.049	.200(**)
size of house	.700(**)		.181(**)	-.031	.155(*)
rented or owned	.276(**)	.181(**)		-.290(**)	.224(**)
legal status	-.049	-.031	-.290(**)		-.379(**)
length of stay in house	.200(**)	.155(*)	.224(**)	-.379(**)	

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

The interrelationship of these variables is illustrated in Table 11:

- Smaller houses tend to be rented;
- People who have moved more recently tend to have smaller houses;
- Rented houses tend not be recognised by the authorities;
- People in rented houses tend to have moved in more recently;
- People who have moved more recently tend to live in houses that are not recognised by the authorities.

This builds a picture of vulnerability that can be based around the rental status of a household. There is no significant difference in the proportion of households renting or owning houses between Bishkek and Osh (MW p = 0.181).

3.4 Economic Status

3.4.1 Income and Expenditure

Respondents were asked for expenditure details of a number of priority items, of which food and energy were considered to be the only essential items i.e. any response with no value against food or energy expenditure was regarded as invalid. Average expenditure (for valid responses) is given in Table 12.

Table 12: Annual household expenditure (priority items)

Item N = 126	Annual Expenditure (som/a)	Percentage of total expenditure
food	21531	39%
clothing	8965	16%
travel	5803	11%
energy (10 fuels)	4848	9%
education	4254	8%
housing	3615	7%
medication	1985	4%
communal services	1708	3%
telephone	981	2%
other	754	1%
debt payment	618	1%
total household expenditure	55063	100%

There is some debate over whether expenditure of income figures are more reliable – people tend to inflate expenditure figures (tendency to assert the status of the household), but the deflate income figures (reluctance to expose themselves to tax). However, the mean annual declared income for the part of the sample represented in Table 12 is 54,800 som/a. In this case the ratio of declared income to expenditure is 99.5% which indicates the data is reliable[5].

Does this sample include the poor? Dividing the sample into ten bands according to per capita income shows that the per capita income amongst the poorest group is 3,240 som/year (see Table 13); this is still well above the figure of 140 som/month (1,680 som/year) used by the MLSA as a threshold for receiving state support.

Table 13: annual per capita income (10 groups)

Per capita income range	N	Mean
<5,800	11	3240
5,801 - 8,500	13	6887
8,501 - 11,000	14	9852
11,001 - 13,400	10	12117
13,401 - 15,000	10	14130
15,001 - 19,000	20	17180
19,001 - 22,000	8	20296
22,001 - 25,200	16	23760
25,201 - 33,000	13	28326
>33,000	11	47159
Total	126	18244

[5] This household incme figure is 15% higher than similar figures derived from the IPA Household Energy survey 2003)

3.4.2 Perceived household condition

Respondents were asked to rate the material position of their household on a subjective scale. The majority (57%) indicated that they can provide food but find it difficult to pay utility bills. Only 8% claim to be in severe poverty where they find it difficult to pay for food – see (Table 14).

Table 14: Material position of the household

	Frequency	Percent
Difficult to provide the family with food	17	7.9
Manage to provide food but find it difficult to pay the util	123	56.9
afford required foods, clothes and manage to pay the bills	54	25.0
Have all we need and made some savings	9	4.2
Don't know what to answer	11	5.1
Total	214	99.1

Respondents in Osh tend to regard themselves as better off (MW p = 0.000), although there is no difference in reported household expenditure (MW p = 0.719).

The relationship between this subjective poverty assessment and household income is presented in Table 15 (based only on complete records), and shows a good correlation of the subjective measure with declared per capita income.

Table 15: Per capita income for categories of Material position

	N	Mean annual per capita income
Difficult to provide the family with food	8	13695
Manage to provide food but find it difficult to pay the util	69	16993
afford required foods, clothes and manage to pay the bills	35	20757
Have all we need and made some savings	8	25286
Don't know what to answer	5	16480
Total	125	18346

3.4.3 Poverty indicators

Correlations between a range of indicators which represent aspects of economic conditions to a certain extent are presented in Table 16; a number of observations can be made:

- There is a good degree of correlation between the perceived economic condition of the household (material position), and ability to pay for items (electricity and others).
- It is interesting to note that whilst ability to pay for food and other items does correlate with per capita expenditure and income, ability to pay for electricity does not correlate.
- There is a good correlation between household income and expenditure (similarly between per capita income and expenditure);

It is proposed that per capita income and material position of the household are the most reliable indicators of poverty. Frequency of inability to pay other bills correlates strongly, but has only been responded to by 29% of the sample.

A snapshot of ability to pay for items is given by the number of households in debt at the time of the survey (presented in Table 17). However, these figures appear to contradict the findings from in Table 16, referred to above. Table 18 indicates that current food debts (snapshot) are associated with poverty, whilst both electricity and other debts are commonly found amongst households that regard themselves as comparatively well off. The most common 'other' debts are heating, education and credit repayments. Of the two sets of figures, the snapshot figures are likely to be less reliable.

Table 16: Correlation of economic indicators

	material position of h/h	rented or owned	frequency of inability to pay for electricity	frequency of inability to pay for food	frequency of inability to pay other bills	total annual h/hold expenditure	total household income	Per capita expenditure	Per capita income	Proportion of expenditure spent on energy	number of rooms	Number of fully employed adults
material position of h/h		0.203**	-0.252***		-0.454***			0.219*	0.206**			0.219***
rented or owned	0.203**		-0.312***								0.276***	
frequency of inability to pay for electricity	-0.252***	-0.312***		0.576***								
frequency of inability to pay for food			0.576***		0.354**			-0.253*				
frequency of inability to pay other bills	-0.454***			0.354**				-0.629***	-0.396***		-0.287*	-0.27*
total annual h/hold expenditure							0.322***	0.646***		-0.617***		0.202*
total household income						0.322***			0.733***			0.417***
Per capita expenditure	0.219*			-0.253*	-0.629***	0.646***			0.364***	-0.389***		
Per capita income	0.206**				-0.396***		0.733***	0.364***				0.223***
Proportion of expenditure spent on energy						-0.617***		-0.389***				-0.23**
number of rooms		0.276***			-0.287*							
Number of fully employed adults	0.219***				-0.27*	0.202*	0.417***		0.223***	-0.23**		

*** Correlation is significant at the 0.001 level (2-tailed)
** Correlation is significant at the 0.01 level (2-tailed)
* Correlation is significant at the 0.05 level (2-tailed).

Table 17: Households currently in debt

	Frequency	Percent
Electricity	37	17.1
Food	7	3.2
other	31	14.4

Table 18: Material position of the household currently with debts (frequency)

	Electricity	Food	Other
Difficult to provide the family with food	2	4	0
Manage to provide food but find it difficult to pay the util	24	1	23
afford required foods, clothes and manage to pay the bills	9	2	6
Have all we need and made some savings	0	0	0
Don't know what to answer	1	0	2
Total	36	7	31

4 State Safety Nets

Data was gathered on the following state benefits:

- 21% of the sample claimed to have one or more pensioner in the household, but nearly a quarter of these claim not be receiving any **pension benefit** (see Table 19**)**.
- **Invalidity benefit** is received by only a small proportion of respondents (3%) and appears to be well targeted (all 5 households registering an invalid receive benefit).
- None of the respondents claim to receive **unemployment benefit**.
- Few households (3%) receive **other MLSA benefits**.

Table 19: Households with pensioners (frequency)

Pensioners in household	Receiving benefit	Not receiving benefit	Total
yes	35	10	45
no	5		
Total	40		

Table 20: Households receiving benefits by poverty grouping (frequency)

	Per capita income quartiles				
	lowest (<10,400)	low (10,400 - 15,000)	medium (15,001 - 24,000)	high (>24,000)	Total
Senior citizens pension	10	12	9	9	40
Invalid benefit			4	2	6
Unemployment benefit					0
Other	3			3	6

Table 21: Households receiving benefits by perception of poverty groupings (frequency)

	Material position of household					
	Difficult to provide the family with food	Manage to provide food but find it difficult to pay the util	afford required foods, clothes and manage to pay the bills	Have all we need and made some savings	Don't know what to answer	Total
Senior citizens pension	3	26	9	1	1	40
Invalid benefit		5		1		6
Unemployment benefit						0
Other	1	1	2		2	6

These tables indicate that the existing system of benefits does not target the poor. This is primarily because it is pension and invalidity benefits that are received in the sampled communities, neither of which is intended to be poverty focused.

5 Energy use

5.1 Choices of fuels

The following table presents the numbers of household using each fuel as either a primary or backup fuel for a range of activities (cooking, space heating, water heating, lighting and washing):

Table 22: Households using fuels

Fuel	Frequency	Percent
Electricity	200	92.6
Gas	107	49.5
LPG	34	15.7
District Heating	70	32.4
Wood	51	23.6
Dung	26	12.0
Coal	87	40.3

N.B. based on 200 respondents indicating fuel uses

Table 23: Types of electrical connections

Fuel	Frequency	Percent
not connected	7	3.2
Illegal	11	5.1
legal disconnected	2	.9
Legal	192	88.9
Total	212	98.1

Note that of the 7 claiming not to be connected, 6 claim to use electricity as either a main or backup fuel for one of the activities, as does one of the two claiming to have disconnected legal supplies (so we can assume they were reluctant to admit to having an illegal connection). This indicates that 99% of households are connected (based on 212 responses in Table 23), and 8.5% have some form of illegal connection.

Table 24 indicates that illegal connections are not a feature of poverty.

Table 24: Type of electrical connection by poverty grouping (frequency)

	Per capita household expenditure quartiles				
	lowest (<13471)	low (13471 - 19037)	moderate (19037 - 28925)	high (>28925)	Total
not connected	0	1	2	1	4
illegal	0	2	1	2	5
legal	26	24	25	24	99
Total	26	27	28	27	108

Current fuel uses are presented in Table 25 and show the following characteristics:

- Where district heating is available, this is the preferred form of **space heating**; elsewhere, there is an equal split between electricity and coal use.
- Gas (piped) is the preferred **cooking** fuel, closely followed by electricity. Note that when people use coal for heating in winter, this is also used for cooking, but mostly by low grade energy users who use wood for cooking in the summer.
- Although most households connected to district heating services use central hot water for **water heating** and clothes washing, about one third of these households prefer to use electricity and gas for water heating. Electricity is clearly the preferred fuel. Again, there is a shift from wood to coal in the winter.

Table 25 Main choice of fuel (whole sample)

Percentages	Cooking		Space heating	Water heating		lighting	Clothes washing	
	summer	winter		summer	winter	summer	summer	winter
Elec	35.2	36.6	20.4	37.5	37.5	85.6	44.4	42.6
Piped gas6	42.1	39.8	2.8	12.0	13.0		6.5	6.0
LPG	4.2	4.6		1.4	1.4		.9	.9
central (district) heating			30.6	1.9	1.9			
central hot water			.5	19.0	19.9		19.9	19.9
Wood	10.2	5.1	3.7	12.0	5.1		7.4	1.9
cow dung			2.8	1.4	1.9		1.9	1.9
Coal	.5	5.1	20.8	.5	7.9		.5	5.6
Candles						0.9	.5	
Total	92.6	91.7	81.9	87.0	89.8	89.4	82.9	79.6

Table 26 presents the same information, but for those respondents falling into the poorest quartile based on per capita household expenditure:

- less people using electricity for **cooking** in favour of wood and coal, and piped gas.
- A greater reliance on wood for **space heating**, and less on electricity
- In contrast, more of the poor tend to use electricity for **water heating** and less use central heating services.

[6] used exclusively in urban communities

Table 26 Main choice of fuel (lowest quartile per capita household expenditure N=27)

Percentages	Cooking		Space heating	Water heating		lighting	Clothes washing	
	summer	winter		summer	winter	summer	summer	winter
Elec	22.2	25.9	11.1	48.1	40.7	85.2	48.1	51.9
Piped gas	48.1	48.1		14.8	18.5		7.4	7.4
LPG	3.7	3.7						
central (district) heating			37.0					
central hot water				11.1	14.8		14.8	11.1
Wood	18.5		11.1	11.1	7.4		7.4	3.7
cow dung								
Coal Candles		14.8	22.2		3.7			3.7
Total	92.6	92.6	81.5	85.2	85.2	85.2	77.8	77.8

When looking at choice of backup fuels for cooking:

- Gas users tend to use electricity as a backup
- Electricity users tend to use coal and LPG as a backup
- Wood users use coal as a backup; coal users use wood as a backup;

Table 27 Secondary fuels for cooking, by main fuel (winter)

Frequency	***main cooking fuel - winter***			
	elec	piped gas	wood	coal
Elec	0	65	1	3
Piped gas	9	0	1	0
LPG	20	2	0	0
Wood	6	1	0	5
cow dung	3	0	1	0
Coal	30	1	7	0

When looking at choice of backup fuels for space heating:

- District heating users use electricity as backup
- Electricity users use coal and gas for backup
- Coal users use electricity as a backup.

Table 28 Secondary fuels for space heating, by main fuel

Frequency	main cooking fuel - winter					
	elec	piped gas	District heating	wood	dung	coal
Elec	0	2	47	2	3	19
Piped gas	7	0	1	0	0	2
Wood	3	0	0	0	2	10
Coal	16	1	0	6	0	0

This indicates that piped services are preferred – both gas for cooking and district heating for space heating. Users then rely on electric appliances for backup. However, these are specifically urban services; elsewhere people use electricity for cooking using coal as a backup; electricity and coal are used as both main and backup for space heating.

Table 29 indicates those social groupings amongst which there are significant differences in the choices of main fuels; these differences are then expanded in the following tables which present frequencies of respondents using the principal fuels. Not surprisingly, characteristics of clothes washing closely follows that of water heating.

Table 29 Significant differences in main fuel choices amongst groupings

	Groups	main cooking fuel - winter	main space heating fuel	main water heating fuel - WINTER	main clothes washing fuel - WINTER
education	<tertiary: tertiary (MW sig.)	**0.004**		**.0452**	
Rental status	Rented: owned (MW sig.)	**.044**			
Material position	Prob paying bills: able to pay (MW sig.)			**.004**	**.005**
Per capita income	Lowest:low:medium:high (KW sig.)		**0.000**		
Adult units per h/hold	Low:medium:high (KW sig.)	**.009**	**.001**	**.006**	**.024**
Total h/hold exp	Lowest:low:medium:high (KW sig.)		.005		
% exp on energy	Low:medium:high (KW sig.)		**.002**		

- MW Sig = p values resulting from the Mann Whitney U Test
- KW Sig = p values resulting from the Kruskal Wallis H Test
- differences significant where p>0.05.

Table 30 Significant differences in main cooking fuels (winter) by groupings (principal fuels only)

Frequency	Education		Rental status		Adult units per household		
	below tertiary	tertiary and above	rented	owned / mortgaged	Low (<=2.5)	medium (3.0 - 3.5)	high (>3.5)
Elec	46	33	13	63	27	36	16
Piped gas	26	60	3	81	29	30	27
District heating							
District hot water							
Wood	3	8	1	10	2	3	6
Coal	5	6	1	10	1	5	5
Total (for all fuels)	85	113	19	174	61	77	60

Households renting, and with lower levels of education tend to use electricity for cooking, whilst the more advantaged groups tend to use gas. Use of solid fuels increases with the number of people in a household, and is only really evident amongst owned properties; this may reflect the fact that traditional stove designs are not suited to small houses, and electricity requires less investment in appliances for temporary rented accommodation.

Table 31 Significant differences in main space heating fuels (winter) by groupings (principal fuels only)

Frequency	Per capita income				Adult units per household			% h/hold expenditure on energy		
	lowest (<10,400)	low (10,400 - 15,000)	medium (15,001 - 24,000)	high (>24,000)	Low (<=2.5)	medium (3.0 - 3.5)	high (>3.5)	Low (<7.16)	Medium (7.17 - 11.55)	High (>11.55)
Elec	10	4	14	15	21	20	3	11	10	6
Piped gas	0	0	3	2	4	0	2	2	0	1
District heating	7	15	25	19	21	22	23	17	14	12
District hot water										
Wood	5	2	0	1	2	2	4	1	0	6
Coal	22	13	8	2	8	21	16	2	8	13
Total (for all fuels)	48	36	52	39	57	69	51	33	32	39

There is greater use of solid fuels (predominantly coal) amongst the poor and a preference for electricity amongst the better off. The same trend can be seen in the household size, with greater use of solid fuels amongst larger households, and a preference for electricity amongst smaller households (as suggested above, stoves

may be unsuited to small house design). Again, there is a greater reliance on solid fuels amongst households allocating a high proportion of their expenditure on energy, and a preference for electricity amongst those spending a low proportion on energy (note that proportion of expenditure on energy is a relatively weak indicator of wealth as it correlates with per capita expenditure but not with per capita income – see Table 16).

Table 32 Significant differences in main water heating fuels (winter) by groupings (principal fuels only)

Frequency	Education		Material position		Adult units per household		
	below tertiary	tertiary and above	Problems paying bills	Able to pay bills	low (<=2.5)	medium (3.0 - 3.5)	high (>3.5)
Elec	41	40	47	33	30	35	16
Piped gas	10	18	16	12	13	9	6
District heating							
District hot water	14	29	34	9	9	16	18
Wood	3	8	6	5	3	5	3
Coal	10	7	15	2	2	6	9
Total (for all fuels)	85	109	130	63	60	76	58

Table 32 indicates that a greater proportion of those households with higher levels of education use district hot water, with others tending to use electricity and solid fuels in its place; however, this is more likely to reflect availability than choice. This may also be true of those expressing problems with paying utility bills; nevertheless, it is clear that those households in a better position tend to use high cost fuels (electricity and gas) whilst poor households use coal. Small houses tend to use electricity and gas, whilst district hot water is more common in larger houses.

5.2 Energy costs

Then mean annual household expenditure on energy is 4680 som ($110 approx.) amongst those households giving energy cost data (N = 184). Table 33 presents the annual expenditure on each type of fuel (irrespective of whether fuels are used as main or backup fuels), and shows that costs of district heating and LPG are highest.

Table 33 Annual expenditure on each fuel

Fuel	N	Mean annual expenditure (som)	Median annual expenditure (som)
Electricity	178	1413.15	1132.50
Piped gas	83	1619.10	1030.00
District heating	51	2706.92	2000.00
District hot water	32	1705.34	1440.00
Oil	0		
Kerosene	3	220.00	200.00
Wood	50	1202.90	900.00
Dung	11	1186.64	1400.00
Coal	74	2050.70	1650.00
LPG	21	2693.59	1625.00
Total energy	184	4677.85	4000.00

Exchange rate: 42 som/$US

These figures are based on the basis of five heating months in winter, which was obtained from the IPA survey data – see Table 34

Table 34 Heating season (months)

Fuel	N	Mean	Median
Bishkek	238	5.03	5
Issyk-Kul	276	5.63	6
Jalalabad	387	4.23	4
Naryn	295	6.73	7
Batken	300	4.87	5
Osh	490	4.81	5
Talas	292	5.74	6
Chui	356	4.79	5
Total	2634	5.15	5

From IPA household Energy Survey 2002 data set – DFID Tariff policy and utility reform project.

Based on half of the sample which gave adequate information (N = 126),
The mean percentage of household expenditure on energy is 11.4% (median = 9.6%), but Figure 2 shows that there are many households paying more than this. (12.5% of households spend more than 21%).

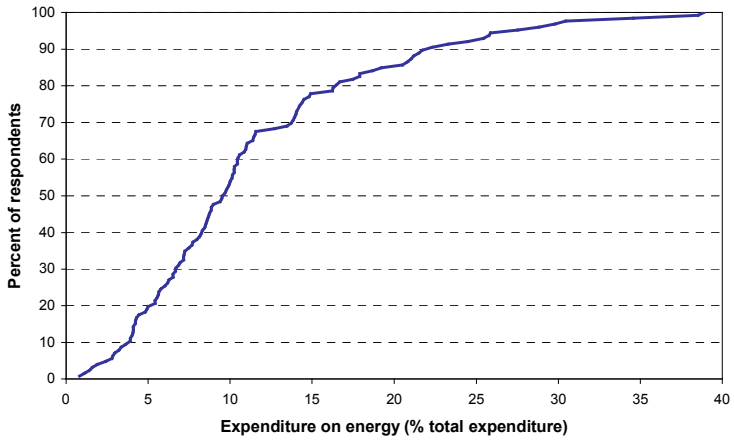

Figure 2 Cumulative distribution of percentage household expenditure on energy (N = 126)

There is remarkably little difference in absolute expenditure on fuels amongst various groupings, as shown in Table 35. Notable exceptions are:

- Higher expenditure on wood an dung amongst larger households;
- Expenditure on wood is lower in rented households;
- Poor households tend not to use district heating;
- Expenditure on coal tends to increase as a greater proportion of household expenditure is spent on energy (i.e. amongst poorer households)

Of more interest is the fact that total household expenditure on energy appears to be only weakly linked to poverty - absolute expenditure increases with total household expenditure, but not with per capita income – a strong indicator of poverty; it is also linked to household size (larger households spend more). Households spending a larger proportion of their total expenditure on energy are actually spending more on energy. Proportion of expenditure spent on energy is also weakly linked to poverty – the percentage tends to be larger amongst poor households, but the indicator does not correlate with the main poverty indicators (Table 16).

Table 35 Significant differences in expenditure on fuels amongst groupings

	Groups											
		Elec	gas	DH	DHW	Kerosene	Wood	Dung	Coal	LPG	Total	% exp on energy
education	<tertiary: tertiary (MW sig.)											
Rental status	Rented: owned (MW sig.)						**.009**					
Material position	Prob paying bills: able to pay (MW sig.)											
Per capita h/hold income	Lowest:low:medium:high (KW sig.)				**.010**							
Adult units per h/hold	Low:medium:high (KW sig.)				**.010**						**.004**	
Total h/hold exp	Lowest:low:medium:high (KW sig.)			**.023**							**.010**	**.000**
% exp on energy	Low:medium:high (KW sig.)			**.018**	**.010**				**.022**		**.000**	

- MW Sig = p values resulting from the Mann Whitney U Test
- KW Sig = p values resulting from the Kruskal Wallis H Test
- differences significant where p>0.05.

5.3 Categories of housing by types of energy

It was proposed that dwellings can be categorised according to the types of fuel used for primary activities. The following typology has been proposed, and covers 65% of the sample.

Table 36 Housing categories by types of fuel

	Type of dwelling	***Cooking fuel***	***Heating fuel***	***Frequency***	***Percent (of total sample)***
1	flats	gas	district heating	55	25.5
2	flats	electric	district heating	9	4.2
3	houses	gas	gas	4	1.9
4	houses	electric	electric	14	6.5
5	houses	electric	solid fuel	20	9.3
6	houses	solid fuel	solid fuel	15	6.9
7	temporary dwellings	electric	electric / solid fuel	23	10.6
	Total			140	64.8

There are significant differences between the poverty conditions of these groups, as shown in Table 37 (KW p = 0.000).

Table 37 Annual per capita income for categories of housing

	Mean (som/year)	N	Adult units
houses - wood cooking, solid fuel heating	7732	15	4.1
houses - electric cooking, solid fuel heating	11493	20	3.4
temporary dwellings	13556	22	2.9
houses - electric cooking, electric heating	17394	14	3.0
flats - gas cooking, district heating	21127	55	3.3
flats - electric cooking, district heating	22781	9	3.0
houses - gas cooking, gas heating	26200	3	1.8
Total	16907	138	

Table 38 Mean annual expenditure on fuels by categories of housing

	Expenditure on energy (som/year)					
	electricity	piped gas	district heating	wood	coal	LPG
houses – wood cooking, solid fuel heating	1067	850			1338	2069
houses - electric cooking, solid fuel heating	1822				1050	2344
temporary dwellings	1094				832	1547
houses - electric cooking, electric heating	2280	2850			550	1289
flats - gas cooking, district heating	1187	1093	2290			
flats - electric cooking, district heating	1593	665	5464			
houses - gas cooking, gas heating	1023	8825				800

Table 38 presents the mean amounts spent on each fuel *by those households using each fuel* (e.g. houses – wood cooking, solid fuel heating; 1067 som/year is the mean expenditure of the 14 households paying for electricity, but there is only one household using piped gas and they pay 850 som/year).

Households in temporary dwellings tend not to have accumulated commonly held 'luxury' electrical appliances e.g. ownership of music equipment, fridges, washing machines is low, but on the other hand ownership of 'essential' electricity equipment such as electric hobs, home made heaters, electric irons, and electric kettles is high. The low expenditure on other fuels confirms that electricity is the primary energy source. The low expenditure on electricity reflects the illegal nature of connections and low payment rates. This group will, therefore, be affected by enforcement of payment.

The more wealthy groups are less dependent on electricity (preferring to use gas), and the poorest are not so dependent on electricity (forced to use solid fuels), but it is the middle to low income groups which tend to use electricity and which will be most severely affected by electricity price increases.

Under the tariff structure prevailing at the time of the survey (up to 150 kWh/month at 0.43 som/kWh, additional units at 0.80 som/kWh) the poorest category of houses is using an average of around 180 kWh/month; note that the average consumption is

likely to be less than this in practice, as households are likely to use more premium cost units in winter, and may not even use the entire tier 1 allowance in summer.

5.4 Cost of electricity with / without meters

Of the total sample, 92% (198) claimed to receive metered bills, but only 164 gave a response to the amount they pay. Amongst those who pay, the mean annual cost is 1400 som. Amongst the 11 receiving nominal bills, 9 are paying, and the mean cost is 1412 som/year, indicating that the nominal bills closely match actual consumptions so there is no cost benefit or penalty associated with receiving nominal bills.

6 Changes to date

6.1 Changes in choice of fuels

18.5% of the sample claim to have changed their main cooking fuel in the last 5 years; Table 39 and Table 40 indicate that the shift is towards electricity, and away from wood and gas.

Table 39 Changes in Main cooking fuel – summer (frequency)

Main fuel	Changed from					
	elec	piped gas	LPG	wood	coal	Total
Elec		5	2	7	1	15
Piped gas	2		0	0	0	2
LPG	0	1		1	0	2
Wood	0	0	0		1	1
Coal	0	0	0	0		0
Total	2	6	2	8	2	20

Table 40 Changes in Main cooking fuel – winter (frequency)

Main fuel	Changed from					
	elec	piped gas	LPG	wood	coal	Total
Elec		5	2	8	2	17
Piped gas	0		0	0	0	0
LPG	0	0		1	0	1
Wood	0	0	0		0	0
Coal	2	0	0	0		2
Total	2	5	2	9	2	20

16% of the sample claim to have changed their heating fuel in the last 5 years. Although Table 41 appears to shows a shift to coal and electricity, note that an equal number of people have changed from coal to electricity as have changed from electricity to coal. Other changes are from district heating to electricity, and from piped gas to coal, but the numbers of responses are too small to be conclusive.

Table 41 Changes in Main space heating fuel (frequency)

Main fuel	Changed from					
	elec	piped gas	central (district) heating	wood	coal	Total
Elec		0	3	0	5	8
Piped gas	0		0	0	0	0
central (district) heating	1	0		0	0	1
Cow dung	1	1	0		1	3
Coal	5	3	1	1		10
Total	7	4	4	1	6	22

Any tendencies for members of vulnerable groups to change fuels are not significant, with the exception of those in rented properties who are more likely to have changed heating fuels (MW p = 0.047).

6.2 Reasons for changing fuels

Table 42 shows that economic considerations are clearly most influential in driving fuel switching. However, access is of similar importance for heating fuels – bear in mind that there are shifts from electricity to coal (where cost is likely to be influential), and shifts from coal to electricity (where access and convenience are likely to be influential). The main reason given under 'Other reasons' was moving house.

Table 42: Reasons given for change of fuel for cooking and space heating

	Cooking		Space heating	
	Frequency	Percent	Frequency	Percent
Less cost	20	60.6	13	40.6
less polluting			2	6.3
convenient	2	6.1	3	9.4
access	5	15.2	10	31.3
safety				
other	6	18.2	4	12.5
Total	33	100.0	32	100.0

However, when looking at the value placed on each of the characteristics of fuels Respondents were asked to indicate how important they felt each of these characteristics was (in a general context), and whilst the results confirm that cost and access are most important, there is not much difference between them. Note that pollution is clearly least influential.

Table 43: Mean and median importance attributed issues influencing fuel choice

Range 1 to 5	Accessibility	Cost	Pollution	Convenience	Safety
N	205	208	200	206	201
Mean	4.14	4.38	3.16	3.64	3.83
Median	5.00	5.00	3.00	3.50	4.00
IQR	(4 to 5)	(4 to 5)	(2 to 5)	(3 to 5)	(3 to 5)

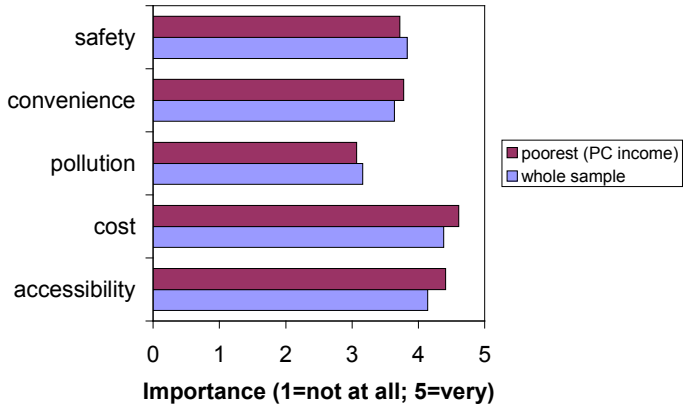

Figure 3 importance of fuel characteristics

Table 44 Significant differences in attitudes towards fuel characteristics amongst groupings

	Groups	access	cost	pollution	convenience	safety
Education	<tertiary: tertiary (MW sig.)			**.014**	**.007**	**.002**
Rental status	Rented: owned (MW sig.)					
Material position	Prob paying bills: able to pay (MW sig.)			**.045**	**.000**	
Per capita income	Lowest:low:medium:high (KW sig.)				**.043**	
Adult units per h/hold	Low:medium:high (KW sig.)					
Total h/hold exp	Lowest:low:medium:high (KW sig.)				**.028**	
% exp on energy	Low:medium:high (KW sig.)		**.003**			

- MW Sig = p values resulting from the Mann Whitney U Test
- KW Sig = p values resulting from the Kruskal Wallis H Test
- differences significant where p>0.05.

Interestingly, education appears to have most influence on attitudes towards fuels, with better educated people attaching greater importance to pollution, convenience and safety. As might be expected, households having difficulty paying utility bills (material position) are less concerned with pollution issues, and those with greater spending power attach greater importance to convenience. The value of convenience is also evident amongst households with high per capita incomes; however, it is odd that convenience is also highly rated amongst the poorest group (see Figure 3). Cost is of more importance to households which spend a greater proportion of their total household expenditure on energy.

6.3 Changes in consumption

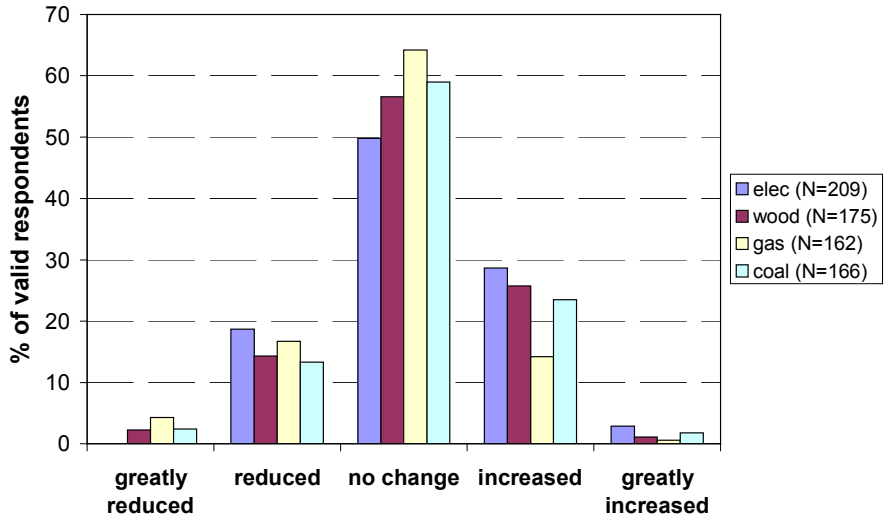

Figure 4 Perceived changes in consumptions of principal fuels (last 5 years)

Respondents were asked to make a subjective assessment of how their consumption of the principal fuels had changed over the last 5 years. The results presented in Figure 4 show that electricity consumption has been most subject to changes, with some households increasing their consumption and others reducing it. Consumption of gas (not distinguishing between piped and bottled) is most stable. Overall, consumptions of electricity, wood and coal appear to be increasing, whilst consumption of gas is decreasing slightly.

The main reasons given for these changes are summarised in Table 45

Table 45 Reasons for changes in consumption of fuels (ranked in order of frequency)

Fuel	Reasons for increase	Reasons for decrease
electricity	• installation of water heaters • increase in appliances • growing families	• Increasing tariffs • Economising • Substituting with other fuels (coal)
Wood	• Fuel substitution (savings on electricity, and power cuts) • Cheaper fuel	• Wood is expensive • Wood is not available • economising
Gas	• convenient	• Prices have increased • Expensive fuel • Economise
Coal	• Cheaper fuel (gas and electricity costs have increased) • Extending heating period • Convenient to purchase	• Expensive (for good quality coal) • Heat fewer rooms

Table 46 indicates that the poor are substituting clean fuels (electricity and gas) for solid fuels, especially coal. There appears to be an overall trend of substitution between electricity and coal – the better off are using more electricity and less coal, whilst the poorest group claim to be using less electricity and more coal.

Table 46 Changes in consumption of fuels over last 5 years by wealth groupings (means)

material position of your household (Range –2 to +2)	Electricity		wood		gas		coal	
	N	Mean	N	Mean	N	Mean	N	Mean
Difficult to provide the family with food	17	-.06	14	-.29	14	-.14	14	.21
Manage to provide food but find it difficult to pay the util	121	.02	109	.17	102	-.06	102	.15
afford required foods, clothes and manage to pay the bills	51	.41	37	.16	34	-.18	35	.06
Have all we need and made some savings	8	.63	6	-.33	5	-.40	6	-.83
Don't know what to answer	11	.36	7	-.14	6	.00	7	.14
Total	208	.15	173	.10	161	-.10	164	.10

To a certain extent this trend is also evident in changes claimed by categories of housing (see Table 47, ranked in order of increasing annual per capita income) – increase in coal use is closely linked to poverty and has increased amongst all but the wealthiest groups. It is interesting to note that the poorest category claim that their consumption of electricity has increased, presumably due to an increase in domestic appliances.

Table 47 Changes in consumption of fuels over last 5 years by housing categories (means)

Categpry of house (Range –2 to +2)	Electricity		wood		gas		coal	
	N	Mean	N	Mean	N	Mean	N	Mean
houses - wood cooking, solid fuel heating	15	0.2	15	0.6	9	0.11	13	0.69
houses - electric cooking, solid fuel heating	20	-0.05	20	0.4	20	-0.3	20	0.35
temporary dwellings	22	-0.23	23	-0.13	22	0.14	23	0.26
houses - electric cooking, electric heating	14	0.14	14	-0.07	12	0	13	0.31
flats - gas cooking, district heating	54	0.09	38	-0.13	38	-0.13	36	-0.14
flats - electric cooking, district heating	0	0	6	-0.5	6	-0.83	6	-0.83
houses - gas cooking, gas heating	4	-0.25						
Total	137	0.07	117	0.05	108	-0.11	112	0.14

6.4 Influence of changes in quality of service

There is strong correlation between the three types of problems encountered with electrical supplies i.e. households with poor quality supplies tend to suffer power cuts, voltage drop, and surges. Moreover, responses indicate (Table 48) that people feel that the quality of supplies has generally deteriorated over the last five years, most especially the temperature of the district heating water.

The correlations presented in Table 49 show the following relationships:

- Choice of main cooking fuel is influenced by the occurrence of power cuts and surges;
- Choice of space heating fuel is influenced by frequency of power cuts;
- Changes in quality of power supplies (all three indicators) correlate with changes in gas consumption, indicating that where quality of electricity supplies has increased, people have increased consumption of gas; this may reflects improvements made in areas where residents can afford to increase their use of gas.
- There is a correlation between the occurrence of problems (in the last 6 months) and changes in fuels for both cooking and heating (although interestingly only for power cuts and surges, but not for voltage drop). However, there is a correlation between frequency of voltage drop and change

in cooking fuel, emphasising the importance of voltage stability when cooking.

- The negative correlation between changes in consumption of electricity and coal indicates that one is being substituted with the other, whilst the positive correlation between changes in the consumption of wood and coal indicates that they are used together (i.e. solid fuel as an alternative to gas / electricity).

When looking at perceived changes in quality of supply issues, there is no difference between poverty related groupings (rental status, material position, or per capita income).

Table 48: Changes in quality of supply issues (over the last five years)

Change (Range –2 to +2)	N	Mean	Median	IQR
Power cuts	174	-.39	0	(-1 to 0)
Weak supply	191	-.60	-1	(-1 to 0)
Appliances fused	96	-.55	-1	(-1 to 0)
Inadequate district heating	97	-1.10	-1	(-2 to 0)

An analysis of problems reported with district heating shows that those who feel they experience problems most frequently also feel that the quality of supply has deteriorated.

Table 49 Correlations between electricity quality of supply and changes in fuel use

	power cuts occurred	frequency - power cuts	change - power cuts	supply weak occurred	frequency - supply weak	change - supply weak	appliances fused occurred	frequency - appliances fused	change - appliances fused	main cooking fuel - winter	main space heating fuel	main water heating fuel - winter	changed cooking fuel	changed heating fuel	consumption of electricity changed	consumption of wood changed	consumption of gas changed	consumption of coal changed
power cuts occurred		-0.311***		0.279***			0.553***			0.215**			0.227***	0.269***				
frequency - power cuts	-0.311***			-0.26***	0.443***		-0.282**	0.25*			0.206*							
change - power cuts						0.828***	0.399***		0.84***								0.203*	
supply weak occurred	0.279***	-0.26***			-0.328***		0.371***											
frequency - supply weak		0.443***		-0.328***									0.204**					
change - supply weak			0.828***						0.823***								0.253**	
appliances fused occurred	0.553***	-0.282**	0.399***	0.371***					0.403***	0.228**			0.297***	0.24**	-0.224**		0.222*	
frequency - appliances fused		0.25*												0.261*				
change - appliances fused			0.84***			0.823***	0.403***										0.352**	
main cooking fuel - winter	0.215**						0.228**				0.309***	0.531***						
main space heating fuel		0.206*								0.309***		0.433***			-0.2**	0.317***		0.202*
main water heating fuel - winter										0.531***	0.433***					0.276***		
changed cooking fuel	0.227***				0.204**		0.297***							0.571***				
changed heating fuel	0.269***						0.24**	0.261*					0.571***					
consumption of elec changed							-0.224**				-0.2**							-0.26***
consumption of wood changed											0.317***	0.276***						0.506***
consumption of gas changed			0.203*			0.253**	0.222*		0.352**									
consumption of coal changed											0.202*				-0.26***	0.506***		

*** Correlation is significant at the 0.001 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

6.5 Utility Payment patterns

6.5.1 Electricity

Electrification rates are high at around 99% (Table 23), and almost all households have meters (92% of sample). Only 5% claim to receive nominal bills – these are mostly 'illegal' connections. In Kyrgyzstan it is not uncommon for people to make their own illegal connection by tapping into overhead distribution cables, and then to enter into an agreement with the utility company to use the electricity – a meter can even be installed. This appears to be the case with those receiving nominal bills, as they claim to make payments to local inspectors.

Table 50 shows that most people pay electricity bills at the post office and through local inspectors, both of which are assumed to offer convenience in that they are local points of payment; it is alleged bills can be reduced (in a number of ways) by negotiating with local inspectors, who take a share of the benefit. Choice does not appear to change between poverty groupings. It was pointed out that inspectors are more interested in fixing bills in wealthy neighbourhoods, because the bills (and potential benefits) are higher i.e. negotiating with inspectors is not a feature of low income communities.

Table 50: Points of payment of electricity bills

Point of payment	Frequency	Percent
company	26	12.0
local inspector	48	22.2
occasional seller	1	.5
post office	76	35.2
government department	8	3.7
Total	159	73.6

Only 59% of the sample claim to be able to pay their bills in full, and a large number of households (one third) take advantage of flexible payment systems whereby they can make only part payment of bills. Rented households have significantly lower ability to pay, as do households with a lower perceived material position.

Table 51: Ability to pay electricity bills

Point of payment	Frequency	Percent
unable to pay	10	4.6
Make part payment - arranged with local inspector	47	21.8
Pay in instalments	25	11.6
Pay in full	127	58.8
Total	209	96.8

It is interesting to note that 64% of the sample claim to be unable to pay their bill in full at some time or other, indicating the value of flexible payment systems (see Table 52).

Table 52: Frequency of payment problems, and ability to pay electricity bills

Frequently unable to pay bills	payment of electricity bills				Total
	unable to pay	part payment - local inspector	Pay in instalments	Pay in full	
never	4	11	3	53	71
rarely	1	11	7	46	65
occasionally	0	18	6	16	40
often	2	5	3	0	10
continually	0	1	3	4	8
Total	7	46	22	119	194

Similarly, almost half of respondents indicated that they had experienced disconnection, with 5% claiming they were disconnected most months. The frequency of disconnection is linked to ability to pay electricity bills (KW p = 0.000) indicating that disconnection does not appear to be used simply as a means of persuading people to pay their bills, in which case frequency of disconnection would have been similar across all ability to pay groups.

Non payment of bills is given as the reason for disconnection amongst only half of those who gave a reason. A substantial proportion of respondents (15%) claim that disconnection was due to non-payment by neighbours, which has important implications for social networks.

Table 53: Reason for disconnection (electricity)

Reason	Frequency	Percent valid
We have not paid bills	51	43.6
Neighbours don't pay	17	14.5
Technical problems	43	36.8
Illegal connection was cut	4	3.4
other	2	1.7
Total	117	100.0

Respondents were asked how the frequency of disconnections had changed over the last five years, and although it appear that improvements in disconnection situation are closely related to poverty, such that things have improved amongst households with a high material position, and those with high per capita expenditure, this is not statistically significant. Nevertheless, it interesting to note that the most vulnerable group is the only one to register no change i.e. reforms have not yet resulted in an increase in disconnections due to non payment, or a decrease in disconnections due to improved network.

6.5.2 Gas and District Heating

Based on responses to use of fuels for principal activities, 50% of households use piped gas, 32% use district heating, and 16% use LPG (actual figures are likely to be higher as a small number of respondents did not indicate fuel choices).

Table 54 and Table 55 show that post offices are clearly the preferred point of payment for other utility bills.

Table 54: Points of payment of piped gas bills

Point of payment	Frequency	Percent
Company	17	7.9
local inspector	7	3.2
post office	38	17.6
government department	3	1.4
Total	65	30.1

Table 55: Points of payment of district heating bills

Point of payment	Frequency	Percent
Company	6	2.8
local inspector	1	.5
post office	38	17.6
government department	1	.5
Total	46	21.4

Although respondents were not asked for detail of payment of other utility bills, only 4 respondents claimed to have outstanding gas debts, indicating that non-payment is not a major problem (4% of gas users). However, 15 people (21% of district heating users) claimed to have outstanding heating debts. These figures compare with a figure of around 17% of the sample claiming to be in debt on electricity bills at the time of the survey. Note that both gas and district heating tend to be used by better off households (see Table 37).

6.6 Quality of life indicators

A number of questions were asked regarding observed changes in the living conditions of their respective neighbourhoods. These involved housing, health (child), employment, water and sanitation, education (schooling), communications, security, food and entertainment. An index of perceived neighbourhood improvement, was developed by taking the mean of the responses to the nine above indicators, each measured on a 5 point bi polar scale presented in Table 56. (This scale of nine indicators was found to have an Alpha coefficient [7]of 0.86). The neighbourhood index is compared with a more general measure of perceived improvement in living conditions over the same period. These two measures correlate closely ($p = 0.000$) although the general measure is consistently higher than the calculated index, which is not weighted.

Responses to a question on living conditions in general indicates that the general feeling is that things have improved slightly (mean = 0.16), although 47% of the sample feel there has been no change.

Those groupings where differences are evident in people's perception of changes in society are presented in Table 56. The most striking feature is that the poor feel that conditions have got worse, whilst the better off feel that things have improved, particularly in the areas of employment and housing conditions (Material position, and Per capita income). However, it is interesting to note that the view of the poorest

[7] Cronbach's Alpha coefficient is a measure of a scale's reliability. A coefficient of >0.6 normally indicates reliability.

group is consistently more optimistic than the 'low' per capita income group, indicating that the affect on the very poorest appears to have been mitigated to a certain extent.

Table 56: Neighbourhood quality of life indicators comparing tenure status and size of dwelling

	All	Education			Material position			Per capita income					Proportion of expenditure on Energy				
		below tertiary	tertiary and above		Probs paying bills	Able to pay		lowest (<10,400)	low (10,400 - 15,000)	medium (15,001 - 24,000)	high (>24,000)		Lowest (<= 5.01)	Low (5.02 - 9.80)	Medium (9.81 - 16.13)	High (>16.14)	
n		90	124		140	73		56	42	61	42		41	44	44	45	
Range (-2 to +2)	Mean	Mean	Mean	**MW Sig**	Mean	Mean	**MW Sig**	Mean	Mean	Mean	Mean	**KW Sig**	Mean	Mean	Mean	Mean	**KW Sig**
housing	0.1	-0.07	0.23	**0.014**	-0.04	0.37	**0.001**	0.1	-0.24	0.23	0.25	**0.028**	0.37	0.11	0.04	0	
child health	0.09	0.01	0.16		-0.02	0.31	**0.002**	0.09	-0.14	0.27	0.12		0.36	0.07	0.02	0.02	
Employment	-0.27	-0.47	-0.13	**0.016**	-0.56	0.26	**0**	-0.29	-0.67	-0.23	0.05	**0.018**	0.27	-0.29	-0.54	-0.53	**0.002**
water / sanitation	-0.01	-0.03	0		-0.04	0.04		-0.03	-0.11	0.02	0		0.18	-0.07	0	-0.16	
Education	-0.15	-0.23	-0.1		-0.29	0.1	**0.004**	-0.07	-0.3	-0.2	-0.14		-0.02	-0.09	-0.17	-0.27	
Communications	0.06	-0.09	0.17	**0.014**	0.01	0.15		0.02	0	0.06	0.13		0.15	0	0.09	-0.11	
security	-0.55	-0.62	-0.5		-0.66	-0.34	**0.031**	-0.39	-0.6	-0.64	-0.64		-0.36	-0.64	-0.41	-0.62	
food	0.14	0.09	0.17		0	0.4	**0.002**	0.02	-0.02	0.16	0.38		0.61	0.18	-0.13	0.11	**0**
Entertainment	-0.27	-0.44	-0.14	**0.02**	-0.53	0.2	**0**	-0.1	-0.73	-0.25	-0.13	**0.003**	0.15	-0.45	-0.48	-0.24	**0.012**
Mean index	-0.13	-0.2313	-0.0512	**0.032**	-0.2612	0.138	**0**	-0.09	-0.34	-0.09	-0.02		0.1599	-0.1439	-0.1944	-0.2	**0.019**
General living conditions	0.16	0.05	0.24		0.07	0.33	**0.014**	0.1	-0.16	0.2	0.48	**0.001**	0.51	0.16	-0.11	0.07	**0.008**

- MW Sig = p values resulting from the Mann Whitney U Test
- KW Sig = p values resulting from the Kruskal Wallis H Test
- differences significant where p>0.05.

There does appear to be a link between a change in main heating fuel and quality of life indicators (see Table 57). However, the link may be considered counterintuitive – those who have changed fuel feel that conditions are getting worse (mean index = -0.44), whilst those who have not changed have a more positive view (mean index = -0.06).

Correlations with changes in electricity consumption reflect the increase in demand created by appliances (likely to be TV and video), which will in turn be linked to employment prospects.

Table 57: Correlation coefficients: changes in fuels and Neighbourhood quality of life indicators

Changes in conditions	Changed main fuel		Changes in fuel consumption (over 5 years)			
	cooking	heating	electricity	wood	gas	coal
housing		0.217**				
child health						
Employment			0.266***			
water / sanitation		0.255***				
Education						
Communications		0.214**				
security				0.22**		
food		0.224***				
Entertainment			0.21**			
Mean index		0.229***				
General living conditions		0.265***				

7 Perceived Impact of Tariff Reforms

7.1 Awareness of Tariff reform process

Only 59% of respondents claim to have any knowledge of the electricity reform processes, but all have given their opinions on likely changes in fuel prices and enforcement of bill payment (see Table 58). This indicates that people are aware of imminent changes in the electricity industry (price increases and enforcement of payment). 13% of the sample do not agree that households should pay for their consumption (this does not seem to be a poverty specific characteristic), so there is likely to be some resistance to paying bills. This distribution of opinion is more or less consistent across poverty groupings.

Table 58: Likely changes in energy markets during the next 5 years

Percent sample	Electricity Price increase	Coal price increase	District heating price increase	Gas price increase	Enforcement %
Very unlikely	.9	.5		.5	
unlikely	.9	.9	.5	.9	1.4
no opinion	25.9	26.9	33.3	24.5	15.7
likely	40.3	49.5	37.5	45.8	47.7
very likely	31.9	21.8	25.5	25.0	33.3
Mean (range –2 to +2)	1.01	.92	.91	.97	1.15

Television is clearly the most effective means of informing people of reform processes.

Table 59: Sources of information on electricity reforms

	Frequency	Percent
press	44	20.4
TV	89	41.2
radio	11	5.1
friends and family	16	7.4
not interested	23	10.6
Total	183	84.7

Respondents were asked which of the possible changes in energy markets would have most impact on their household, and rank the three highest priority issues. As can be observed in Table 60, the prospect of electricity price increases will have the greatest impact followed by enforcement of payment, and it is assumed that in this context people are concerned that the utility will require complete payment, and people will loose current flexible payment options. It is somewhat surprising to note that there are no significant differences in expected impact of changes between groupings.

Table 60: Impact of price increases and enforcement

% sample Ranking	Electricity	Coal	District Heating	Piped gas	Enforcement (electricity)
First	70.8	6.5	16.2	2.8	8.8
second	22.7	37.0	21.8	4.6	10.6
third	3.7	11.6	3.7	23.1	46.8
% response	97.2	55.1	41.7	30.5	66.2

Opinions on likelihood of changes and the perceived impact of changes can be combined to create a measure of attitude towards changes. This measure shows that overall, people believe prices will only go up, and that electricity price increases are perceived as the most important threat. The potential impact of electricity price increases is most keenly felt amongst those in the 'low' per capita income group (mean = 3.04), but less so amongst the poorest (see Table 61) – this reflects the reduced reliance on electricity amongst the poorest. Conversely, they are more concerned about increases in solid fuel prices (coal). This group is also more concerned about enforcement of payment, reflecting lower rates of payment (especially in informal settlements).

Table 61: Mean attitudes towards changes in energy industry

Range –6 to +6	Electricity	Coal	District Heating	Piped gas	Enforcement (electricity)
Whole sample	2.69	1.01	1.21	.56	.95
Material position – difficult to provide food	2.71	1.18	.76	.18	1.00
Per capita h/hold expenditure = lowest	2.22	1.39	.58	.25	1.09

8 Future Coping Strategies

8.1 Overall

When asked how people would respond to an increase in the cost of energy, reduction in use is clearly the favoured response. When rankings are weighted, the figures indicate that changing fuels is a marginally more popular strategy than paying more (see Table 62).

shows the proportion of the total sample that ranked each strategy as their first, second and third choice, and it presents the mean of weighted scores as an overall index.

Table 62: Ranking of proposed coping strategies

Range (0 to 3)	N	Pay more	Change fuel	Reduce use
Weighted mean		1.59	1.64	2.40
Material position – difficult to provide food	17	2.59	1.65	1.47
Per capita h/hold income = lowest	28	2.25	1.96	1.29

Weighted scores – 1st ranking = 3, 2nd = 2; 3rd = 1; not ranked = 0.

There are some differences between social groupings (see Table 63):

- Those who have problems paying utility bills are less likely to elect to pay more and are more likely to reduce their consumption;
- It is only those in the highest per capita household expenditure group who are willing to pay more, and least likely to change fuels or reduce consumption;

Table 63 Significant differences in coping strategies amongst groupings (weighted responses)

	Groups	Pay more	Change fuel	Reduce use
Education	<tertiary: tertiary (MW sig.)			
Rental status	Rented: owned (MW sig.)			
Material position	Prob paying bills: able to pay (MW sig.)	**.000**		**.000**
Per capita h/hold expenditure	Lowest:low:medium:high (KW sig.)	**.021**	**.012**	**.006**
Adult units per h/hold	Low:medium:high (KW sig.)			
Total h/hold exp	Lowest:low:medium:high (KW sig.)	**.015**	**.033**	
% exp on energy	Low:medium:high (KW sig.)			

- MW Sig = p values resulting from the Mann Whitney U Test
- KW Sig = p values resulting from the Kruskal Wallis H Test
- differences significant where p>0.05.

However, when looking at the poorest groups in these sensitive categories, quite a different set of priorities are evident – see Table 62. This indicates that the poorest feel they have little scope for energy saving, and they will have to pay more. Bear in mind that people's experience of payment includes considerable flexibility - though non-payment, negotiating with inspectors, or stealing.

8.2 Pay more – savings in household expenditure

Travel and housing are the items of household expenditure where cost savings are most likely to be made (see Table 64 which presents the percentage of the sample who have ranked each option as their first, second or third choice, and the mean of weighted scores as an overall index); within this context, travel most likely includes holiday travel, mostly to villages.

Table 64: Areas where savings would be made in the household budget

% sample	Housing	Food	Travel	Debt payment	Education	Clothing	Telephone	Medical
First	40.7	3.7	39.8	3.7	2.8	15.3	4.2	1.9
second	22.2	4.2	31.5	6.5	6.5	17.6	7.4	3.2
third	17.6	5.1	13.4	14.8	6.0	29.2	6.9	5.1
% response	80.6	13.0	84.7	25.0	15.3	62.0	18.5	10.2
Weighted means (range 0 to 3)								
Whole sample (N=216)	1.84	.25	1.96	.39	.27	1.10	.34	.17
Material position – difficult to provide food (N=17)	1.59	.18	2.00	.24	.00	1.18	.35	.35
Per capita h/hold expenditure = lowest (N=28)	2.04	.21	1.86	.14	.07	1.07	.29	.07

Weighted scores – 1st ranking = 3, 2nd = 2; 3rd = 1; not ranked = 0.

It is somewhat surprising that there are few significant differences between those who indicated that paying more (and making costs savings elsewhere) would be their primary response, and all others in the sample (see Table 65). Those intending to make savings are more inclined to make savings in debt payments and in telephone costs.

Amongst those not able to pay utility bills, they would be less inclined to make savings in food costs, and more inclined to make savings in travel and telephone costs. Areas where the poor (per capita income) would make savings are roughly the same as for the sample as a whole.

Table 65 Significant differences in items for making savings amongst groupings

	Groups	Housing	Food	Travel	Debt payment	Education	Clothing	Telephone	Medical
Education	<tertiary: tertiary (MW sig.)				**0.048**				
Rental status	Rented: owned (MW sig.)								
Material position	Prob paying bills: able to pay (MW sig.)		**0.009**	**0.02**				**0.049**	
Per capita income	Lowest:low:medium:high (KW sig.)								
Adult units per h/hold	Low:medium:high (KW sig.)						**0.019**		
Total h/hold exp	Lowest:low:medium:high (KW sig.)								
% exp on energy	Low:medium:high (KW sig.)	**0.024**	**0.02**						
coping	Pay more as 1st: others				**0.008**			**0.002**	

- MW Sig = p values resulting from the Mann Whitney U Test
- KW Sig = p values resulting from the Kruskal Wallis H Test
- differences significant where p>0.05.

8.3 Reduce energy consumption

Domestic appliances and lighting are the electrical services where energy savings are most likely to be made (see Table 66). There appear to be few significant differences in response across various groupings.

Table 66: Areas where energy savings would be made

(range 0 to 3)	N	lighting	cooking	Space heating	Hot water	entertainment	appliances	business
Weighted mean	216	1.49	0.45	0.86	0.66	0.96	1.46	0.14
Material position – difficult to provide food	17	2	0.59	0.88	0.59	0.82	1.18	0.12
Per capita h/hold expenditure = lowest	59	1.59	0.46	1	0.42	0.64	1.39	0.17

8.4 Fuel substitution

Respondents were asked to rank their top three choices of fuels they would prefer to use for cooking and heating if the cost of their current fuel were to increase. Potential changes in cooking fuels are given in Table 67, which presents the means of weighted scores from this ranking:

- A large number of electricity users responded that they would use electricity, implying that they would still be prepared to use electricity even if the prices go up; others would switch to wood;
- Pipe gas and LPG users would switch to electricity;
- Wood users would continue to use wood others would switch to dung;
- Coal users would switch to wood.

Table 67 Preferred alternative cooking fuels (mean weighted scores)

Main fuel (winter)	N	Preferred change to (range 0 to 3)					
		elec	piped gas	LPG	Wood	dung	coal
Electricity	79	1.58	.44	1.15	1.27	.19	.94
Piped gas	86	2.45	.84	1.36	.23	.01	.10
LPG	10	2.20	.30	1.50	.90	.30	.70
Wood	11	.64	.00	.18	2.36	1.55	1.18
Coal	11	.64	.55	.36	2.36	.45	.82
Total	198	1.89	.60	1.16	.91	.21	.57

Weighted scores – 1st ranking = 3, 2nd = 2; 3rd = 1; not ranked = 0.

When it is considered that poor households tend to use piped gas, electricity and solid fuels (Table 26), it emphasises the impact that electricity price rises will have on the poor, as they will tend to continue using electricity. Investigation of poverty groups shows trends similar to those in Table 67

Potential changes in heating fuels are presented in Table 68:

- Electricity users will continue to use electricity, and will change to coal and wood;
- District heating users will switch to electricity;
- Coal users will switch to electricity and wood (and continue to use coal).

Table 68 Preferred alternative heating fuels (mean weighted scores)

Main fuel	N	Preferred change to (range 0 to 3)						
		elec	piped gas	LPG	District heating	Wood	dung	coal
Electricity	44	1.48	.73	.18	.34	1.23	.25	1.45
Piped gas	6	2.00	.50	.50	.00	.67	.00	1.50
District heating	66	2.73	.80	.21	.32	.02	.05	.02
Wood	8	.38	.00	.00	.00	2.13	.88	1.38
Dung	6	1.33	.00	.00	.00	1.83	.67	.33
Coal	45	1.73	.20	.09	.00	1.67	.47	1.58
Total	177	1.99	.55	.16	.20	.92	.26	.90

8.5 Intentions

During the preliminary surveys, a number of statements were given regarding possible responses to increasing energy costs. These were used in the questionnaire as intention statements, and can be categorised according to the proposed coping strategies i.e. pay more (P), change fuels (C), and reduce consumption (R). Some of the statements given refer to making informal arrangements (I) to secure power, which was not included as a proposed coping strategy on the basis that this is exactly what the utilities will be taking measures to prohibit; nevertheless, this is evidently regarded as a coping strategy and must be included in the analysis.

Table 69: Outcome beliefs regarding impact of electricity price increase ranked by strength

Category	Statement	Mean	Median (range –2 to +2)	IQR
I	some people will use beetles[8]	0.65	1	(0 to 2)
I	make an arrangement with the inspector to cover our debt	0.07	0	(-1 to 1)
R	will heat fewer rooms	0.04	0	(-1 to 1)
P	will borrow money	0	0	(-1 to 1)
R	reduce the number of hours that we heat the house	-0.03	0	(-1 to 1)
R	will STOP (continue) using hot water	-0.12	0	(-1 to 1)
P	find extra work to pay the extra money	-0.13	0	(-1 to 1)
C	will cook outside (using wood)	-0.23	0	(-1 to 1)
R	we will STOP (continue) using the fridge	-0.26	-1	(-1 to 1)
P	will buy food on credit	-0.38	0	(-1 to 0)
C	use kerosene lamps for lighting	-0.49	-1	(-2 to 1)
C	will cut woods by ourselves	-0.52	-1	(-2 to 1)
P	close family will help with paying bills	-0.62	-1	(-1 to 0)
R	move to a new house to escape from debts	-0.62	-1	(-2 to 0)
R	eat more food that does not need to be cooked	-0.73	-1	(-2 to 0)
I	will arrange to take electricity from a neighbour's supply	-0.74	-1	(-2 to 0)
C	use candles for lighting	-0.75	-1	(-2 to 0)
R	will stop watching TV	-0.93	-1	(-2 to 0)
R	send our children to live with relatives	-1.13	-1	(-2 to –1)
R	whole family will move into a relative's house	-1.18	-1	(-2 to –1)

These outcome beliefs are ranked in Table 69 and show that people are generally reluctant to take most of the actions represented in the statements (negative response indicates disagreement with statement).

[8] Device used to steal electricity by bypassing meter

Note that means for all options for the sample as a whole are negative (see Table 71), indicating that there is resistance to any change. The least negative option is to make informal arrangements, indicating that people's preference will be to try to avoid paying extra before actually paying more, which appears to be the next least negative option; this contradicts responses presented in Table 62, in which people claim their preferred option will be to reduce consumption.

Significant differences in responses are noted between those able to pay utility bills and those not (see Table 70), such that the better off exhibit a stronger resistance to change fuels and to reduce consumption. Resistance to change fuels is highest amongst the highest per capita income group, but is also high amongst the poorest, indicating they feel they are currently using lowest cost fuels.

Table 70 Significant differences in calculated coping strategies - amongst groupings

	Groups	Pay more	Change fuel	Reduce consumption	Informal
Education	<tertiary: tertiary (MW sig.)				
Rental status	Rented: owned (MW sig.)			**.030**	**.009**
Material position	Prob paying bills: able to pay (MW sig.)		**.000**	**.000**	**.000**
Per capita income	Lowest:low:medium:high (KW sig.)		**0.009**		
Adult units per h/hold	Low:medium:high (KW sig.)				
Total h/hold exp	Lowest:low:medium:high (KW sig.)		**.029**		
% inc on energy	Low:medium:high (KW sig.)	**.03**			

- MW Sig = p values resulting from the Mann Whitney U Test
- KW Sig = p values resulting from the Kruskal Wallis H Test
- differences significant where p>0.05.

Table 71 presents a breakdown of results for groupings of material position of household (the most sensitive indicator in Table 70). This indicates that the poorest are least resistant to paying more, and to reducing consumption; it also shows that only the better off (top two groups) will not be inclined to make informal arrangements i.e. the preferred strategy for most of the sample will be to make informal arrangements if at all possible.

Table 71: Mean calculated coping strategies (by material position of household)

Range -2 to +2	N	Pay more	Change fuel	Reduce consumption	Informal arrangements
Difficult to provide the family with food	17	-.1029	-.3824	-.3913	.2157
Manage to provide food but find it difficult to pay the util	123	-.2520	-.2893	-.4673	.2263
afford required foods, clothes and manage to pay the bills	54	-.2546	-.8657	-.7359	-.3519
Have all we need and made some savings	9	-.3333	-.7222	-.5895	-.7037
Whole sample	215	-.2849	-.4988	-.5548	-.0039

8.6 Outcomes and Impact

Some of the statements gathered during the preliminary surveys relate to how people believe they will be affected by increasing energy costs. These were used in the questionnaire to assess the strength of belief and the importance given to these. Each statement was presented with a bi polar 5 point scale exploring the degree of agreement or disagreement with each. Outcome statements can be categorised into key issues: family unity (F), security (S), health (H), education (E), financial independence (debt avoidance) (D).

Table 72 presents the mean, median and IQR for each of these statements for the whole sample. The statements that were most strongly agreed with related the negative impact of price increases on, education and health. Respondents generally do not agree with beliefs that they will run into difficulties with paying e.g. that the utility company will late personal property to cover bad debt nor that they will be disconnected.

Table 72: Outcome beliefs regarding impact of electricity price increase ranked by strength

Category	Statement	Means	Median (range –2 to +2)	IQR
S	lighting in public places will reduce, so thefts and crimes will increase	-0.79	-1	(-2 to 0)
E	children's education will be affected by not enough heating	-0.78	-1	(-1 to –1)
E	children's education will be affected by poor lighting	-0.76	-1	(-1 to –1)
H	will get sick because of lack of heating	-0.73	-1	(-1 to –1)
H	our inability to pay bills will cause psychological illness	-0.69	-1	(-1 to 0)
F	inability to pay bills will cause arguments in the family	-0.67	-1	(-1 to 0)
H	will get sick because of not cooking properly	-0.58	-1	(-1 to 0)
S	our house will be disconnected	-0.56	-1	(-2 to 0)
D	will get into debt with Energosbyt	-0.56	-1	(-1 to 0)
H	our health will be affected by not having hot water	-0.47	-1	(-1 to 0)
S	will be disconnected because of our neighbour's debts	-0.27	-1	(-1 to 1)
D	electricity company will get a court order against us	0.1	0	(-1 to 1)
S	company will take things from our house to pay for debts	0.22	0	(-1 to 1)
D	close family will help with paying bills	0.62	1	(0 to 1)

Most significant differences in responses to these outcome statements were evident between groups of material position of the household (Table 73). Responses amongst those who regard themselves as in poorer material position are more strongly negative, indicating that they feel more vulnerable to the impacts of cost increases. However, whereas the general trend is for the poor to have a more negative view of outcomes than the better off, the poorest (per capital income) tend to have a more positive view – details are presented in Table 74.

Table 73: Differences in Outcome beliefs by vulnerable groups

	Material position	Per capita income
	Prob paying bills: able to pay (MW sig.)	Lowest : low : medium : high (KW sig.)
inability to pay bills will cause arguments in the family (CS)	**0**	**0.002**
thefts and crime will increase (CHANGED SENSE)	**0.029**	**0.028**
company will take things from our house to pay for debts (CS)	**0.001**	**0**
will be disconnected because of our neighbours debts (CS)	**0.017**	**0.001**
our house will be disconnected (CS)	**0.002**	**0**
will get sick because of lack of heating (CS)	**0.001**	**0.001**
our inability to pay bills will cause psychological illness (CS)	**0**	**0.008**
will get sick because of not cooking properly (CS)	**0**	**0.007**
our health will be affected by not having hot water (CS)	**0.02**	**0.08**
childrens education will be affected by poor lighting (CS)	**0**	**0.007**
childrens education will be affected by not enough heating (CS)	**0.001**	**0.01**
electricity company will get a court order against us (CS)	**0.044**	**0**
close family will help with paying bills (CS)		
will get into debt with Energosbyt (CS)	**0**	**0.04**

- MW Sig = p values resulting from the Mann Whitney U Test
- KW Sig = p values resulting from the Kruskal Wallis H Test

- differences significant where p>0.05.

Table 74: Differences in Outcome beliefs by per capita income groups

	lowest (<10,400)	low (10,400 - 15,000)	medium (15,001 - 24,000)	high (>24,000)
inability to pay bills will cause arguments in the family (CS)	-0.24	-0.93	-0.98	-0.53
thefts and crime will increase (CHANGED SENSE)	-0.34	-1.07	-0.97	-0.84
company will take things from our house to pay for debts (CS)	1.05	-0.02	-0.03	-0.22
will be disconnected because of our neighbours debts (CS)	0.26	-0.51	-0.59	-0.18
our house will be disconnected (CS)	0.14	-0.87	-0.87	-0.64
will get sick because of lack of heating (CS)	-0.19	-0.84	-0.92	-0.98
our inability to pay bills will cause psychological illness (CS)	-0.25	-0.84	-0.87	-0.8
will get sick because of not cooking properly (CS)	-0.1	-0.76	-0.86	-0.6
our health will be affected by not having hot water (CS)	-0.14	-0.53	-0.73	-0.42
childrens education will be affected by poor lighting (CS)	-0.31	-1.07	-1	-0.69
childrens education will be affected by not enough heating (CS)	-0.31	-0.98	-1.05	-0.8
electricity company will get a court order against us (CS)	0.79	0.09	-0.22	-0.24
close family will help with paying bills (CS)	0.82	0.51	0.47	0.64
will get into debt with Energosbyt (CS)	-0.18	-0.8	-0.73	-0.53

Respondents were also asked to rank each of the five key issues, and the results are presented in Table 75, and show that good health and maintaining family unity are regarded as most important.

Table 75: Importance of issues

Issues N = 216 Range (0 to 3)	Mean	Median	IQR
Health	2.06	2	(1 to 3)
Family	1.89	2	(1 to 3)
financial	.97	1	(0 to 2)
Security	.82	9	(0 to 2)
Education	.42	0	(0 to 1)

A set of impact measures was calculated as the product of the response to the outcome statement and the importance attributed to the key issue. When ranked (see Table 77), the four most strongly negative impacts relate to health.

Table 76: Attitudes regarding impact of electricity price increase ranked by strength

Statement	Means	Median (range –6 to +6)	IQR
impact - sick because of lack of heating	-1.59	-2	(-3 to 0)
impact - inability to pay will cause psychological stress	-1.51	-2	(-3 to 0)
impact - get sick not cooking properly	-1.28	-2	(-3 to 0)
impact - health, not enough hot water	-1.11	-1	(-3 to 0)
impact - inability to pay will cause family arguments	-1.06	-1	(-3 to 0)
impact - get into debt with Energosybt	-0.44	0	(-2 to 0)
impact - thefts and crime increase	-0.41	0	(-1 to 0)
impact - poor education not enough heating	-0.23	0	(0 to 0)
impact - poor education because of poor lighting	-0.2	0	(0 to 0)
impact - house will be disconnected	0.02	0	(0 to 0)
impact - company will get court order	0.03	0	(0 to 0)
impact - disconnected because of neighbour's debts	0.05	0	(0 to 0)
impact - company will take things from house	0.53	0	(0 to 0)
impact - family will help with paying bills	0.8	0	(0 to 2)

A mean impact scoring can be calculated for each category of outcome statement by taking the mean of all attitudes in each category - the results are ranked in Table 77 and confirm that the greatest impact is likely to be on health. The potential impact on family unity is also flagged as important (bear in mind that this score is based only on a single indicator).

Table 77: Potential impacts resulting from cost increases

Impact N = 216 Range (-6 to +6)	Mean	Median	IQR
Impacts - health	-1.3709	-1.5	(-3 to 0)
Impacts - family unity	-1.0556	-1	(-3 to 0)
Impacts - education	-.2140	0	(0 to 0)
Impacts - security in home	.0475	0	(-0.25 to 0)
Impacts - financial independence (debt)	.1349	0	(0 to 0)
Overall impact (sum) (range -84 to +84)	-6.38	-10	(-16 to –1)

Table 78 shows that attitudes are most sensitive to material position of the household groupings, so these have been explored and the detail is presented in Table 79 and Table 80:

- the general trend is for poorer groups to have more negative attitudes (overall); this is true except for the poorest group (by per capita income), which has a positive attitude;
- concerns regarding education are linked to wealth, such that the better off believe they will be more negatively affected than the poor;
- even amongst the poorest there is a weak attitude regarding getting into debt i.e. people are not especially concerned that they will encounter serious difficulties when paying increased costs;

Table 78 Significant differences in attitudes re: impact of cost increases - amongst groupings

	Groups	Attitudes regarding:					Overall
		family	security	health	education	financial	
Education	<tertiary: tertiary (MW sig.)	**.028**					
Rental status	Rented: owned (MW sig.)						
Material position	Prob paying bills: able to pay (MW sig.)	**.000**	**.038**	**.000**	**.026**	**.002**	**.000**
Per capita income	Lowest:low:medium:high (KW sig.)	**.001**	**.021**			**.002**	**.008**
Adult units per h/hold	Low:medium:high (KW sig.)		**.019**				
Total h/hold exp	Lowest:low:medium:high (KW sig.)					**.028**	
% inc on energy	Low:medium:high (KW sig.)	**.013**					

- MW Sig = p values resulting from the Mann Whitney U Test
- KW Sig = p values resulting from the Kruskal Wallis H Test
- differences significant where p>0.05.

Table 79: calculated attitudes (by material position of household)

	N	Attitudes regarding:					Overall
range		family (-6 to +6)	security (-6 to +6)	health (-6 to +6)	education (-6 to +6)	financial (-6 to +6)	(-84 to +84)
Difficult to provide the family with food	17	-1.7647	-.2353	-1.7353	-.0588	.0392	-9.6471
Manage to provide food but find it difficult to pay the util	123	-1.5447	-.0894	-1.7967	-.2114	-.0352	-9.6179
afford required foods, clothes and manage to pay the bills	54	.0000	.3472	-.7361	-.2685	.3889	-.9259
Have all we need and made some savings	9	-1.2222	-.1389	-1.4167	-.3889	.3333	-7.2222

Table 80: calculated attitudes (by per capita income groups)

	N	Attitudes regarding:					Overall
range		family (-6 to +6)	security (-6 to +6)	health (-6 to +6)	education (-6 to +6)	financial (-6 to +6)	(-84 to +84)
lowest (<10,400)	58	-0.1186	0.6949	-0.556	-0.0431	0.5862	2.1552
low (10,400 - 15,000)	45	-2.2444	-0.0889	-1.7833	-0.2111	-0.1407	-10.5778
medium (15,001 - 24,000)	64	-1.4844	-0.2852	-1.7656	-0.2031	-0.0521	-10.25
high (>24,000)	45	-0.5333	-0.1556	-1.4944	-0.4667	0.0815	-7.8222

9 Summary

Housing indicators build a picture of vulnerability that can be based around rental status of a household – they tend to be smaller, are not recognised by the authorities and are occupied by people who have moved more recently. Poverty is reflected in energy choices - people tend to use district heating and piped gas (for heating and cooking respectively) where they are available, but elsewhere the poor use solid fuels for both heating and cooking, the better off tend to use electricity, and those who can will pay a premium for gas (bottled). Nevertheless, the poor use electricity for lighting and household appliances.

Price increases were given as the main factor affecting ability to pay for household items (38%), followed by household members loosing their jobs (30%). Many households have changed fuels in favour of electricity for cooking; electricity and coal appear to be

interchangeable for space heating. *Cost* was clearly the main reason for changing fuels, especially for changing cooking fuel, although *accessibility* of fuels was also important in changing space heating fuels. Overall, consumptions of electricity, wood and coal appear to be increasing, whilst consumption of gas is decreasing slightly. Households in a stronger material position are more likely to have increased consumption of electricity, whilst the poorest group indicated that they have reduced consumption. Fuel choices appear to be most sensitive to cost, and recent changes to in choice of fuels indicate that electricity is regarded as cheap compared to other fuels. As people gain more disposable income, they will increasingly be prepared to pay for premium fuels which offer good accessibility (reliable, easy to use), notably LPG where piped gas is not available.

Indicators covering changes in living conditions show that the poor feel that conditions have got worse, whilst the better off feel that things have improved. The strongest sense of deterioration concerns security, followed by employment and entertainment; whilst improvements are felt in food, housing and health.

The employment context of many households is unreliable and erratic e.g. many people can only find casual employment, and others may return to their villages for seasonal labouring. This means that many households may have problems paying bills on a regular basis, and this is evident in the number of households (even those who pay their bills in full), reporting having difficulty in paying bills regularly. Some form of flexible payment mechanism would help such households pay for their consumption over the longer term.

Overall, payment rates appear to be good – only 5% claim to be unable to pay electricity bills. This indicates that there is a good culture of payment in the domestic sector, and so there is little need for more expensive metering options to improve recovery rates, such as prepaid meters.

There is a clear indication that the poor are likely simply to pay more in the event of increasing electricity costs. This is likely to be because they feel they have already pared energy consumption, and are using lowest cost fuels, so they have little scope to make further cost savings. Households will make savings in housing and travel budgets to make up additional costs. However, results show that the most likely response will be to resort to informal means of reducing costs e.g. theft, and negotiating with inspectors; utilities need to be prepared for this. Findings also indicate that households, including the poor, do not believe they will run into financial problems in the event of increased prices i.e. they are confident in their ability to pay higher costs.

However, those households likely to be most severely affected by electricity reforms are those currently using electricity i.e. lower and middle income groups. Higher income households tend to use gas and district heating, and the lowest income households use solid fuels. These are the households which have scope to move down the energy ladder to cheaper fuels (but not those in flats). However, sourcing additional fuelwood will increase environmental pressures, when it appears that informal wood cutting already appears to be significant; the burning of coal will also have consequences in terms of health and environmental pollution.

The greatest impact of price increases is likely to be on health. Health is regarded as the highest household priority, and people are concerned that the responses they will need to make will adversely affect family health. This has implications not only for government health services, but also for wider development planning e.g. impact on school attendance, labour resources etc.

Just over half of the respondents claimed to have any knowledge of the reform processes, indicating that there remains a need for further awareness raising campaigns. Campaigns should also encourage people to pay (13% do not agree that people should pay for energy consumed), and to publish the real cost of fuels, to enable people to make informed fuel choices. TV appears to be the most influential medium.

Appendix 4

Country Survey Analysis – Moldova

1 Description of Sample

1.1 The sampling strategy

A stratified random sample was obtained from data collected from the Department for Protection of Children's Rights where the poor families of Chisinau are registered. One of the departments refused to give us information, so the operators had to find the respondents by random sample, asking families from poor looking households. Overall 400 households from 5 districts were sampled – see table 1.

Table 1: Chisinau Districts

	Frequency	Percentage
Ciocana	86	21.50
Botanica	91	22.75
Riscani	73	18.25
Centru	73	18.25
Buiucani	77	19.25
Total	400	100

The household was the sampling unit. A representative of each household was interviewed. The respondents were asked to provide information regarding their individual status, as well as that of the household in general. The following descriptive information therefore initially represents the respondents status and then that of the household.

The original questionnaire addressed energy choices and changes to date. In order to gather data that was compatible with the other country surveys, a supplementary questionnaire intended to explore coping strategy and impact issues was subsequently run with a subset (N = 198) of the original sample. This supplementary sample appears to be reasonably representative of the whole sample in that there are few statistically significant differences between the supplementary sample and those not included in the supplementary sample, but those differences do indicate that the supplementary sample is slightly less vulnerable:

- Households in the supplementary sample are slightly smaller (3.43 compared with 3.81; MW p = 0.029);
- More of the supplementary sample use district heating, and fewer use solid fuels (MW p = 0.005);
- Households in the supplementary sample are less likely to have been cut off from gas supplies (MW p = 0.019).

1.2 The respondents

The average age for all respondents was 47; the majority of respondents (131) were between 35 and 45 years of age (see Table 2).

Table 2 Age of all responsents

Age group	Frequency	Percentage
<35	85	21.25
35 to 45	131	32.75
46 to 55	76	19.00
56>	108	27.00
Total		100

When the occupation and gender of the respondents is considered (Table 3), 24% of the respondents were pensioners, of which 75% were women. This is as expected because in the Republic of Moldova the life expectancy of women is higher than that of men. A large proportion (20%) of respondents work in other fields, these tended to be service industries like vendors, tailors, watchmen, janitors and occasional workers. 10% of respondents work in education, of which 82% are female, this is consistent with the idea that in the Republic of Moldova the education sector is becoming female dominated.

Overall one can say the sectors in which respondents work are generally low paid and low security. The most vulnerable to poverty are the pensioners with a relatively low pension (200 lei on average), the construction workers have very low job security because they don't have permanent jobs and therefore are situated in the shadow economy, teachers can't rely on the states budget for salaries and often have to find supplementary funding through elective lessons or monthly fees from parents.

Table 3 Occupation, Sector and Gender

Occupation Sector	Whole sample		Female		Male	
	Frequency	Percent	Frequency	Percent within sector	Frequency	Percent within sector
Agriculture	1	0.3	1	100.0	0	0
Constructions and Industries	56	14.1	31	55.4	25	44.6
Education	38	9.5	31	81.6	7	18.4
Health	26	6.5	24	92.3	2	7.7
Unemployed	35	8.8	25	71.4	10	28.6
Student	17	4.3	13	76.5	4	23.5
Transport, communications	9	2.3	7	77.8	2	22.2
Other	78	19.6	53	67.9	25	32.1
Pensioner	97	24.4	73	75.3	24	24.7
Housewife\husband	41	10.3	35	85.4	6	14.6
Total	398	100	293	73.6	105	26.4

The majority of all respondents had attained tertiary level education; 21% of respondents have attained graduate education, 6% college and 21.5% vocational school (Table 4). There is a significant difference (p=0.000) in educational achievement between respondents younger than 35 and respondents older than 55, the younger respondents achieving the higher level of education (33% of respondents younger than 35 have a graduate education compared to only 18% of respondents over 55). When gender is considered, there is a higher percentage of

female respondents with no education or an incomplete medium education (22.4% for females compared to 18.1% for males) also, the percentage of males with a vocational school education (26.7%) is higher than that of females (19.7%).

Table 4 Education of the respondents

Education	Frequency	Percentage
without any education	22	5.50
Incomplete medium education	63	15.75
General school	91	22.75
Vocational school	86	21.50
High school	11	2.75
College	26	6.50
Unfinished studies	17	4.25
Graduate education	84	21.00
Total	400	100

Glossary: Nowadays in the Republic of Moldova the educational system is formed from:

- Studies before attending school from the age of 1-7, this is the kindergarten system.
- Primary school, 4 classes (after finishing 4 classes) children are automatically passed to gymnasium.
- Middle incomplete studies of 9 classes, graduators of 9 classes can continue their studies in the professional school, college, 11 classes and high-school (12 classes).
- The school of 11 classes - school of general studies (after 2 years of studies, the students have the possibility to go in the zero year at he university)
- High-school (3 years of studies, the graduators are ready to go to the university)
- The Vocational school (professional school) (in 3 years of studies, can be obtained a calling)
- Superior incomplete studies (university studies, 4 years of studies)
- Post University studies (master, PH.D)

1.3 Housing

The mean number of people in a household was 3.62 ± 1.90 (with a range of 1 to 13). At first glance this value may seem low, but considering most of the households lived in flats or hostels in the city (see Table 7), this value seems reasonable. If the number of rooms in the house is taken into consideration (Table 5), and the density of occupation (Table 6), a better picture of living conditions is seen; the majority of households (293) have between 1 and 3 people in the household per room in the house, with a mean of 1.77 ± 1.03.

Table 5: Number of rooms

Number of rooms	Frequency	Percent
1	89	22.3
2	160	40.0
3	112	28.0
4	28	7.0
5	9	2.3
6	1	.3
7	1	.3
Total	400	100.2

Table 6 Number of persons per room

No. people per room	Frequency	Percentage
<1.0	44	11
1.0 to 1.9	191	47.75
2.0 to 2.9	102	25.5
≥3.0	63	15.75
Total	400	100

The majority (65%) of households live in flats, 20% live in houses in private sectors and 14%

Glossary: In Chisinau there are 5 types of dwelling:

- Private flat: these are small flats in a block of up to 16 floors. They have a kitchen, a bathroom, a hall, a balcony and usually between 1 and 4 bedrooms.
- Non-private flat: these are the same structures as the private flats, the only different being that they are owned by the state enterprise or the state institution. The residents have the right to privatise the apartment.
- Private room in hostel: these are very simple, small rooms of $6m^2$ to $20m^2$ in hostels of 4 to 15 families. Sometimes they have a toilet and a tap for water in the rooms. There is a kitchen and a bathroom on each floor. They are owned by the lodge. The hostel residents have no direct contract with the electricity companies, so they pay their bills through the hostel administrator.
- Non-private room in hostel: these are the same as the private rooms only owned by the state.
- House in a private sector

live in hostels. Of those who live in flats 64% live in private flats and 36% live is state owned flats. Of those that live in hostels, 64% live in state owned rooms, 36% live in private rooms.

Table 7 Type of dwelling

	Frequency	Percentage
Private flat	166	41.50
Non-private flat	93	23.25
Private room in hostel	20	5.00
Non-private room in hostel	36	9.00
House in a private sector	75	18.75
Other	10	2.50
Total	400	100

Most of the flats had 2 (44%) or 3 (28%) rooms, the households in hostels mostly occupied 1 (60%) or 2 (32%) rooms, private sector houses mostly had 2 (44%) or 3 (29%) rooms.

Correlation coefficients presented in Table 8 present a picture of the housing, such that density (people per room), which is an indicator of poverty, increases with poorer types of dwelling, particularly hostel rooms, and with size of family.

Table 8: Correlation of household indicators

	number of persons in household	household type	Number of rooms in household	Persons per room
number of persons in household			0.405***	0.597***
household type			0.348***	-0.321***
Number of rooms in household	0.405***	0.348***		-0.431***
Persons per room	0.597***	-0.321***	-0.431***	

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

1.4 Economic Status

1.4.1 Poverty indicators

The main economic indicator in this survey was a subjective self assessment of family income (Table 9); most respondents claimed that they did not earn enough for the necessary things (food, clothes, education - parents can't afford to pay for their children's books or their studies, transport – they travel by trolleybus or they walk, medicine – they do not get treated, services – water payment, gas, heating, electricity).

A high percentage of respondents claimed they were unable to pay for utility bills (Table 9); 30% were unable to pay for electricity, 33% gas and 64% heating. As expected, a correlation can be seen between the inability to pay for utilities and the material position of the household (p=0.000 for each utility).

Table 9 Material position of the household and ability to pay for utilities

	Whole sample		Unable to pay for electricity		Unable to pay for gas		Unable to pay for heating	
	Frequency	Valid Percent	Frequency	Valid Percent	Frequency	Valid Percent	Frequency	Valid Percent
It is not enough for necessary things	181	46.77	70	40.00	74	46.25	115	80.99
It is enough just for necessary things	165	42.64	28	17.95	29	19.72	71	53.38
It is enough for a decorous livelihood but we can't buy expensive things	33	8.53	10	30.30	10	34.48	9	37.50
We succeed to buy expensive things, but we economise	8	2.07	2	25.00	1	14.29	2	28.57
Total	387	100.00	110	29.65	114	33.24	197	64.38

Those that were unable to pay for utilities were asked how long they were unable to pay utility bills; there was a large spread from 3 months to 4 years, but the majority (around 40%) had been unable to pay for bills for more than 4 years (Table 10). The main reasons for inability to pay for bills reported by respondents were (in order of priority):

- increased tariffs (149),
- small salaries (82),
- no job (52).

Table 10 Length of time unable to pay utility bills

	Electricity		Gas		Heating	
	Frequency	Valid Percent	Frequency	Valid Percent	Frequency	Valid Percent
3 months	31	29.52	20	20.20	19	9.90
6 months	9	8.57	9	9.09	17	8.85
1 year	12	11.43	12	12.12	31	16.15
2 years	6	5.71	7	7.07	24	12.50
3 years	8	7.62	8	8.08	25	13.02
more than 4 years	39	37.14	43	43.43	76	39.58
Total	105	100.00	99	100.00	192	100.00

The correlations between a number of possible poverty indicators are presented in Table 11. This shows good correlation between ability to pay for various energy services, and that these tend to correlate with the subjective self assessment indicator of poverty; this appears, therefore, to be the most reliable indicator of poverty.

Table 11: Correlation of economic indicators

	Household type	persons per room	material position	pleased with life	ability to pay - electricity	ability to pay - gas	ability to pay - heating	freq. Of debt payments	% income on energy	age	ownership - TV	ownership - fridge
Household type		-0.321***										
persons per room	-0.321***									-0.383***		
material position				0.384***		-0.228***	-0.34***					
pleased with life			0.384***									
ability to pay - electricity						0.751***	0.458***					
ability to pay - gas			-0.228***		0.751***		0.516***					
ability to pay - heating			-0.34***		0.458***	0.516***			-0.282***			
freq. Of debt payments												
% income on energy							-0.282***					
age		-0.383***										
ownership - TV												0.256***
ownership - fridge											0.256***	

1.4.2 Income and Expenditure

When asked about other income sources, 173 respondents claimed to receive income from other sources, many of which had multiple sources (table 7). Of those that responded, the most popular sources were other (specific sources unknown) parents, children, other relatives and the state. Of those that did not respond, it cannot be said whether they do not receive alternative sources of income – it may be that they didn't know. Very few households had relatives living abroad (only 55, 14%); this indicates a minimal influence of remittances on the household.

Table 12 Contributions to family income

Responses	Frequency
No response	227
Children	79
Relatives	51
Parents	107
States	49
From NGO	17
Church	6
Other	258
Total	567

When the respondents were asked to list their household's top three priority expenditures (Table 13), the top was electricity, second was food, and third was gas. It appears that the responses have been distorted by the emphasis of the survey on electricity and energy; data on expenditure (as opposed to priorities) from other countries indicate that food is clearly the top expenditure item.

Table 13 Priority household expenditure

	Number of responses
Electricity	336
Food	283
Gas	182
Heating	99
Medicine	76
Clothes	61
Education	47
Water bill	31
Transport	27
Total	1142

The median percentage of income spent on energy utilities (electricity, gas and heating) is the 41 – 50% band. Note that the percentage of income spent on energy does not correlate with the material position (subjective self assessment of poverty) – see Table 11.

2 State Safety Nets

Data was gathered (from the supplementary sample) on the following state benefits:

- 24% of respondents are pensioners, but 35% claim to be receiving a state pension; 87% of pensioners receive a pension and an additional 5% receive invalidity assistance, leaving 7% of pensioners not receiving any benefit;
- **Invalidity benefit** is received by 8%
- Only 2 households claim to receive **unemployment benefit**.
- A further 7% claim to be receiving **other benefits**.

Table 14: Households receiving benefits by perception of poverty groupings (frequency)

	Material position of household				
	not enough for necessary things	enough for necessary things	enough for livelihood but not expenses	succeed to buy expensive things	Total
Senior citizens pension	34	30	5	0	69
Invalid benefit	10	5	0	0	15
Unemployment benefit	1	1	0	0	2
Other	6	7	1	0	14
Total	85	91	13	4	193

Table 14 indicates that the existing system of benefits does not specifically target the poor. This is primarily because it is pension and invalidity benefits that are received in the sampled communities, neither of which is intended to be poverty focused.

3 Energy use

3.1 Choices of fuels

The majority of households use gas ranges for cooking (Table 15), a small percentage use electric ranges and wood ranges. District heating is the main source of heating (Table 16); roughly equal numbers of households use gas and solid fuels, and few (only 2%) rely on electricity.

Table 15 Fuels used for cooking

	Cooking	
	Frequency	Percentage
Gas range	356	89.22
Electric range	32	8.02
Manufactured woods range	6	1.50
Other	5	1.25
Total	399	100.00

Table 16 Fuels used for heating

	Heating	
	Frequency	Percentage
Central (district) heating	271	69.49
Building's autonomous heating	36	9.23
Gas stove	29	7.44
Wood and coal stove	28	7.18
Household's autonomous heating	9	2.31
Electric heater	8	2.05
Gas range	7	1.79
Other	2	0.51
Total	390	100.00

Differences in choice of cooking fuel amongst poverty groupings (material position) are not significant. However, those who have difficulty paying electricity and gas bills are more inclined to use electricity and wood than gas (MW p = 0.015 for ability to pay electricity; MW p = 0.000 for ability to pay gas) - see Table 17.

Table 17 Main cooking fuel by ability to pay for electricity

	Able to pay for electricity		Able to pay for gas	
	yes	No	yes	No
Gas range	249	96	232	101
Electric range	17	12	5	11
Manufactured woods range	3	3	0	2
Other	1	3	1	4
Total	270	114	238	118

Choice of cooking fuel also depends on type of dwelling (KW p = 0.012). Table 18 shows a greater reliance on gas in flats, and a greater use of electricity in hostels (the poorest category).

Table 18 Fuel use for cooking by house type

	House in private sector		Flat (private + non-private)		Hostel (private + non-private)	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Gas range	63	84	239	92	46	84
Electric range	6	8	16	6	8	15
Manufactured woods range	6	8		0		0
Other	0	0	4	2	1	2

Poverty appears to have a more distinct impact on choice of heating fuels (KW p = 0.005), notably the use of gas decreases with poverty. Those who have difficulty paying for heating tend to rely less on gas and more on solid fuels (MW p = 0.000). Nevertheless, most households in all categories rely on district heating.

Table 19 Choice of heating fuel by material position

	not enough for necessary things		enough just for necessary things		enough for a decorous livelihood		able to buy expensive things	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Gas range	2	1.1	5	3.0				
Central heating	132	72.9	113	68.5	15	45.5	6	75.0
Electric heater	4	2.2	2	1.2	2	6.1		
Wood and coal stove	19	10.5	4	2.4	3	9.1	1	12.5
Gas stove	8	4.4	14	8.5	7	21.2		
Autonomous heating	11	6.1	23	13.9	6	18.2	1	12.5
Total (of category)	181		165		33		8	

As expected, houses in private sectors are more likely to use gas and solid fuels for heating (65%), most flats in apartment blocks use district heating (80%) with a high percentage using autonomous heating systems (15%) and almost all households living in hostel rooms use central heating (89%); (KW p = 0.000).

Glossary: In Chisinau during Soviet times, central heating systems were installed in all apartment blocks. Of the 240,000 apartments registered in the Termocom, 8000 don't have central heating systems but use autonomic heating instead and 40 apartments don't even have autonomic heating because of security issues.

Houses in private sector are built with wood or gas stoves, a few with central heating.

The heating tariff is a flat rate that was fixed in 1999 at 233 lei/giga calorie

Table 20 Fuel use for heating by house type

	House in private sector		Flat (private + non-private)		Hostel (private + non-private)	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Central Heating	14	18.92	202	80.16	48	88.89
Wood and coal stove	26	35.14	4	1.59	1	1.85
Gas stove	22	29.73	1	0.40	2	3.70
Autonomous heating	6	8.11	37	14.68	2	3.70

The respondent's age seems to affect the choice of fuel for cooking (Table 21) with younger respondents more likely to use electricity than older respondents. This result is consistent with may other responses showing that younger people use electricity and electrical appliances more than older people. For example, Table 22 shows that on the whole, over the past 5 years, younger respondents have increased their use off appliances while older respondents have decreased their use of appliances.

Table 21 Fuels use for cooking by age of respondent

	<35		35 to 45		46 to 55		56>	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Electricity	13	15.48	14	10.69	5	6.58	0	0
Gas	68	80.95	111	84.73	70	92.11	107	99.07
Wood	2	2.38	3	2.29	0	0	1	0.93
Other	1	1.19	3	2.29	1	1.32	0	0

Table 22 Change in appliance use over last 5 years by age of respondent

	<35		35 to 45		46 to 55		56>	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Bigger	25	30.49	27	21.60	6	8.00	7	6.54
The same	46	56.10	62	49.60	37	49.33	37	34.58
Lesser	11	13.41	36	28.80	32	42.67	63	58.88

3.2 Energy consumption and costs

Mean monthly consumptions (based on mid points of bins) are presented in Table 23, and show that gas use is seasonal, unlike electricity.

Table 23 Mean monthly energy consumptions

	Electricity (kWh/month)		Gas (m^3/month)		Heating (Gcal/month)
	Summer	Winter	Summer	Winter	Winter
N	383	383	330	327	272
Mean (est.)	61	78	17.7	35.5	1.46

When considering differences amongst material position groupings, the following trends are evident:

- Electricity consumptions decrease amongst poorer groups (not significant);
- Gas consumptions are lower amongst poorer groups (winter consumptions significant, $p = 0.042$);
- No trend evident on heating consumption.

When considering differences between those who can pay energy bills and those who have difficulty, there is a general trend of higher consumption amongst those who can pay, as expected. However, it is only differences in gas consumption which are flagged as significant (Table 24), which confirms the status of gas as a premium fuel which the poor are less able to afford.

Table 24 Significant differences in energy consumptions amongst groupings

	Gas consumption Summer	Gas consumption Winter
Able to pay for electricity (Yes:no)	**.021**	
Able to pay for gas (Yes:no)	**.03**	**.02**
Able to pay for heating (Yes:no)	**.001**	**.000**

- MW Sig = p values resulting from the Mann Whitney U Test
- differences significant where p>0.05.

The percentage of income spent on energy indicator was cross tabulated with various other indicators to explore the factors that affect it; these included the density of occupation (number of persons per room) (Table 25), house type (Table 26) and the presence of meters (Table 27). The following can be noted:

- Households with lower occupancy density (less than 2 persons per room) spend a higher percentage of income on utilities than households with higher number of people per room (greater than 2).

- Households living in private sector houses actually spend the highest percentage income on utilities,
- Households with meters actually spend a slightly lower percentage income on utilities than households without meters, although none of the differences in Table 27 are fagged as statistically significant;.

Table 25 Influence of number of people per room on energy expenditure

	Whole sample	People in house per room			
		<1	1.0 to 1.9	2.0 to 2.9	≥3.0
Mean percentage of income spent on utilities	45	55	47	44	40

Table 26 Influence of house type on energy expenditure

	Type of house				
	Private flat	Non-private flat	Private hostel	Non-private hostel	Private sector house
Mean percentage of income spent on utilities	47	45	37	43	52

Table 27 Influence of meters on energy expenditure

	Electricity meter?		Gas meter?		Heating meter?	
	Yes	No	Yes	No	Yes	No
Mean percentage of income spent on utilities	46	49	45	48	44	49

The majority of respondents pay for their fuels at a post office or bank (45.5% and 47,5% respectively; Table 28). Only 7.1% of respondents pay for their fuels at informal sellers.

Table 28 Where do you pay for fuels?

	%
Local inspector	6.1
Neighbour	0.5
Occasional seller	0.5
Post office	45.5
Bank	47.5

4 Changes to date

4.1 Installation of meters

The majority of households (93%) have electricity meters (Table 29). The 7% who don't have electricity meters live mostly in blocks (flats or hostels) which will have only one meter; some may have no contract with Union Fenosa. In contrast, only roughly half of gas users have a meter. Approximately 37% of the respondents say they have a heating meter. This doesn't

Anecdote: The hostel lodgers from the street M. Drăgan 18/2 said that the consumption of electricity is not calculated correctly. Even if each room had an electricity meter, somehow the administrator would take the reading from the common meter and then divides the sum for each lodger of the hostel.
A woman who was living on the 3rd floor, having 3 children, lived without her husband; and the consumption for electricity was calculated for each family member, even the children aged 4 months, 3 and 10 years old, they did not consume as much electricity as they were obliged to pay.

mean that each of the households have a heating meter, the households in blocks of flats who use the central heating have a meter for each entrance of the block or for the whole block.

Table 29 Presence of electricity, gas and heating meters

	Electricity meter?		Gas meter?		Heating meter?	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Yes	363	90.80	175	43.80	146	36.50
No	28	7.00	177	44.30	160	40.00

The majority of households with meters claimed their utility bills had decreased since installing the meter (Table 30). The biggest impact was for gas meters where almost 90% of households claimed their gas bills had decreased.

Table 30 Perceived affect of meters on cost of utilities

	Electricity		Gas		Heating	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Cost decreased	139	54.94	141	89.24	76	66.09
Cost same	110	43.48	16	10.13	37	32.17
Cost increased	4	1.58	1	0.63	2	1.74

Despite the apparent decrease in utility bills after installing a meter, 141 respondents who hadn't had a meter(s) installed said that the reason was because the meters are expensive (Table 31).

Table 31 Reasons for not installing a meter

	Frequency
The meter is expensive	141
Meter's installation is expensive	89
We are in the process of the installation	9
It is not necessary	7
I didn't want one	3
Other	13
Total	262

Having a meter affects choice of fuel for cooking and heating. Table 32 shows that where no electricity meter is installed, a greater proportion of households use electricity for cooking (not significant). Almost all of those with a gas meter also have an electricity meter, and a greater proportion use gas for cooking (Table 33).

Table 32 Affect of electricity meter on fuel use for cooking

	Electricity meter present		Electricity meter not present	
	Frequency	Percentage	Frequency	Percentage
Gas range	326	90.06	22	78.57
Electric range	26	7.18	5	17.86

Table 33 Affect of gas meter on fuel use for cooking

	Gas meter present		Gas meter not present	
	Frequency	Percentage	Frequency	Percentage
Gas range	174	99.43	160	90.40
Electric range	1	0.57	11	6.21

There is no difference in choice of heating fuels.

Table 34 Affect of meters on choice of fuels for heating

	Electricity meter present				Gas meter present			
	yes		No		Yes		No	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Gas range	6	1.7			9	4.25	11	5.53
Central heating	245	67.5	21	75.0	114	53.77	133	66.83
Electric heater	8	2.2			18	8.49	12	6.03
Wood and coal stove	26	7.2	1	3.6	16	7.55	10	5.03
Gas stove	28	7.7			27	12.74	2	1.01
Autonomous heating	34	9.4	2	7.1	22	10.38	26	13.07

Table 35 and Table 36 show that those with meters are more likely to be able to pay their electricity or gas bills (MW $p = 0.009$ for differences in ability to pay electricity bills between households with and without meters; ability to pay gas bills is not significant). This probably reflects the cost of installing meters i.e. only the better off can afford to have meters installed. The installation of meters appears to be linked to ability to pay, rather than choice of fuels.

Table 35 Affect of electricity meter on ability to pay for electricity

	Electricity meter present		Electricity meter not present	
	Frequency	Percentage	Frequency	Percentage
Able to pay for elec	251	72.13	13	48.15
Unable to pay for elec	97	27.87	14	51.85

Table 36 Affect of gas meter on ability to pay for gas

	Gas meter present		Gas meter not present	
	Frequency	Percentage	Frequency	Percentage
Able to pay for gas	120	72.73	105	62.87
Unable to pay for gas	45	27.27	62	37.13

Interestingly, having a heating meter and being able to pay for heating bills are not related at all i.e. metering is a planning issue rather than an affordability issue.

4.2 Perceived changes in energy consumption

Respondents were asked to make a subjective assessment of how their consumption of the principal fuels had changed over the last 5 years. The results presented in Figure 1 show that electricity consumption has been most subject to changes, with some households increasing their consumption and others reducing it. Consumption of district heating is most stable.

There are an approximately equal number of households with increased and decreased energy consumption.

Table 37 Perceived change in energy consumption over last 5 years

	Electricity		Gas		Heating	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Much less	14	3.50	19	4.75	7	1.75
Less	102	25.50	92	23.00	43	10.75
The same	146	36.50	140	35.00	169	42.25
greater	90	22.50	71	17.75	58	14.50
Much greater	21	5.25	19	4.75	21	5.25
Total	373	93.25	341	85.25	298	74.50

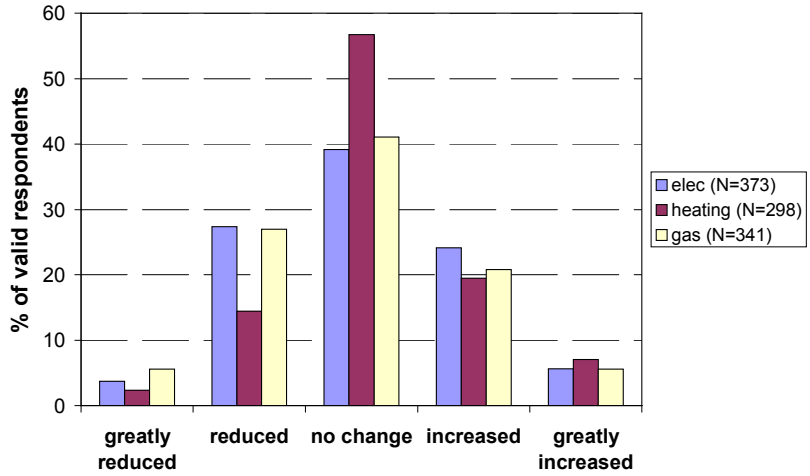

Figure 1 Perceived changes in consumptions of principal fuels (last 5 years)

Table 38 indicates that the poor have made economies in their use of gas and electricity over the last few years. Only the better off feel they have increased their consumption of electricity.

Table 38 Changes in consumption of fuels over last 5 years by wealth groupings (means)

material position of your household (Range –2 to +2)	Gas		electricity		heating	
	N	Mean	N	Mean	N	Mean
not enough for necessary things	152	-0.21	170	-0.11	133	0.08
enough just for necessary things	143	0.04	151	0.08	127	0.20
enough for a livelihood, can't buy expenses	29	0.03	33	0.00	22	0.00
Succeed to buy expensive things	5	0.00	7	0.71	6	0.67
Total	329	-0.08	361	-0.01	288	0.14

The installation of meters does not appear to affect the perception of changes in consumption.

It should be pointed out that choice of fuels has remained stable over the last few years – only 5% and 4% of households[1] have changed main cooking and heating fuels respectively; these subsets are too small to permit further analysis of fuel substitution behaviour.

[1] Based on responses from the supplementary sample

4.3 Disconnections

Electricity is the most common energy source to be cut off with 30% of households reporting having been disconnected at some point in the past; second is gas with 13%, lastly heating with only 6% (Table 39).

Table 39 Occurrence of being cut off from energy source

Have you been cut off in the past?	Electricity		Gas		Heating	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Yes	116	29.0	53	13.3	24	6.0
No	276	69.0	291	72.8	278	69.5

Approximately 70% claimed they had been cut off because they could not pay their debts (see Table 40). It is not surprising, therefore, to find that a greater proportion of the poor have experienced disconnection (Table 41).

Table 40 Reason for being cut off from energy source

Income	Frequency	Percentage
We didn't pay the historical debts	64	48.9
We didn't pay the actual debt	26	19.8
The habitants don't pay	25	19.1
We had technical difficulties	8	6.1
Stolen energy	4	3.1
Other	4	3.1
Total	131	100.0

Table 41 Occurrence of disconnection by economic position

Income	Have been cut off from electricity		Have been cut off from gas		Have been cut off from heating	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Not enough for necessary things	63	35.8	37	23.9	15	11.2
Just enough for necessary things	45	27.6	12	8.2	7	5.3
Enough for decorous livelihood but not for expensive things	3	9.1	1	3.7	1	4.5

Similarly, households with a higher occupancy density are more likely to be disconnected; again, this relates to the economic position since houses with more people per room are generally in a lower economic position (Table 42).

Table 42 Occurrence of being disconnected by number of people per room

No. people/room	Have been cut off from electricity		Have been cut off from gas		Have been cut off from heating	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
<1.0	5	11.9	4	10.0	2	7.4
1.0 to 1.9	43	22.9	16	9.5	8	5.4
2.0 to 2.9	33	33.3	17	20.0	9	11.4
≥3.0	35	55.6	16	32.0	5	10.2

When the type of house is considered (Table 43), it is clear that households living in hostels are more prone to being cut off from energy sources than flats or houses. Also that households living in state owned flats and hostels are more prone to being cut off than private flats and hostels. An interesting point is that households living in private flats are less likely to be cut off than households in private sector houses.

Table 43 Occurrence of being disconnected by type of house type

House type	Have been cut off from electricity		Have been cut off from gas		Have been cut off from heating	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
House in private sector	23	31.9	9	15.8	2	9.5
Private flat	28	17.1	13	8.4	7	4.7
State owned flat	28	30.4	14	16.9	4	4.9
Private hostel	12	60.0	8	42.1	2	12.5
State owned hostel	24	68.6	8	34.8	9	34.6

Table 44 illustrates some of the ways in which people cope when disconnected; note that 10% of the 131 who responded claim to access electricity illegally.

Table 44 Energy sources used while disconnected

	Responses
Candles	88
Oil candles	40
Gas lamps	30
Woods stove	13
We had borroed the energy from the neighbours	9
The illegal connection	5
Other	18
We didn't use anything	48
Total	251

The majority of those who had been disconnected in the past simply paid their bills to get reconnected (Table 45).

Table 45 Ways of getting reconnected

	Frequency	Responses
We paid the bill	34	8.50
We borrowed money and paid	28	7.00
We acquitted in rates	22	5.50
We did nothing	14	3.50
We sold some things from our household	5	1.25
We have connected illegally	1	0.25
Other	18	4.50
Total	122	30.50

Table 46 and Table 47 show that overall, disconnections are more rare today than they were 5 years ago. The five communities have very similar statistics; the mean change[2] for the sample as whole is –0.84, and has a range of -0.59 to -1.03. Ciocana, Botanica and Riscani have mean changes higher than the mean for the whole sample while Centru and Buiucani have lower mean changes.

Table 46 Change in frequency of disconnections over past 5 years by community

	much more rare %	more rare %	No change %	more frequent %	much more frequent %	Total %
Ciocana	29.8	42.6	21.3	2.1	4.3	100
Botanica	38.7	29.0	29.0	3.2	0	100
Riscani	22.7	50.0	22.7	4.5	0	100
Centru	14.3	57.1	22.9	2.9	2.9	100
Buiucani	17.1	43.9	26.8	4.9	7.3	100
Whole sample	24.2	44.9	24.2	3.5	3.0	100

Table 47 Mean change in frequency of disconnections over past 5 years by community

	Mean change[2]
Ciocana	-0.91
Botanica	-1.03
Riscani	-0.91
Centru	-0.77
Buiucani	-0.59
Whole sample	-0.84

4.4 Opinions on Reforms

The majority of respondents (58%) were interested in the energy sector (Table 48), but that still leaves a high proportion (40%) of respondents with little or no interest. The most common source of information on the energy sector is the television (48%) then radio (18%) and discussions with acquaintances (16%) (Table 49).

Regarding the influence of privatising the electricity sector, the overall view is that it will have a mildly negative impact on household consumption of electricity (Table 50). When asked about the utility companies, a higher proportion of respondents didn't trust them than trusted them (Table 51); Termocom is trusted the least.

The most common problem with the energy sector reported by respondents was high tariffs, causing difficulties for consumers to pay for their energy bills (Table 52). Electricity tariffs appear to cause most concern - 88% of respondents felt that the electricity tariffs were too high, compared with 79% claiming gas and heating tariffs were too high. Other commonly held views included the depreciation of the MDL, bad administration of energy enterprises, and irresponsibility of consumers in paying energy bills on time.

Table 48 Interest in the energy sector

	Frequency	Percentage
Very interested	56	14.00
Interested	177	44.25
Little interested	100	25.00
Very little interested	35	8.75
Not interested	24	6.00
Total	392	98.00

[2] The mean change uses the following scale: -2=much more rare, -1=more rare, 0=no change, 1=more frequent, 2=much more frequent

Table 49 Source of information on the energy sector

	Frequency	Percentage
Press	24	6
Television	190	47.5
Radio	72	18
Discussions with acquaintances	62	15.5
Total	355	88.75

Table 50 Influence of privatisation of the electricity sector on consumption of electricity

	Frequency	Percentage
Positive	64	16
Doesn't influence	130	32.5
Negative	142	35.5
Total	336	84

Table 51 Trust in the utility companies

Do you trust in the utility companies?	Union Fenosa (electricity)		Chisinau-Gas		Termocom (heating)	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Very much	62	15.50	61	15.25	27	6.75
Not so much	180	450	182	45.50	158	39.50
Definitely not	115	28.75	104	26.00	139	34.75
Total	357	89.25	347	86.75	324	81.00

Table 52 Problems in the energy sector

	Responses
The high tariff	240
The difficulty of the consumers to pay for bills	183
The depreciation of the MDL	117
Bad administration of energy enterprises	75
The irresponsibility of the consumers to pay the energy bills on time	71
Growing of energy losses	42
Dependence on the import of primary resources	39
Other	35
Lack of investment in energy sector	8
Total	810

5 Future Coping Strategies[3]

5.1 Overall

When asked how people would respond to an increase in the cost of energy, reducing energy consumption is clearly the favoured of the three suggested coping strategies. This is followed by paying more for energy; changing to a cheaper fuel is the least favoured option. Table 53 shows the percentage response for each option and the mean rank - both agree that respondents would rather reduce their use of fuels than pay more or change to a cheaper fuel.

[3] This analysis is based on responses from the supplementary sample.

Table 53: Ranking of proposed coping strategies

Ranking	Pay more %	Change fuel %	Reduce use %
First	18.7	8.6	71.2
second	1.0	6.6	1.5
third	3.0	0	1.0
% response	22.7	15.2	73.7
Weighted mean (range 0 to 3)	0.61	0.39	2.18

Weighted scores – 1st ranking = 3, 2nd = 2; 3rd = 1; not ranked = 0.

These trends are more acute amongst poverty groupings (see Table 54):

- Those with a poor material position and those who spend a lower percentage of their income on energy are less likely to pay more for energy than those in better material position and those who spend a higher percentage of their income on energy.
- Similarly, those with a poor material position and those who spend a lower percentage of their income on energy are more likely to reduce energy use than those in better material position and those who spend a higher percentage of their income on energy.
- Those with a large number of people living in the house per room (>2) are less likely to change fuel than those with a smaller number of people living in the house per room (<2).

Table 54: Significant differences in coping strategies amongst groupings (weighted responses)

Poverty indicator	Groups	Pay more	Change fuel	Reduce use
% exp on energy	Low : Medium : High (KW sig.)	**0.005**		**0.028**
Ability to pay for electricity	Able : Not able (MW sig.)			
Ability to pay for gas	Able : Not able (MW sig.)		**0.031**	
Ability to pay for heating	Able : Not able (MW sig.)			
Appreciation of family income	Not enough for necessities : Enough for decorous lifestyle (MW sig.)	**0.038**		**0.017**
Number of people in house per room	<2 : >2 (MW sig.)		**0.021**	
Household ownership	Private : Non-private (MW sig.)			
Household type	Hostel : Flat : House (KW sig.)			
Education	Graduate : Non-graduate (MW sig.)	**0.022**		

- MW Sig = p values resulting from the Mann Whitney U Test
- KW Sig = p values resulting from the Kruskal Wallis H Test

5.2 Reduce energy consumption

A number of areas for energy reduction were presented and the respondents asked to rank the three areas in which they would be most likely to make savings in their energy budget. These are listed in Table 55. As noted in Table 53, this would be the preferred strategy for 71% of the sample.

When the responses are weighted, Table 55, the most favoured way of saving energy is through reduced use of appliances and lighting.

Table 55: Ranking regarding energy consumption reduction options

Ranking	Lighting %	Cooking %	Space heating %	Water heating %	Entertainment %	Appliances %	Business activities %
First	34.8	1.0	4.5	1.0	5.6	48.5	0.5
second	8.1	2.5	1.0	1.0	5.6	15.2	1.0
third	1.5	0.5	1.0	1.5	4.5	0.5	0.5
% response	44.4	4.0	6.5	3.5	15.7	64.2	2.0
Weighted mean (range 0 to 3)	1.22	0.09	0.17	0.07	0.32	1.76	0.04

Weighted scores – 1st ranking = 3, 2nd = 2; 3rd = 1; not ranked = 0.

Respondents were asked which specific energy conservation measures they take, and Table 56 shows that draughtproofing windows and reducing lighting are widespread practices.

Table 56 Energy conservation measures

	Responses
The preparation of windows	189
Lamp with less bulbs	184
Candles	41
The heating of less rooms	38
Oil candles	25
Woods stove	12
Gas lamp	8
Other	53
We don't use anything	192
Total	742

There are some differences in coping strategy between social groupings (see Table 57):

- Those whose income is not enough for the necessary things are more likely to make savings with domestic appliances than those whose income is enough for the necessary things.
- Those with a graduate education are more likely to make savings on entertainment than those with less education.

Table 57: Significant differences in items for making savings amongst groupings

Poverty indicator	Groups	Lighting	Cooking	Space heating	Water heating	Entertainment	Appliances	Business activities
% exp on energy	Low : Medium : High (KW sig.)		**0.003**					
Ability to pay for electricity	Able : Not able (MW sig.)							**0.046**
Ability to pay for gas	Able : Not able (MW sig.)							
Ability to pay for heating	Able : Not able (MW sig.)							
Appreciation of family income	Not enough for necessities : Enough for decorous lifestyle (MW sig.)			**0.003**				
Number of people in house per room	<2 : >2 (MW sig.)				**0.030**		**0.037**	
Household ownership	Private : Non-private (MW sig.)							
Household type	Hostel : Flat : House (KW sig.)				**0.002**			
Education	Graduate : Non-graduate (MW sig.)					**0.042**		

- MW Sig = p values resulting from the Mann Whitney U Test
- KW Sig = p values resulting from the Kruskal Wallis H Test

5.3 Pay more – savings in household expenditure

Respondents were asked where they would make savings in household budget items in order to pay more for energy. If the weighted responses are considered, the priority areas for making savings is clearly housing repairs; some respondents could make savings in travel, clothing and telephone costs (see Table 58).

Table 58: Ranking of areas where savings would be made in the household budget

Ranking	Housing repairs %	Food %	Travel %	Debt payment %	Education %	Clothing %	Telephone %	Medical care %
First	60.6	4.5	10.6	0.5	0.5	9.6	9.6	0.5
second	9.6	3.0	6.1	1.0	1.5	8.1	4.0	1.0
third	1.5	0	5.1	0.5	0.5	1.5	3.5	0.5
% response	71.1	7.5	21.8	2.0	2.5	19.2	17.1	2.0
Weighted mean (range 0 to 3)	2.03	0.20	0.49	0.04	0.05	0.46	0.40	0.04

Weighted scores – 1st ranking = 3, 2nd = 2; 3rd = 1; not ranked = 0.

Table 59 shows that few significant differences were found when each option was tested against various poverty indicators.

Table 59 Significant differences in items for making savings amongst groupings

Poverty indicator	Groups	Housing repairs	Food	Travel	Debt payment	Education	Clothing	Telephone	Medical care
% exp on energy	Low : Medium : High (KW sig.)						**0.019**		
Ability to pay for electricity	Able : Not able (MW sig.)							**0.023**	
Ability to pay for gas	Able : Not able (MW sig.)							**0.040**	
Ability to pay for heating	Able : Not able (MW sig.)								
Appreciation of family income	Not enough for necessities : Enough for decorous lifestyle (MW sig.)								
Number of people in house per room	<2 : >2 (MW sig.)								
Household ownership	Private : Non-private (MW sig.)							**0.017**	
Household type	Hostel : Flat : House (KW sig.)		**0.044**		**0.002**				
Education	Graduate : Non-graduate (MW sig.)								

- MW Sig = p values resulting from the Mann Whitney U Test
- KW Sig = p values resulting from the Kruskal Wallis H Test

5.4 Fuel substitution

Respondents were asked to rank their top three choices of fuels they would prefer to use for cooking and heating if the cost of their current fuel were to increase. Potential changes in heating fuels are given in Table 60, which presents the means of weighted scores from this ranking. Only two fuels are given consideration by a significant proportion of the sample - electricity and piped gas:

- The majority of the sample use district heating, and are most likely to change to electricity, and some to piped gas;

- Users of the other appliances (gas and autonomous systems) would also tend to use electricity
- Those using solid fuel (assumed to be coal) are the only group with a clear intention to use wood;
- Some households using portable appliances (i.e. gas range, electric) would switch to wood.

Table 60: Preferred alternative space heating fuels (mean weighted scores)

Main fuel (winter)	N	Preferred change to (range 0 to 3)						
		Electricity	Piped gas	LPG	Central Heating	Mazut	Wood	Coal
Gas Range	4	0.75	0.75	0	0	0	0.75	0
Central Heating	147	2.22	0.69	0.02	0.10	0	0.01	0.01
Electric Heater	4	0.50	1.50	0	0	0.75	0.75	0
Wood/Coal stove	6	0.50	0	0	0	0	2.5	0
Gas stove	13	2.00	0.38	0.08	0	0	0	0.69
Autonomous system	18	2.55	0.44	0	0.17	0	0	0
Total	198	2.12	0.65	0.02	0.11	0.02	0.12	0.07

Weighted scores – 1st ranking = 3, 2nd = 2; 3rd = 1; not ranked = 0.

As with space heating, electricity is the preferred option of alternative fuel for cooking, as shown in Table 61:

- most gas users (91% of the sample) are likely to change to electricity, but many to LPG;
- most electricity users would switch to LPG rather than wood; the high value given to electricity implies that people regard themselves as having little choice, and would be prepared to pay the higher cost.

Table 61: Preferred alternative cooking fuels (mean weighted scores)

Main fuel (winter)	N	Preferred change to (range 0 to 3)				
		Electricity	Piped gas	LPG	Wood	Dung
Gas	180	1.67	0.22	0.98	0	0
Electricity	16	0.81	0.56	1.13	0.38	0.06
Total	198	1.60	0.25	1.01	0.03	0.01

5.5 Intentions

During the preliminary surveys, a number of statements were given regarding possible responses to increasing energy costs. These were used in the questionnaire as intention statements, and can be categorised according to the proposed coping strategies i.e. pay more (P), change fuels (C), and reduce consumption (R). Some of the statements given refer to making informal arrangements (I) to secure power, which was not included as a proposed coping strategy on the basis that this is exactly what the utilities will be taking measures to prohibit; nevertheless, this is evidently regarded as a coping strategy and must be included in the analysis. Table 62 shows 21 intention statements and responses.

It is clear that most of the intention statements have negative responses, indicating reluctance for change (negative response indicates disagreement with statement). The only statements with a positive agreement are in the pay more category; this contradicts responses presented in Table 53 which indicated that reducing energy use was the preferred coping strategy.

Table 62: Intentions regarding impact of electricity price increase ranked and ordered by strength

Category	Statement	Mean	Median	IQR
P	If electricity costs increase we will borrow money	0.16	0	0 to 1
R	If energy costs increase we will STOP using hot water (CS)	0.14	0	-1 to 0
P	If electricity costs increase we will be able to find extra work to pay the extra money	0.12	0	0 to 1
P	If electricity costs our close family will help with paying bills	0.06	0	-1 to 0
R	If energy costs increase we will heat fewer rooms	-0.03	0	-1 to 0
I	If electricity costs increase some people will use beetles	-0.07	0	0 to 0
R	If energy costs increase we will reduce the number of Hours that we heat the house	-0.22	0	-1 to 0
R	If energy costs increase some people will move to a new house to escape from debt	-0.25	0	-1 to 0
R	If electricity costs increase we will be STOP using fridge in summer (CS)	-0.27	-1	-1 to 1
R	If electricity costs increase we will stop watching TV	-0.35	0	-1 to 0
R	If energy costs increase we will change to eating food that does not need to be cooked	-0.38	0	-1 to 0
R	If energy costs increase we will send our children to live move relatives to reduce energy consumption	-0.39	0	-1 to 0
I	If electricity costs increase some people we will make an arrangement with the inspector to cover our debt	-0.40	0	-1 to 0
R	If energy costs increase our whole family will move into a relative's house to save energy	-0.45	-1	-1 to 0
I	If we are disconnected from electricity, we will arrange to take electricity from a neighbour/s supply	-0.47	-1	-1 to 0
P	If electricity costs increase we will buy food on credit	-0.47	-1	-1 to 0
C	If electricity costs increase we will use candles for lighting	-0.55	-1	-1 to 0
C	If energy costs increase we will cut woods by ourselves	-0.73	-1	-1 to -1
C	If electricity costs increase we will use kerosene lamps for lighting	-0.75	-1	-1 to -1
C	If energy costs increase we will cook outside(using wood)	-0.85	-1	-1 to -1

Note that means for all options for the sample as a whole are negative (see Table 63), indicating that there is resistance to any change. The least negative option is to pay more, and reducing consumption is the second most likely response; this is slightly different from the declared intentions (Table 53), where people indicated they would prefer to reduce consumption rather than reduce consumption. In both tables, changing fuels is the option of last resort.

The overall trend is that the better off appear to be more resistant to any type of change (see Table 63); however, only rankings for intention to reduce energy consumption is the only one where differences are significant (KW p = 0.000). Note that the poor appear to be the group with the strongest intention to pay more. It is interesting that they still appear reluctant to steal electricity (although less than other groups), and share a strong aversion to changing fuel; the changing fuel statements refer largely to wood, so this confirms a reluctance (or inability) to switch to solid fuels, probably due to the fact that most dwellings are flats or hostels and not suited to the burning of solid fuels.

Table 63: Mean calculated coping strategies (by material position of household)

Range -2 to +2	N	Pay more	Change fuel	Reduce consumption	Informal arrangements
not enough for necessary things	85	0.0029	-0.6294	-0.1141	-0.2804
enough just for necessary things	91	-0.044	-0.8104	-0.3309	-0.348
enough for livelihood but can't buy expenses	13	-0.1538	-0.6731	-0.3162	-0.4359
succeed to buy expensive things	4	-0.125	-0.5	-0.5556	-0.5
Whole sample	193	-0.0324	-0.715	-0.2391	-0.3273

5.6 Outcomes and Impact

Some of the statements gathered during the preliminary surveys relate to how people believe they will be affected by increasing energy costs. These were used in the questionnaire to assess the strength of belief and the importance given to these. Each statement was presented with a bi polar 5 point scale exploring the degree of agreement or disagreement with each. Outcome statements can be categorised into key issues: family unity (F), security (S), health (H), education (E), financial independence (debt avoidance) (D). Table 64 shows the outcome statements and the mean responses.

Table 64: Outcome beliefs regarding impact of electricity price increase ranked and ordered by strength

Category	Statement	Mean	Median	IQR
H	If energy costs increase we will get sick because of lack of heating	-0.41	0	0 to 1
S	If electricity increase lighting in public places will reduce, so level of crime will increase	-0.36	0	0 to 1
H	If electricity costs increase our inability to pay bills will cause psychological illness	-0.36	0	0 to 1
D	If we are not able to pay increased electricity costs the electricity company will get a court order against us	-0.28	0	0 to 1
F	If electricity costs increase our inability to pay bills will cause conflicts in the family	-0.24	0	0 to 1
E	If electricity costs increase our children's education will be affected by poor lighting	-0.23	0	0 to 1
H	If energy costs increase our health will be affected by not having hot water e.g. for washing	-0.20	0	0 to 1
E	If energy costs increase our children's education will be affected by not enough heating at home	-0.20	0	0 to 1
D	close family will help with paying bills (CS)	-0.06	0	-1 to 1
D	If electricity costs increase we will get into debt with utility	-0.03	0	-1 to 1
S	If electricity costs increase the electricity company will take things from our house to pay debts	0.07	0	-1 to 0
S	If electricity costs increase our house will be disconnected	0.15	0	-1 to 0
H	If energy costs increase we will get sick because of not cooking properly	0.16	0	-1 to 0
S	If electricity costs increase we will be disconnected because of our neighbour's debts	0.65	-1	-1 to 0

When asked to rank the importance of the key issues, health was clearly the priority concern, followed by financial independence and keeping the family together – see **Table 65**).

Table 65: Importance of issues

Ranking	Family %	Security %	Health %	Education %	Finance %
First	14.1	3.5	74.2	1.0	7.1
Second	2.5	3.5	1.5	2.5	16.2
Third	0	1.0	1.5	2.0	2.5
% response	16.6	8.0	77.2	5.5	25.8
Mean rank	0.47	0.19	2.27	0.10	0.56
Median	0	0	3	0	0
IQR	0 to 0	0 to 0	2 to 3	0 to 0	0 to 1

A set of impact measures was calculated as the product of the response to the outcome statement and the importance attributed to the key issue. When ranked (see Table 66), the three most positive impacts relate to health.

Table 66: Attitudes regarding impact of electricity price increase ranked by strength

Statement N=198 Range (-6 to6)	Mean	Median	IQR
ATT will get sick because of lack of heating (CS)	-0.88	0	-3 to 0
ATT our inability to pay bills will cause psychological illness (CS)	-0.76	0	-3 to 0
ATT our health will be affected by not having hot water (CS)	-0.39	0	-3 to 0
ATT thefts and crime will increase (CHANGED SENSE)	-0.19	0	0 to 0
ATT inability to pay bills will cause conflicts in the family (CS)	-0.16	0	0 to 0
ATT electricity company will get a court order against us (CS)	-0.15	0	0 to 0
ATT childrens education will be affected by not enough heating (CS)	-0.08	0	0 to 0
ATT childrens education will be affected by poor lighting (CS)	-0.07	0	0 to 0
ATT close family will help with paying bills (CS)	-0.05	0	0 to 0
ATT company will take things from our house to pay for debts (CS)	-0.03	0	0 to 0
ATT will get into debt with utility (CS)	0.02	0	0 to 0
ATT our house will be disconnected (CS)	0.10	0	0 to 0
ATT will be disconnected because of our neighbours debts (CS)	0.13	0	0 to 0
ATT will get sick because of not cooking properly (CS)	0.36	0	0 to 2

A mean impact scoring can be calculated for each category of outcome statement by taking the mean of all attitudes in each category - the results are ranked in Table 67 and confirm that the greatest impact is likely to be on health. The potential impact on family unity is also flagged as important (bear in mind that this score is based only on a single indicator).

Table 67: Potential impacts resulting from cost increases

Impact N=198	Mean Range (-6 to +6)
Impacts - health	-0.421
Impacts - family unity	-0.157
Impacts - education	-0.071
Impacts - financial independence (debt)	-0.061
Impacts - security in home	0.005
Overall impact (sum) (range -84 to +84)	-2.14

There were few significant differences across the various socio-economic groupings, nevertheless the trends in Table 68 show that the poor feel more vulnerable to adverse outcomes from increasing energy costs (more negative attitude towards possible outcomes). It is interesting to note that people do not regard themselves as being at risk from measures taken by the company to recover costs (security), but they are more concerned that they will get into debt in the course of making payments.

Table 68: calculated attitudes (by material position of household)

		Attitudes regarding:					Overall
range	N	family (-6 to +6)	security (-6 to +6)	health (-6 to +6)	education (-6 to +6)	financial (-6 to +6)	(-84 to +84)
not enough for necessary things	85	-0.3647	-0.0265	-0.6324	-0.1294	-0.1608	-3.7412
enough just for necessary things	91	0.0659	0.0192	-0.2418	-0.033	-0.0037	-0.9011
enough for livelihood but can't buy expenses	13	-0.4615	0.1154	-0.2308	0	0.1538	-0.4615
succeed to buy expensive things	4	0	0	-0.75	0	0	-3