THE WORLD BANK

ASSESSMENT OF HOUSEHOLD ENERGY DEPRIVATION IN TAJIKISTAN

Social Development Unit
Europe and Central Asia Region
The World Bank

Final Report
June 2014







Policy options for socially responsible reform in the energy sector



ASSESSMENT OF HOUSEHOLD ENERGY DEPRIVATION IN TAJIKISTAN

POLICY OPTIONS FOR SOCIALLY RESPONSIBLE REFORM IN THE ENERGY SECTOR

Social Development Unit
Europe and Central Asia Region
The World Bank

Final Report
June 2014

THE WORLD BANK

Document of the World Bank

ABBREVIATIONS AND ACRONYMS

CALISS	Central Asia Longitudinal Inclusive Society Survey
GBAO	Gorno-Badakhshan Autonomous Province
KWh	Kilowatt Hour
RRS	Raions of Republican Subordination
SDC	Swiss Agency for Development and Cooperation
TALCO	Tajik Aluminum Company
TJS	Tajikistani Somoni (1 US$ = 4.76 TJS)
TLSS	Tajikistan Living Standards Survey

Regional Vice President:	Laura Tuck
Country Director:	Saroj Kumar Jha
Country Manager:	Marsha Olive
Sector Director:	Laszlo Lovei
Sector Manager:	Elisabeth Huybens
Task Team Leader and Author:	Rob Swinkels

TABLE OF CONTENTS

ACKNOWLEDGEMENTS

This study draws on the contributions of many people who participated in the research. We would like to thank the 228 men and women who participated in the focus group discussions, the 3300 men and women who were interviewed as part of the formal household survey, and, lastly, the 11 local officials and the four case study households who shared their experiences and opinions with us.

This report was produced by a World Bank team consisting of Rob Swinkels (Task Team Leader), Sophia Georgieva (Consultant) and Anne Olivier (Consultant). Overall guidance was provided by Elisabeth Huybens and Marsha Olive. Laurent Debroux provided helpful support. "Zerkalo" Center for Sociological Research in Tajikistan conducted the primary research for this study.

The team is grateful for valuable peer review inputs from Lucian Bucur Pop, Sameer Shukla, and Sonya Sultan of the World Bank. The report has also benefitted from comments and contributions by Yuriy Myroshnychenko, Oleksiy Sluchinskiy, Sunil Khosla, Caterina Ruggeri Laderchi, Angela Khaminwa, and Takhmina Mukhamedova of the World Bank. Nigina Alieva and Heather Worley of the World Bank provided help with communication and outreach. Joost de Laat (World Bank) and Federico Torracchi (Consultant) supported the implementation, design and data preparation of the formal household survey. Kimberly Johns (World Bank) kindly provided preliminary tabulations of the Tajikistan citizen report card survey conducted in 2013. Bonita Brindley provided professional editing of earlier drafts of this report. Ayshe Muratova, Farangis Dakthe, Gohar Grigorian, and Victoria Bruce-Goga of the World Bank supported all logistical aspects.

The document benefited from information and guidance from government officials, representatives of civil society organizations and donors provided during discussions in February 2012. Feedback on the draft summary report was provided by a similar set of stakeholders during consultation meetings in early May 2014. Bakhadur Khabibov of the Consumer's Union in Tajikistan provided written comments on a draft summary of the report. Anne Randell (GERES) and Rozik Chorshambiev (GIZ) provided detailed information on efforts to improve residential energy efficiency in rural Tajikistan. We are grateful for their advice and suggestions.

SUMMARY

SUMMARY

1. **Every year an estimated seventy percent of Tajikistan's population suffers from severe electricity shortages in winter.** The energy sector was affected by dramatic changes over the last few decades – regional energy cooperation was disrupted after the break-up of the Soviet Union, gas imports were interrupted, and the state was unable to invest adequately in the maintenance of the national energy infrastructure. Tajikistan has been facing severe power shortages in winter months since the district heating system collapsed and households as a consequence started to use electricity for heating purposes. The Tajikistan power system was severed from the Central Asian power system in 2009 and since that time the country's power supply has been relying for 98% on domestic hydropower plants. Shortages occur in winter when demand is high but water flows are low, whereas in summer there has been significant underutilized power surplus. Imports of piped natural gas from Uzbekistan were stopped in 2012 as the two countries could not reach an agreement on the price. As a consequence of all this, severe load-shedding occurs in winter and customers receive electricity only three to seven hours per day in every region except in the capital Dushanbe and in Gorno-Badakhshan Autonomous Province (GBAO).[1] While only about 10 percent of the population lives in Dushanbe, they consume almost 40 percent of the total residential electricity consumption.

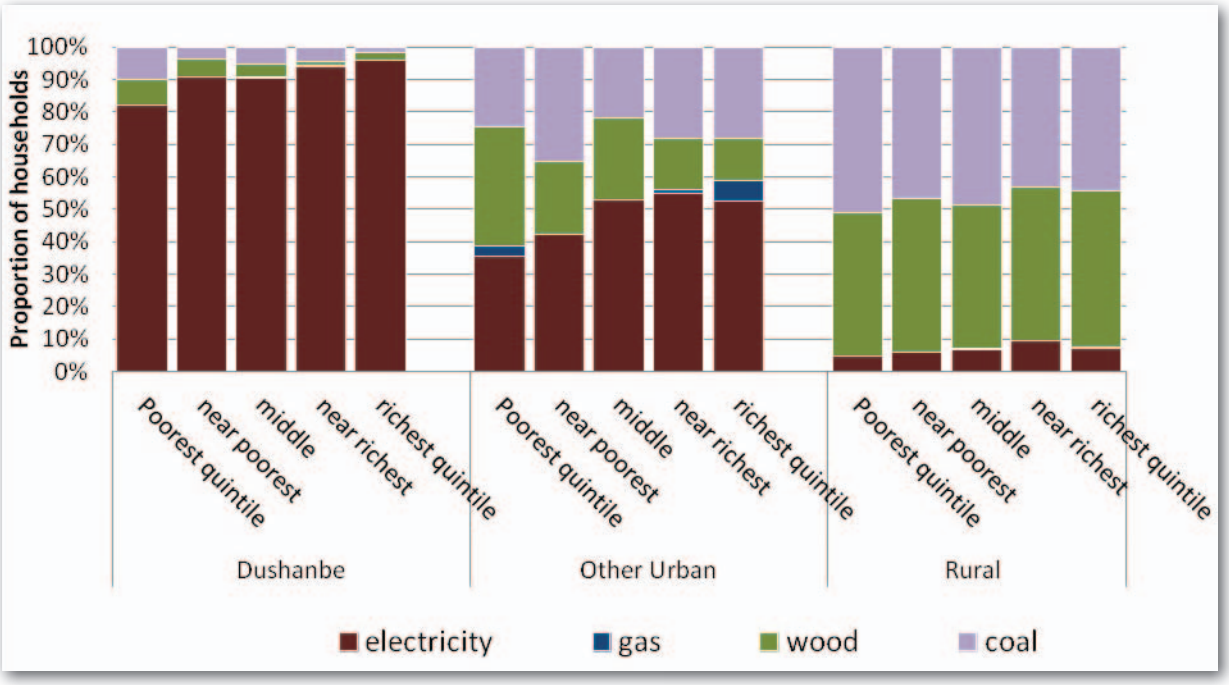
2. **This report assesses energy deprivation in Tajikistan with an emphasis on the human dimension, paying special attention to rural areas**. **It takes a broad look at household energy security, affordability, and coping mechanisms, in order to inform short and medium-term policies to mitigate energy deprivation.** Firstly, it analyzes energy use and spending patterns across diverse groups of consumers – low and middle-income, rural and urban, people who live in houses and those who live in apartments – as the type of energy used determines household vulnerability. Secondly, it examines impacts of energy expenses on the household budget, and strategies adopted to cope with energy payments. Thirdly, it collects consumer attitudes towards potential measures to improve energy security and affordability, such as social assistance and support to improve energy efficiency. It explores the conditions under which an electricity tariff increase would gain acceptance among consumers. Fourthly and lastly, the report simulates the quasi-fiscal impact and the targeting performance of a series of measures that could cushion the impact of rising energy expenditure.

3. **The findings in this report are based on focus group discussions, key informant interviews, and a household budget survey.** The latter included an expanded module on energy consumption with a booster sample for Dushanbe to capture middle income urban households. The household budget survey was nationally representative and included 3,300 respondents. Twenty eight focus groups (with a total of 228 respondents) were conducted with rural and urban, low and middle-income respondents, and men and women in different geographic areas of the country. Mini-case studies were used to illustrate the particular energy situation of four poor households in different circumstances. Key informant interviews were conducted with local leaders, directors of schools, clinics and other social buildings, and civil society organizations. The focus groups, interviews and survey were conducted in the spring and summer of 2013.

4. **The type of energy used for heating differs highly between locations, but does not differ much between wealth groups within a location with the exception of urban areas outside Dushanbe**. In urban areas outside Dushanbe the poorer households use relatively more wood and the wealthier ones rely relatively more on electricity for heating (Figure A second panel). Urban apartment dwellers rely almost exclusively on electricity for heating their homes, while urban house residents use electricity, wood and coal with almost equal intensity. In rural areas, wood and coal are the main heating sources used (Figure A third panel). Yet rural households also use electricity intensively, including for heating, when it is available.

1 In Gorno-Badakshan Autonomous Province electricity is supplied by a separate public-private partnership company (Pamir Energy), which makes its energy situation quite different from the rest of the country. The capital Dushanbe tends to be exempted from load shedding by Barki Tajik, its electricity provider.

Figure A. Major heating source by wealth groups and by location (proportion of households)



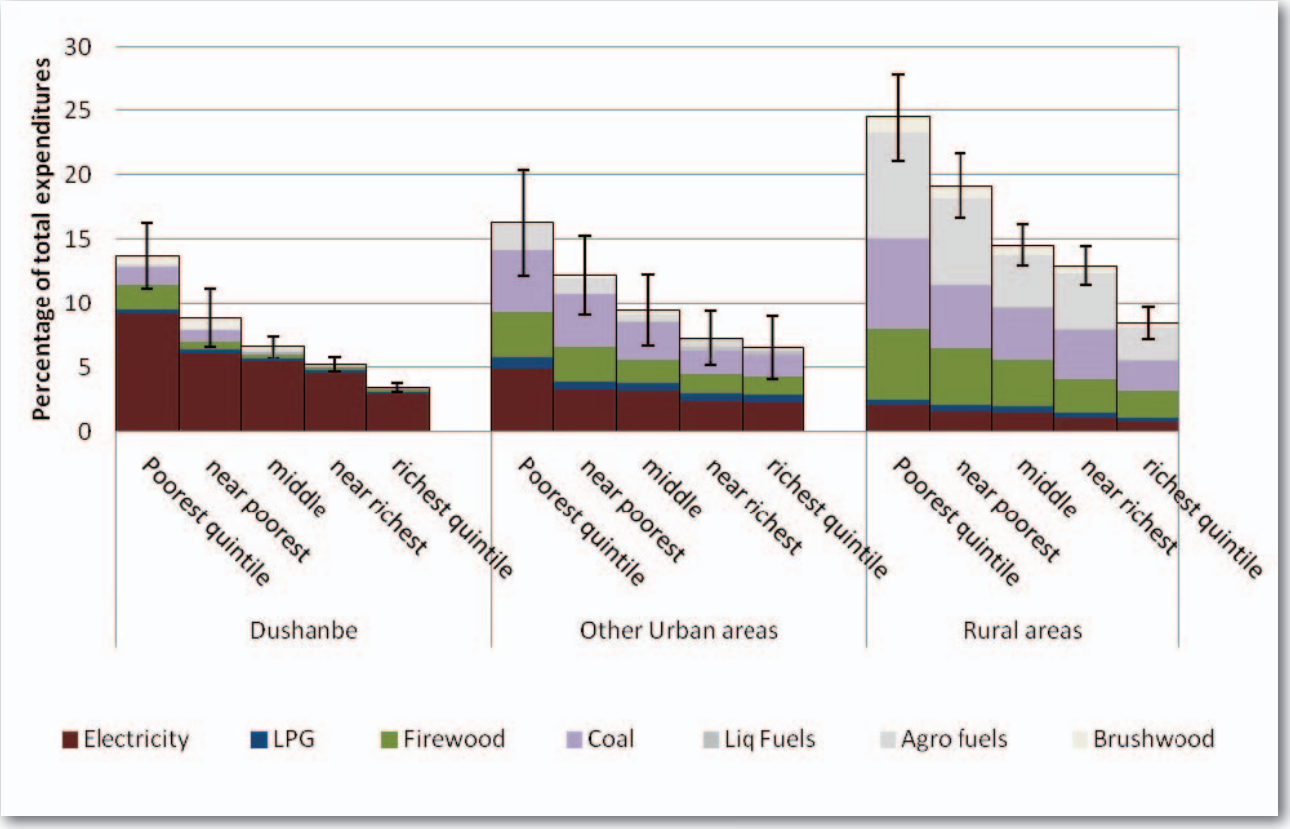
Source: World Bank staff, based on data from the Central Asia Longitudinal Inclusive Society Survey (CALISS), 2013

5. **Energy deprivation and affordability especially affect poor rural households who spend a large share of their total consumption expenditure on energy. This share is higher than for households in urban areas.** During the heating season, the poorest quintile in rural areas spends almost 25 percent of their monthly consumption expenditure on energy. The poorest quintile[2] in urban areas outside Dushanbe spends approximately 15 percent of their consumption on energy, during winter while in Dushanbe this figure is 14 percent (Figure B). On an annual basis these figures are 14, 10 and 9 percent respectively and among the highest in Europe and Central Asia. Rural households also have fewer available coping strategies than urban ones and are negatively affected by the limited supply of electricity in the winter for lighting and other basic needs.

6. **Electricity shortages in rural areas affect the quality of social service delivery. Some schools and medical facilities face the same electricity rationing as residential areas which affects their functioning. They can only operate during daylight.** Densely populated areas have a special electricity line for social buildings (a so-called "red line"), which supplies unlimited electricity during the heating season. However, it is common for private houses or small shops to connect illegally to the red line, resulting into social buildings receiving less energy than needed. In the winter of 2008, no heating systems were operating in 26 percent of Tajikistan's schools and health centers. Reduced access to heat and electricity (and therefore running water) forced many hospitals and health centers to close or work restricted hours—in some cases discharging patients. Our findings suggest that these problems continue to affect the rural population of Tajikistan.

2 The poorest quintile is the poorest of five equal groups into which the survey population is divided according to their level of consumption expenditure using the survey expenditure data.

Figure B. Proportion of total household consumption spent on energy by wealth groups and by location during the heating season



Source: World Bank staff, based on data from the Central Asia Longitudinal Inclusive Society Survey (CALISS), 2013
95% Confidence Interval shown in error bars

7. **Findings suggest that large groups of rural households are struggling to meet their energy needs and keep warm**. Coal and agro-fuels form the bulk of the energy expenditures. The poorest households often have difficulty taking advantage of the low seasonal prices of coal and firewood at the end of the summer due to cash liquidity constraints and competing expenses (e.g. back to school demands in early fall). Rural focus group participants reported that on average a rural household spends Somoni 1600-2000 (US$ 340-425) on coal per year, which would be between 5 and 15 percent of an average annual household income in the country.

8. **During the heating season in Dushanbe - where electricity is available on a near continuous basis – households consume at least 800-900 kWh per month**, compared to 400-600 Kwh in other urban areas and 200-250 kWh/ month in rural areas. In Dushanbe electricity is the main electricity source for heating homes and water, cooking and for using electric appliances. The main reasons for that are lack of alternative heating sources and low energy efficiency of residential buildings. Together with their low incomes, this explains why even with the current low electricity tariffs, the poorest households in Dushanbe suffer from high energy expenditure burdens during the heating season.

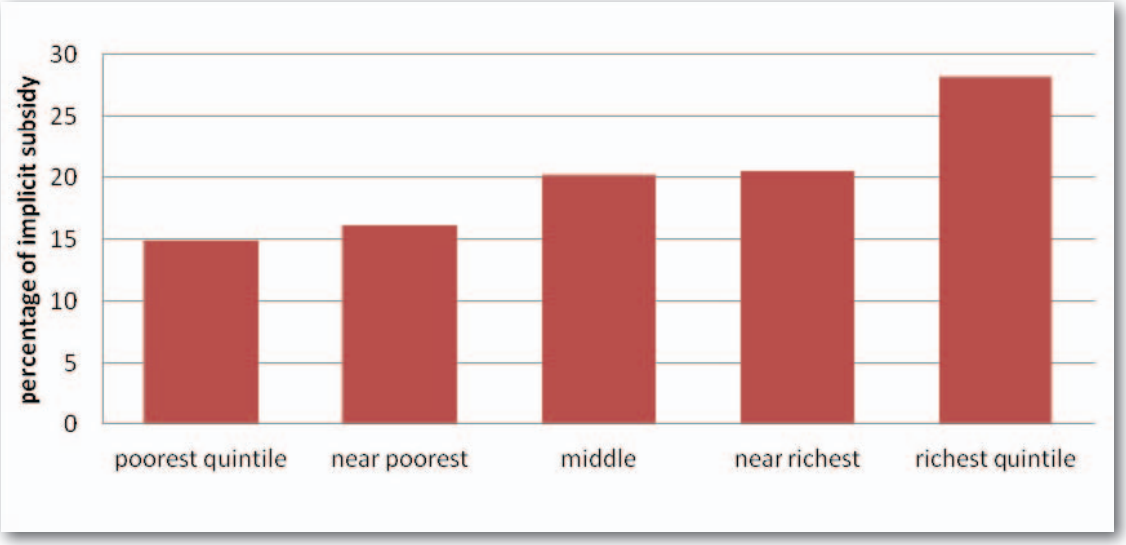
9. **Cutting expenditures on food and clothes are the two most common strategies applied by rural households for dealing with high energy expenses.** Households are also trying hard to reduce their consumption of energy to the extent this is possible. Most study participants conveyed they were willing to reduce food intake to be warm and preferred to be a little hungry in a warm home. In fact, nearly all rural focus group respondents reported that higher energy costs force them to reduce spending on food. Some population groups are considered especially vulnerable to high energy expenses given their level of income. These groups include, in order of priority, single mothers especially those without remittance income, families with many children, pensioners living alone without family support, people with disabilities, and - in rural areas - doctors and teachers.

10. **Poor households in both urban and rural areas actively adopt low-tech low-cost energy-saving measures.** These include heating only one room in their home for (extended) families to live in during winter, lining walls with carpets, and sealing windows with polyethylene sheets. More technologically advanced options such as plastic windows, foam insulation, and energy-efficient appliances are known but largely unaffordable even for middle-income households. Plastic windows were considered by some to be bad for their health. Financial incentives to support more comprehensive energy efficiency measures are considered to be effective only for middle class households.

11. **Tajikistan's electricity tariffs are the second lowest in Europe and Central Asia and energy efficiency is extremely low.** A recent World Bank report on the winter energy crisis in Tajikistan emphasized the need to raise tariffs in order to better recover costs and improve services. At the same time, there are important concerns about the affordability of electricity price increases in an environment where alternatives such as gas and district heating are no longer available, incomes are low, and where consumer trust in the integrity and transparency of the electricity utility company is limited.

12. **Implicit electricity subsidies - resulting from supplying electricity to households at a price that does not recover its cost - are regressive and benefit richer households more than the poorest groups (Figure C).** This is not surprising given that for the country as a whole, electricity consumption is higher among high income households compared to those with lower incomes (as measured through the formal household survey used for this study) (Figure D). According to this survey, urban and richer households benefit disproportionally from the current implicit electricity subsidies. This counts especially for households in Dushanbe where electricity is available on a near continuous basis. Clearly, the current low electricity tariff policy is an inefficient and ineffective means for targeting public resources to poor and vulnerable households to protect them from high energy expenditures.

Figure C. Distribution of implicit electricity subsidies across wealth groups



Source: World Bank, based on data from the Central Asia Longitudinal Inclusive Society Survey (CALISS), 2013

13. **Residential tariff increases might be acceptable to the population, especially in rural areas, but only if a number of conditions related to quality of service, and transparent and equitable billing methods are met.** First, electricity supply must become more reliable. Second, the suppliers must be more committed to repairing system breakages promptly at their own expense. And, third, the supply and billing system must be transparent, treating all customers equally, eliminating illegal connections, and prohibiting homemade electrical heaters (these contribute to system breakdowns and subsequent repair costs that are borne by all consumers). There is a widespread public perception of corrupt practices and consumer trust in the electricity utility company is very low. In areas were pre-paid metering is in place such as in parts of Khatlon satisfaction rates with electricity services are above the national average (although below GBAO), according to a recent World Bank citizen report card survey (World Bank, forthcoming). Pre-paid metering systems leave less scope for corruption and facilitate more transparent billing in the country. However, they require households to pay for electricity before they have received it instead of paying for it afterwards. This may in some cases be problematic for the poorest households.

14. **An increase in electricity tariffs – needed to make plans for addressing Tajikistan's electricity crisis financially viable – also would need to be accompanied by measures to protect low income households**. A fifty percent increase[3] would have the largest impact on poor households in Dushanbe and other urban areas. During the heating season, spending on energy would rise from about 14 percent to almost 19 percent of household consumption in Dushanbe and would reach 20 percent for the poorest households in other urban areas. This assumes that electricity consumption patterns remain unchanged, a realistic assumption on the short term, especially for apartment dwellers for whom there are no safe heating alternatives.

15. **Currently social assistance plays a very limited role in assisting the poor and vulnerable.** According to the CALISS 2013 survey, social assistance reaches only about 5 percent of the population and about a similar proportion of the poorest fifth. It is weakly targeted to the poor: only about 17% of all social assistance goes to the poorest fifth of the population while 20% goes to the richest quintile. Energy-related benefits cover less than 2 percent of the population (and about 2 percent of the poorest fifth). The main obstacles to accessing social assistance include: (a) a widely held perception that an application for social assistance requires substantial documentation and time; (b) limited access to information on existing social assistance programs and little awareness of their existence among the population; and (c) a perception that the social assistance system operates in an unfair and corrupt manner. As a result the motivation to apply for social assistance is low.

16. **A pilot of a reformed targeted social assistance scheme conducted in two districts in 2011-2012 showed that the new targeting mechanism was approximately twice as accurate in directing social assistance to poor households as the old program.** The pilot tested a new mechanism of identifying the 20 percent poorest households using the Proxy-Means Test (PMT) method. It identified the poor more accurately than the old system. Despite the small transfer amounts, beneficiary households reported significantly higher satisfaction. At the same time, several areas for improvements were identified. These include work to further assess the effectiveness of the PMT formula and operational design of the scheme. In 2013, the targeted social assistance was expanded from two to ten districts. Further roll out of the new program is planned for 2014, with subsequent national roll out by end 2016.

17. **A number of measures can be applied to cushion the poor from rising energy prices and expenditure burdens. These include social benefits targeted to the most vulnerable, and support measures for promoting energy efficiency of houses**. Targeted social benefits can be an important means for transferring cash or other benefits to the poorest, provided they are able to identify and reach them. Energy efficiency measures require awareness and mechanisms for financing such investments. While in principle block tariffs and volume differentiated tariffs can also play a role in protecting the poor, their application in Tajikistan faces a number of constraints (see below).

18. **Three different criteria can be used to compare the effectiveness of different mitigation mechanisms for rising energy costs for the poorest groups.** These include (i) lower energy expenditure burdens for households in the poorest quintiles, (ii) a higher proportion of (implicit) subsidies and benefits going to the poorest groups, and (iii) lower fiscal and quasi-fiscal costs. A number of simulations were conducted using the CALISS 2013 household survey data to find mitigation mechanisms that provide the best balance between these objectives.

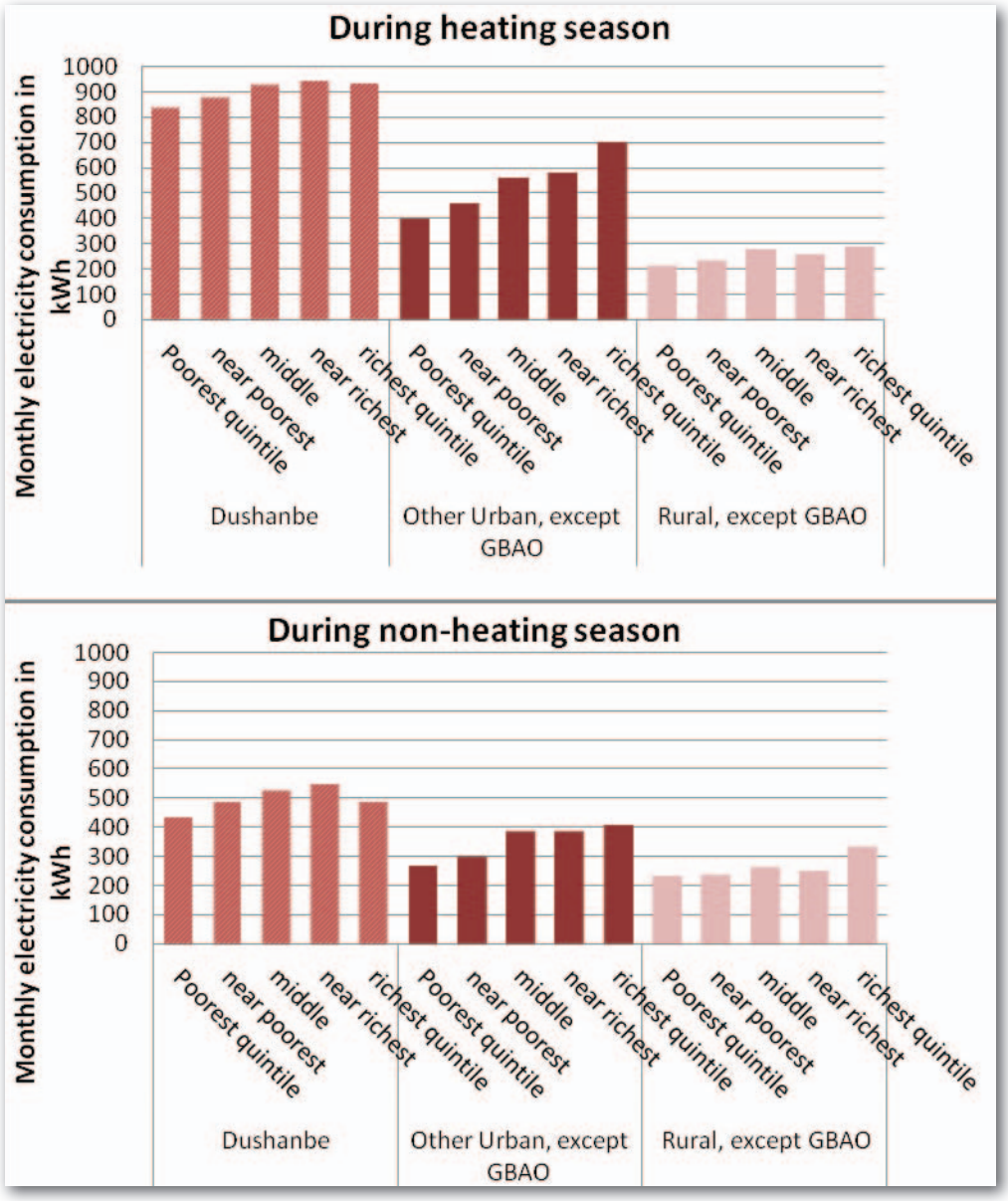
19. **The combination of a fifty percent increase in electricity tariffs with targeted social assistance to compensate households in the poorest quintile for the extra expenses they will incur, would lead to additional revenues for Barki Tajik (the main electricity utility provider in Tajikistan) of Somoni 18.6 million.** A compensation for the tariff increase provided to the poorest quintile through the new targeted social assistance program would on average involve a transfer of Somoni 18.3 per month per household in that quintile. But the reformed targeted social assistance program will not cover all the poorest due to exclusion errors of the proxy mean test mechanism and because some of the poorest tend to not apply for these programs. While further improvement in coverage would certainly be possible over time, reaching all households in the poorest quintile will be near to impossible. Other complementary measures will therefore be needed. Also, as noted above, the roll out of the new targeted social assistance program will only be gradual, hence it will need to be closely coordinated with the schedule of implementation of the tariff reforms.

20. **Volume differentiated tariffs or block tariffs would provide a minimum amount of electricity at a low price for all electricity consumers with higher prices for those that consume more. But the subsidies involved would not be well targeted to the poorest given the small differences in electricity consumption across wealth groups within a**

3 The Government of Tajikistan has committed under recent power sector investment projects supported by International Financial Institutions to increase electricity tariffs by about 50% during 2014-2016.

location, except for urban areas outside Dushanbe (Figure D). Block tariffs for electricity would involve charging lower prices for consumption below a certain threshold per month. Volume differentiated tariffs are similar to block tariffs except that households that consume above the threshold pay the higher tariff for their whole consumption. Block tariffs or volume differentiated tariffs can only target the poor if a household's electricity consumption is a good proxy for its wealth level. Moreover, block tariffs would only help if households are in a position to use less electricity either through adopting energy efficiency measures or by accessing other means for heating their homes. Block tariffs would also do little for rural dwellers who suffer the highest energy expenditures in the country and for whom electricity currently is a relatively unimportant source of energy. Under the current electricity rationing regime, a tariff of 11 d/kWh for consumption below 500 kWh per month in winter and below 250 kWh per month for the rest of the year, and a tariff of 16.5 d/ kWh for consumption above this amount per month would generate additional resources for Barki Tajik of Somoni 8.3 million (about US$ 1.7 million) per month out of a total of Somoni 22.5 million per month that is spent on implicit subsidies under the current universal tariff.

Figure D. Household electricity consumption during the heating and non-heating season by household wealth group and by location (in Kilowatt hours per month)



Source: World Bank staff, based on data from the Central Asia Longitudinal Inclusive Society Survey (CALISS), 2013

21. **Areas where block tariffs and volume differentiated tariffs have been rolled out such as GBAO demonstrate that these are technically feasible.** Tariffs that are differentiated across consumed volume or regions are therefore in principle a possible option. However, incentives for lower consumption of electricity under block tariffs and volume differentiated tariffs only work if households are able to control their electricity consumption levels so as not to exceed an affordable limit. Making available non-electricity heating sources and investments in the energy efficiency of houses and apartment blocks are an important part of the solution for this group.

Recommendations

22. **There is a need to redirect the current implicit electricity subsidies that largely benefit urban households, to households that are affected most by energy deprivation, which are those in rural areas. The most important measure to improve the energy security of rural households and poor urban families is to drastically expand the coverage of the social assistance program.** The first priority here is to roll out the reformed safety net as soon as possible and extend publication campaigns around this program to ensure that more of the poorest households apply. This should take into account that the rural poor spend the highest percentage of expenditures on heating in the winter, and have fewer coping strategies. It would be the most effective way of helping the poor with high energy expenditures regardless of what energy source they use.

23. **A possible seasonal nation-wide top-up to the social transfers provided through the reformed targeted social assistance program to help the poorest households meet energy expenses should be explored.** Given the very poor household perceptions about the integrity of current social assistance programs, there is a need to not only conduct intensive communication campaigns around the new and more transparent proxy means test approach for identifying poor households but also consider including grievance redress mechanisms. The new proxy means test approach to identify households in the poorest (and or near-poorest) quintile[4] could also be used to deliver pre-paid electricity cards to them or channel funds through pre-paid electricity accounts so that they can pay for electricity costs below a lifeline threshold. Given the low coverage of the poorest groups by the new social assistance program there is also a need to further improve the proxy means test and enhance the awareness of poor population groups and encourage them to apply. However, the proxy mean test approach to identify poor households will inevitably lead to exclusion errors and not all households that would qualify for the social assistance program will apply. This means that there will always be poor people that will be rejected wrongly for the program.

24. **Various measures could be contemplated to enhance residential energy efficiency of poor and middle income rural households. Work by GIZ and the NGO GERES has shown that there is a large potential for improving the energy efficiency of rural homes using local materials.** Lessons from their various rural pilot programs should be used to scale up successful measures. The GIZ Warm Comfort program has installed thermal insulation and energy efficient solutions for households in the Gorno-Badakshan region (GBAO). In this program, home improvement solutions for energy efficiency were manufactured and supplied by local cooperatives. The GIZ program has trained and certified craftsmen in making double glazed wooden windows and double doors. Demand for these products is said to be large. Research by GERES in Sughd has identified nine promising technologies which have been published in a catalogue (GERES, undated).[5]

25. **For rural households, initiatives could be introduced that promote energy diversification and that address seasonal price fluctuations.** These could include (i) production of eco-fuels, e.g. biomass coal briquettes from existing farm bi-products; and (ii) where relevant and economically viable, renewables such as solar wind and small hydropower. In addition, savings or community funds could be introduced that would relieve cash constraints for poor families for the autumn purchase of winter fuels. Such mechanisms would allow purchasing fuel at the optimal price and providing short-term storage. This would allow families to smooth seasonal expenditure shocks and pay when money is available from their income or remittances. Community funds could also be used to supplement the available budget for heating of schools, childcare centers, and clinics.

26. **Improving the governance of the power sector by introducing measures to enhance the transparency of its revenue and cost structure and improving the accountability of Barki Tajik towards its customers** would be an important part of the reform package. This should include introducing steps to eliminate illegal connections, set clear standards of company and consumer responsibilities for quality of service, respond to maintenance requests, and create space for consumer engagement in decision-making. Consumer feedback mechanisms should also be created (see Box 7 for an example of such a

4 The poorest quintile is the poorest of five equal groups into which the survey population is divided according to their level of consumption expenditure using the survey expenditure data.
5 http://www.geres.eu/images/publications/catalogue-tajikistan-en.pdf

mechanism using ICT-tools). Pre-paid metering systems piloted in Khatlon and automatic billing such as takes place in GBAO have shown to greatly improve consumer satisfaction in terms of billing transparency and can serve as examples for the rest of the country in this respect.

27. **Any residential tariff increases would need to be accompanied by a strong communications campaign**. Communications are key for making sure that consumers understand why tariff increases are necessary, what will be done to improve the quality and integrity of utility services, improve information disclosure and strengthen accountability. Good communication is also important for explaining what will be done to protect the poor and vulnerable from the impact of a tariff increase, and what will be done to help households improve the energy efficiency of their homes.

28. **Solutions for mitigating energy deprivation in Dushanbe and other urban areas should include the provision of non-electricity means of heating homes.** An upcoming World Bank study on urban residential heating options in Tajikistan will shed further light on such alternatives. While urban residents benefit disproportionately from the current implicit electricity subsidies, the urban poor will be most affected by any possible electricity tariff increases for the residential sector. It will therefore be important to coordinate any change in tariffs with (i) measures that enable low- income households to reduce electricity consumption, and (ii) the roll-out of the reformed social safety net program which is scheduled to be completed by 2016 (- while at the same, as suggested, further strengthening the social safety net program itself).

29. **Speeding up the roll-out of metering systems and automatic billing systems across the country would make it feasible to introduce block tariffs and volume differentiated tariffs in urban areas outside Dushanbe and rural areas, once electricity is provided there on a continuous basis.** Such a tariff policy could also be expanded to Dushanbe once measures for reducing the dependency of households on electricity for heating their dwellings and for enhancing their energy efficiency are more widely accessible.

30. **Continuing to bringing evidence based on household experiences, perceptions and budgets to the debate on energy deprivation and reform in the energy sector in Tajikistan will be important going forward.** Strengthening the existing household expenditure survey to better capture variations in energy use and expenditures would be a priority in this respect. Energy plays an important role in household expenditures and more detailed (seasonal) information should be captured. This would make it easier to provide evidence of the impact of energy reforms on different consumer groups and provide a more accurate basis for targeting of dedicated assistance programs. In addition, mechanism to track consumer satisfaction would be needed.

1.

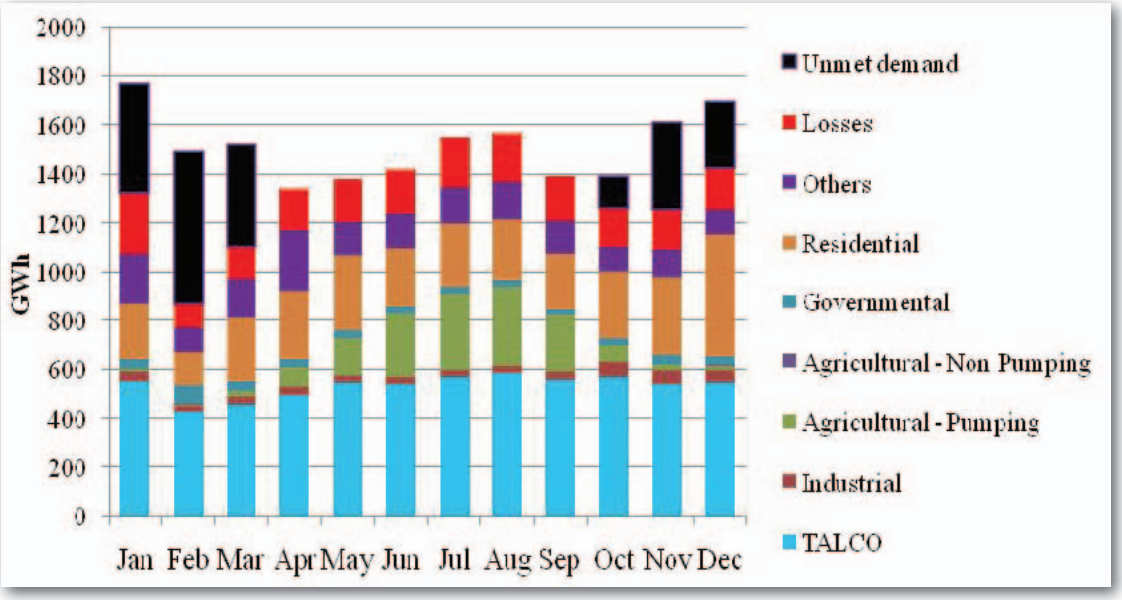
INTRODUCTION

1. INTRODUCTION

1. **Tajikistan has a vast unmet demand for electricity and severe load shedding occurs. Despite high connection rates (99 percent), approximately seventy percent of the population, predominantly in rural areas and small towns, faces severe electricity shortages each winter.** According to a recent World Bank report on Tajikistan's energy crisis (Fields et al (2012)), these shortages amount to about 2,700 GWh, about a quarter of winter electricity demand. Tajikistan has been facing severe power shortages in winter months since households started to use electricity for heating purposes after the district heating system collapsed. The winter energy shortages are caused by a combination of low hydropower output during winter when river flows are low and demand is high driven by heating needs (with no alternative energy source available). The electricity shortages worsened after Tajikistan energy trade with neighboring countries through the Central Asia Power System (CAPS) stopped in 2009. As there has been no investment in new electricity supply capacity and improvement in maintenance of existing assets, the shortages have not been addressed. Without immediate action the shortages could increase to 4,500 GWh by 2016 (over a third of winter energy demand) or worse (Fields et al (2012)).

2. **Demand for electricity is unusually high in Tajikistan because there are limited alternative options for heating, especially in urban areas.** The aluminum smelter TALCO accounts for 40 percent of demand. The residential sector consumes 44%. Unmet demand is high in winter months, largely caused by heating needs. In contrast, electricity use by the agricultural sector is largely restricted to the summer months when it is needed for pumps to meet irrigation needs (Figure 1).

Figure 1: Monthly electricity demand by sector, 2009



Source: SNC (2011) as quoted in Fields et al (2012)

3. **Addressing winter energy shortages requires measures to reduce domestic demand, increase domestic supply and expand regional electricity trade.** A comprehensive energy efficiency program can lead to 50 percent savings in energy use (Fields et al (2012)). Such a program would consist of a number of elements. These include establishing incentives for customers to ration their energy use through higher electricity prices, and providing low cost financing for energy efficiency and investments and energy audits. Increasing domestic electricity supply on the short term would need a rehabilitation of existing hydropower assets construction of a proposed thermal power plant, and possibly increasing the use of waste heat to heat buildings. Finally, available off-peak power from Uzbekistan could help reduce Tajikistan's winter energy shortfall. This proposed plan would require about US$ 380 million per year over the next eight years. With the current low electricity prices in Tajikistan (which at Somoni 11 or US$ 0.023/ KWh are the second lowest in Europa and Central Asia), addressing Tajikistan's electricity crisis is not financially viable. Financing such an investment will require tariff adjustments roughly estimated in the order of 50 percent on the short term across industrial and residential consumers (Fields et al (2012)).

4. **At the same time, measures to enhance cost recovery in the energy sector cannot be taken without assessing their possible impact on household welfare upfront and taking measures to protect low income and vulnerable households.** According to a recent UNDP poverty and social impact assessment, there are strong indications that a large increase

in residential energy tariffs if unmitigated would further strain household budgets, particularly for poor and vulnerable consumers (UNDP, 2011). A recent regional World Bank study provided evidence that energy consumption is quite price inelastic, particularly among poorer households, and that, in the past, energy consumption patterns have often remained stable even when tariffs have increased. This can lead to higher energy shares in household budgets at the expense of food and health care (World Bank 2012).

5. **Consumer acceptability of further measures to promote cost recovery in the energy sector appears to be affected by poor service quality and the lack of transparency on the flow of revenues and expense of Barki Tajik, the main electricity utility provider in Tajikistan.** Further improving the governance of the electricity sector and improving the quality of service to consumers therefore would be essential elements of strengthening the acceptability of reform among the public. The energy situation of consumers in rural areas and small towns deserves special attention.

6. **The evidence for developing a well-informed energy strategy for the residential sector in Tajikistan is hampered by a lack of detailed understanding of how households currently are affected by energy deprivation and how this differs across population groups.** There is a lack of knowledge in three interrelated areas: (1) current energy consumption patterns and expenditure burdens (2) the costs of coping with energy shortages, and (3) what social assistance mechanisms are available to households and what role they could play in securing energy access for low income households. In addition, there is a need to assess the welfare impact of higher electricity prices and the conditions under which these would be acceptable to different types of households in Tajikistan. A recent regional report found that Tajikistan households had the highest energy burden in the region (World Bank 2012).

7. **This study aims at identifying and assessing options for improving household energy security and affordability in the short term and medium term**, with a particular focus on low and middle income households in rural and also in urban areas in Tajikistan. Specifically, it provides in-depth analysis of the following questions:

- What types of energy do households use for basic needs, such as heating, lighting and cooking? What are their seasonal energy consumption and spending patterns? What are their most stressful times in coping with energy expenditures?

- How do energy expenses and spending patterns vary across population groups? How have these changed over time?

- What coping strategies do households employ for dealing with energy shortages and rising energy costs? What is the impact of these strategies on their welfare?

- What current social assistance or other support measures can be taken to lessen energy burdens on households and what are their fiscal and poverty impacts?

- What measures are perceived as most suitable for protecting poor and middle class households against rising energy expenses?

- What incentives and options do households have to save energy in order to reduce energy costs?

- Under what conditions would households be willing to pay more for electricity?

It is hoped that this study will help decision-makers to rebalance policy emphasis from universal implicit subsidies for all consumers to investments in energy generation and energy efficiency, and effective social assistance and protection of the poor and vulnerable.

8. **Data for this study were collected in the field during the spring and summer of 2013 and include both qualitative and quantitative information**. Qualitative data were gathered through twenty-eight focus group discussions held across eleven sites across Tajikistan (see Map 1), eleven key informant interviews, and four ethnographic interviews. The focus group sample was designed to capture key differences in household use of energy across urban and rural areas, among house and apartment residents, and between low and middle-income groups. Quantitative household data were collected through a regional household survey referred to as the 2013 Central Asia Longitudinal Inclusive Society Survey (CALISS). In Tajikistan the survey covered a nationally representative sample of 2,000 respondents, supplemented with a booster sample of 1,300 respondents in Dushanbe. The survey included an enhanced energy module designed to better capture seasonal variations in energy spending. Use is also made of a citizen report card survey on access and quality of public services for the population (World Bank, forthcoming). A more detailed description of the methodology is presented in Annex A. Socio-economic characteristics of the locations of the qualitative research are presented in Annex B.

1. INTRODUCTION

Map 1.Location of research sites for focus group discussions and In-Depth interviews

9. **The report is structured as follows:** Chapter 2 describes recent developments in the energy sector since independence and presents energy consumption patterns in residential and social buildings. Chapter 3 discusses seasonal household energy expenditures across a range of population groups and willingness to pay for higher tariffs. Chapter 4 describes the prevalent strategies households use in order to cope with energy costs, as well as their willingness and capacity to engage in energy-saving measures. Chapter 5 discusses available social assistance programs and options for further mitigation of electricity tariff increase. Chapter 6 presents results from policy simulations of different tariff increase scenarios and social assistance measures and discusses the pros and cons of policy options. Chapter 7 summarizes key findings and policy recommendations. Annex A presents the research design, methodology, and the analytical approach for the primary research. Annex B discusses the characteristics of the locations chosen for the qualitative research. Annex C presents a methodological note on the policy simulations. Lastly, Annex D provides an overview of some of the utility data used for this study.

2.

THE ENERGY LANDSCAPE IN TAJIKISTAN

2. THE ENERGY LANDSCAPE IN TAJIKISTAN

10. **This chapter provides an overview of the trends in availability and use of energy sources in Tajikistan.** It describes the key changes and adaptability of Tajikistan's households to energy shortages over the past twenty years. The chapter also presents the sources for each type of energy used, their costs, and use patterns for different households groups, as well as for social buildings such as schools and clinics.

THE ENERGY SECTOR SINCE INDEPENDENCE

11. **Under the USSR Unified Energy System (UES), Tajikistan relied on a regular supply of electricity, natural gas, and coal through domestic production and imports**. Located in the upstream of Amu Darya and Syr Darya river basins, Tajikistan is rich in water resources and hydro-electric power. During the summer when reservoir levels are high, water released for irrigation produced a surplus of electricity through hydropower, which it could export to neighboring states through the unified grid of the Central Asian Power System (CAPS). During winter, when water inflow is low and domestic electricity demand high, Tajikistan imported electricity from Turkmenistan and Uzbekistan. In addition, Tajikistan benefitted from piped natural gas imports from Uzbekistan and Turkmenistan. Coal was produced domestically, and imported from neighboring states, mostly the Kyrgyz Republic.

12. **Since the country's independence in 1991, households in Tajikistan have experienced substantial changes in energy supply** A Civil War erupted in 1992, ending with a peace agreement in 1997. During this period, prolonged electricity outages occurred, and the supply of coal was temporarily interrupted in some areas leading to increases in its price. The Central Asian Power System continued to function through the early 2000s but the coal price continued to rise and natural gas also became more expensive for customers. Moreover, political relations with Uzbekistan began to deteriorate, largely due to disputes over sharing of water resources. Worsening relations jeopardized the imports of gas and electricity as these imports came mostly from Uzbekistan or through its territory. The exceptionally cold winter of 2007/2008 further worsened regional relations. Due to the unusually high domestic demand for electricity that winter, water was overdrawn from reservoirs, causing floods downstream, and subsequent shortages of irrigation water in Uzbekistan and Turkmenistan in the spring of 2008.

13. **The progressive disruption of regional cooperation was the strongest destabilizing factor of energy security within Tajikistan.** In early 2009, Uzbekistan interrupted some electricity supply to Tajikistan, thus significantly augmenting the power deficit in the winter. In 2010 Uzbekistan and Kazakhstan left the Central Asian Power System. They rejoined later that year, but Tajikistan remained excluded from this arrangement. In 2010-2011 the northern areas of Tajikistan continued to receive some power supply from Uzbekistan, but this was stopped as well in 2012. At the end of 2012, imports of piped natural gas from Uzbekistan also ended permanently as the two countries could not reach an agreement on the price, and their expired import contract was not renewed.

14. **Suspension of natural gas imports had a significant impact on Tajikistan's industries; in the residential sector it affected mostly the operation of the district heating system.** District heating had been available only in Dushanbe and Yavan urban areas. District heating systems declined in capacity gradually since the Civil War and stopped functioning even in main urban centers by 2009 due to rising gas prices, declining volume of imports, and the high maintenance cost of the DH network. The interruption of gas imports also affected industries. This included in particularly the large aluminium smelter TALCO, but the chemical plant Tajik Azot in Khatlon was also significantly affected and forced to downsize.

15. **Tajikistan has modest domestic reserves of natural gas and oil. It has unexploited coal reserves which have been suggested as potential replacements of natural gas for district heating.** Forty coal deposits have been registered in the country. There are at least three coal mines that could be used for fuel supply in the near future. These mines have estimated proven reserves of around 500 million tons (Fields et al 2012). During Soviet times between 400 and 800 tons of coal were mined annually in the country; this figure has declined to 15-20 thousand tons in recent years. Development of coal mining to fill energy needs requires further investigation, with adequate consideration of environmental impacts.

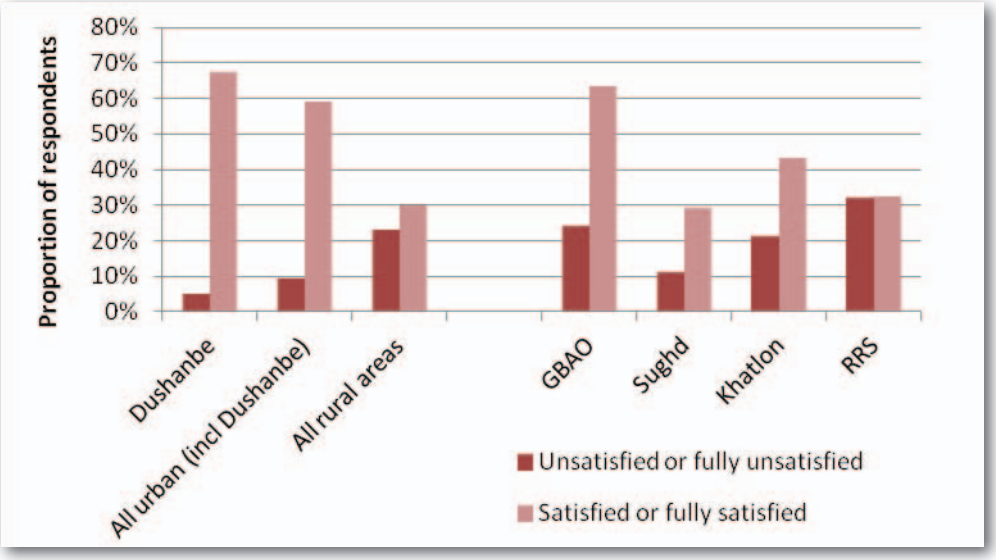
CURRENTLY AVAILABLE ENERGY SOURCES AND THEIR PRICES ELECTRICITY

16. **Ninety-eight percent of electricity in Tajikistan is produced by hydro-power plants. Production capability is directly linked to river flows, which drop dramatically in winter.** As a result, and especially after electricity replaced district heating as a major energy source for heating urban dwellings, electricity load shedding has become common practice for people in rural areas and small towns during winter months. In addition to blackouts and frequent interruptions, electricity supply is often characterized by insufficient voltage during this period. This affects all activities relying on electricity for lighting and impacts the functioning of appliances – including household, educational, health-care related, or business activities.

17. **While 99 percent of households are connected to an electricity grid, only forty percent of them believe that their access to electricity and the quality of supply is satisfactory or fully satisfactory.** This was found in a countrywide citizen report card survey on access and quality of public services for the population conducted in 2013. About 20 percent of households felt this was unsatisfactory or fully unsatisfactory, with the remaining 40 percent saying it was 'medium'. However , there were large variations in answers across locations in the country. Whereas about 68 percent of the population in Dushanbe thought that electricity services were (fully) satisfactory, this was the case for only 30 percent in rural areas. Satisfaction rates were much higher in GBAO (62 percent) and Khatlon (42 percent) than in Sughd or RRS (30 percent) (Figure 2). GBAO has benefited from a public private partnership in electricity generation and distribution (see below).

18. **About half the population (48 percent) believes that during 2011-2012 access to electricity had improved while 49 percent believes there has been no change.** Only 3 percent thought it has worsened. However, in RRS only 20 percent stated that access had improved whereas this figure was 66 percent for Khatlon. In the latter region, a number of investments have recently led to improvements in supply and metering. In GBAO nearly all respondents believed there had been no change. Responses to questions on changes in the quality of electricity supply were similar to those on access.

Figure 2. Satisfaction rates with electricity access and quality of supply (proportion of households)



Source: Citizen report card survey on access and quality of public services for the population (World Bank, forthcoming)

19. **Residential electricity is supplied by two companies: Barki Tajik and Pamir Energy. The latter supplies electricity to GBAO while Barki Tajik serves the rest of the country.** Barki Tajik is a state-owned enterprise. In 2012 Barki Tajik increased residential sector tariffs to 11 diram (0.023 US$) per KWh from 9 diram (0.019 US$) per KWh. The last tariff increase by Barki Tajik tariffs had been in 2009. Pamir Energy was established in 2003 as a public-private partnership between the Government of Tajikistan, the Aga Khan Fund for Economic Development, the International Finance Corporation of the World Bank, and the Swiss Agency for Development and Cooperation. Unlike Barki Tajik, Pamir Energy is able to meet residential demand for electricity throughout the year, although in some areas of GBAO electricity is provided only 18-20 hours a day during winter. Through life lines and volume differentiated tariffs it provides substantial subsidies for low volume consumers with donor support (see Box 6 in chapter 6 for more details).

20. **In addition to large electricity suppliers, some 181 small hydropower plants (HPPs), with a total capacity of over 15 MW, serve communities in Tajikistan[6].** Some 90 plants with a total capacity of 6 MW are in RRS, 58 units with 5.3 MW capacity are in Sughd province, 20 units with over 3.2 MW capacity are in GBAO, and 13 with 686.4 kW capacity are in Khatlon province. Most of these small HPPS are owned by the private sector or jamoats, others are connected to the grid of Barki Tajik and Pamir Energy. The Government of Tajikistan and local communities funded construction of these facilities with assistance from international organizations (Asian Development Bank, DB, GIZ, UNDP, among others)[7]. In 2013 the Government announced plans to build 53 additional small HPPs by the end of 2013.[8]

GAS

21. **Bottled liquefied gas is used by urban and rural households for cooking**. The gas is imported from Kazakhstan by tanker and rail car and is widely available. The 10-20 liter gas tanks can be refilled at petrol stations at an average price of 5 Somoni (1.05 US$) /kg. Little natural gas is produced in Tajikistan. Historically, Uzbekistan was the major supplier of piped natural gas to the country. The major consumers were large industrial companies such as TALCO and Tajcement. In most parts of Tajikistan, the supply of piped natural gas to the residential sector was stopped in 2009, three years before gas imports were permanently discontinued.

COAL

22. **In rural areas and small towns coal is one of the main heating energy sources for households.** Coal mostly originates from within the country and from the Kyrgyz Republic, and is distributed to households through a large network of entrepreneurs. The sale of coal is organized at the district level; prices are determined by market forces and vary widely across districts due to difference in transportation costs and also seasonal availability. Coal is cheapest from August to October and increases in price by 30-60 percent in winter months. Households who have insufficient income to stockpile coal when the price is low pay a premium price for it during cold months or switch to lower-quality supplementary fuels. A study by UNDP (2011a) reported an average of price of coal was approximately 0.2 Somoni per 1 kg (US$ 35/ton) in 2010. Focus group discussants and key informants in our study reported average coal prices of between Somoni 0.4 and 1.3 (US$ 0.08 - 0.28) per kg, depending on quantity bought and the season, as well as on the geographic location. Lower prices were reported in the north of the country, possibly due to proximity to the Kyrgyz Republic from where coal is imported.

SUPPLEMENTARY FUELS (FIREWOOD, DUNG, COTTON STALKS)

23. **Firewood, dung, and cotton stalks are common supplementary fuels in rural and semi-urban areas.** Most households cannot store a large enough amount of these fuels to provide sufficient heating through the winter. Hence these sources are mostly used to supplement coal. Firewood is an important energy source in particular in GBAO and Khatlon region.

24. **Fuel wood consumption is high**: the annual estimated consumption is 3-4 cu m per capita which is about 5 times the global average. Firewood is bought from local entrepreneurs and/or collected from open access areas such as forests, fields, hills, and riversides. The prices for wood vary across the country: a truckload of wood (2 m^3) costs approximately Somoni 800 (US$168) while the price of a bundle is approximately 10-15 Somoni (US$2.1- 3.15). Some households claimed to buy wood from demolition sites. Usually, male householders are responsible for purchasing wood, while women and children are responsible for collecting it.

25. **Dung** is used primarily by households with livestock. Women collect and press moist dung into manageable units and dry them in the sun. Households without livestock can buy moist dung from neighbors, press it and dry it themselves. The price for moist dung varies.

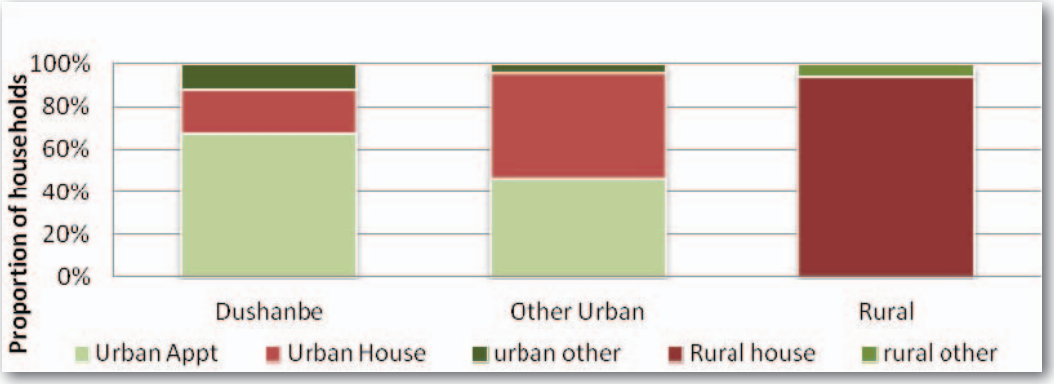
6 Agency for Statistics under the President of Tajikistan
7 Source: http://www.undp.tj/files/reports/SE4ALL_TAJ_Rapid_Assessment_Final_English.pdf (accessed on July 20, 2013)
8 Source: http://news.tj/en/news/tajikistan-expected-build-53-small-hydropower-plants-year (accessed on July 20, 2013)

26. **Cotton** stalks are collected during the harvest season (Sep-Nov). Households with a cotton field collect their own cotton stalks. Local farmers pay some of their laborers in stalks and/or sell bundles on the local market. In the study sites the cost for cotton stalks was reported to be approximately 5 Somoni (US$ 1.05)/bunch.

ENERGY USE IN RESIDENTIAL BUILDINGS

27. **Three main types of dwellings are distinguished in our analysis: urban apartments, urban houses and rural houses.** Two other categories referred to as 'other urban house' and 'other rural house' exist. These include hostels, temporary premises, and barracks. In Dushanbe 67 percent of households live in apartments, this is the case for only 46 percent in other urban areas where about half of households live in houses. In rural areas, all households live in rural houses (Figure 3).

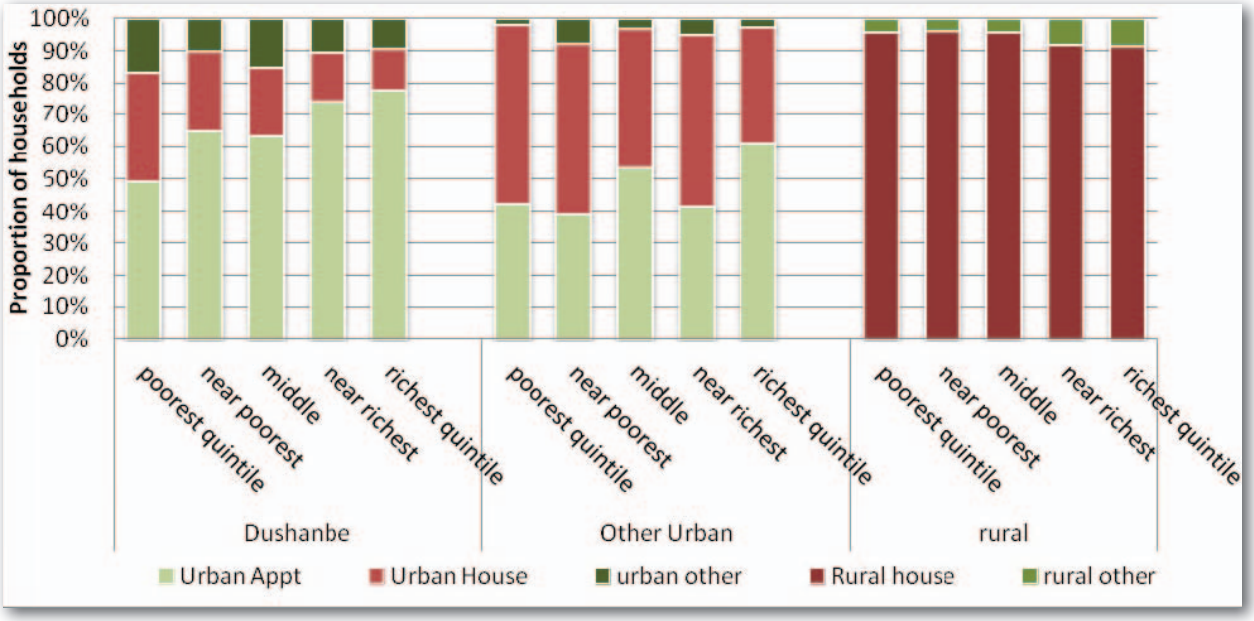
Figure 3. Distribution of type of dwelling by location (proportion of households)



Source: World Bank staff, based on data from the Central Asia Longitudinal Inclusive Society Survey (CALISS), 2013

28. **In Dushanbe most people live in apartments, but about a third of the poorest quintile live in urban houses**. In other urban areas houses are more common among the poorer groups than apartments (Figure 4).

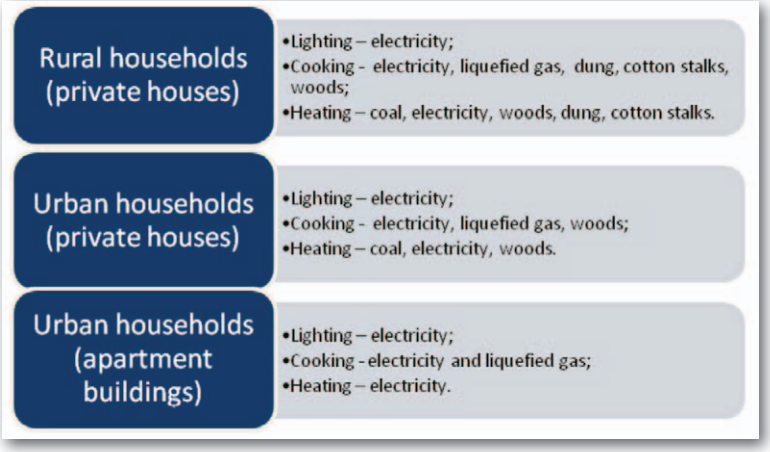
Figure 4. Distribution of type of dwelling by location and by wealth group (proportion of households)



Source: World Bank staff, based on data from the Central Asia Longitudinal Inclusive Society Survey (CALISS), 2013

29. **The types of energy sources that households use differ by type of dwelling and by location. This is especially the case for energy used for heating.** Discussions with focus group participants revealed that urban apartment residents use electricity for all living needs, including heating the home, heating water, cooking, and lighting. Residents of urban and rural houses have access to alternative energy sources but they also use electricity intensively, including for heating, when it is available (Figure 5). Electricity is one of two utilities (along with cold water) that are directly supplied to households in Tajikistan. As said, central heating, and piped gas or hot water are no longer available, or are only available in a few dwellings in Dushanbe.

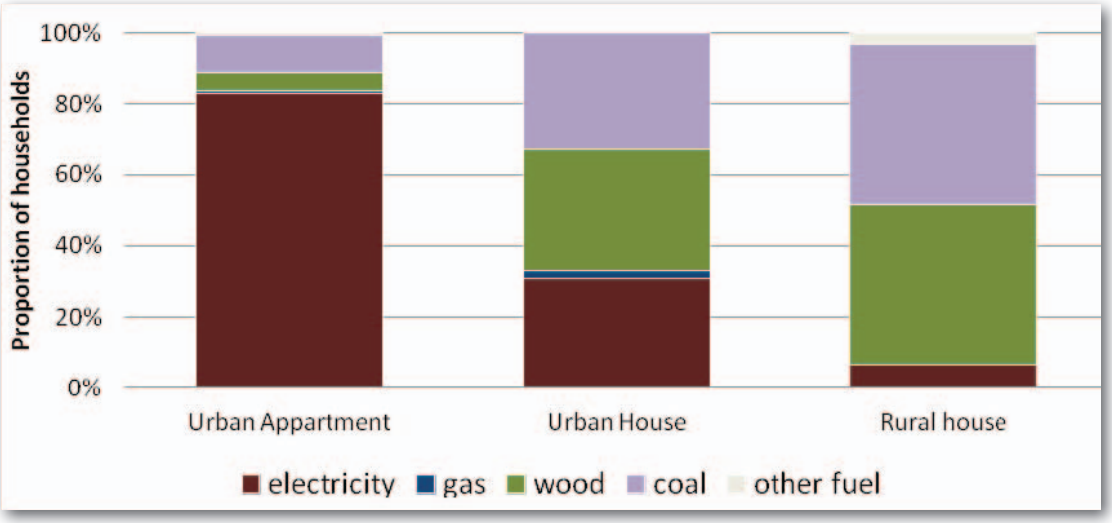
Figure 5. Household categories and types of energy sources used



Source: Focus group discussions conducted for this study

30. The household survey data confirm the findings from the focus groups: urban apartment dwellers rely almost exclusively on electricity for heating their homes, while urban house residents use electricity, wood and coal with almost equal intensity. In rural areas, wood and coal are the main heating sources used (Figure 6).

Figure 6. Major heating sources, variations by type of dwelling (proportion of households)



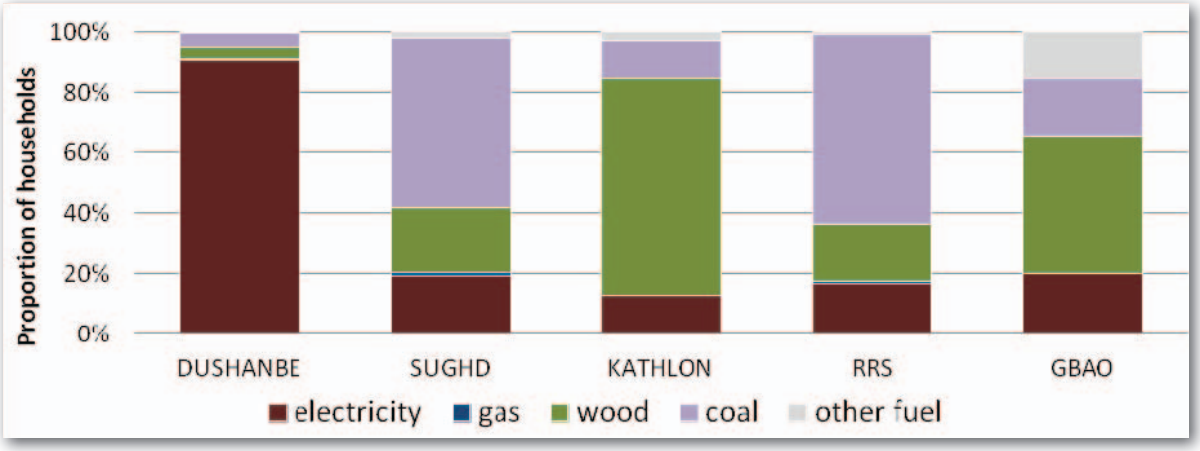
Source: Central Asia Longitudinal Inclusive Society Survey (CALISS), 2013

31. **Annual energy consumption patterns are affected by electricity restrictions during each winter, which vary from year to year. Typically, electricity load shedding begins in October and ends on April 1.** During this period electricity is available only 3-7 hours/day in all regions except Dushanbe and GBAO where power supply is almost continuous. It should be noted that the winter of 2012-13, which was the winter preceding the data collection, was atypically mild. Due to this, electricity

supply restrictions ended earlier in the year, in March 2013[9]. Most focus group participants conveyed that use of energy sources for heating was lower than in previous years. These circumstances should be taken into account when examining the results of this study.

32. **Energy sources used for heating also vary substantially across geographic regions, in particular with respect to the type of solid fuels used as a major heating source.** In Khatlon and GBAO, the major source of energy for heating is wood, while in Sughd and RRS the majority of households heat their homes using coal. In contrast, about 90 percent of Dushanbe residents use electricity as their primary heating source (Figure 7). This is also the case for urban areas in GBAO.

Figure 7. Major heating sources, by region (proportion of households)

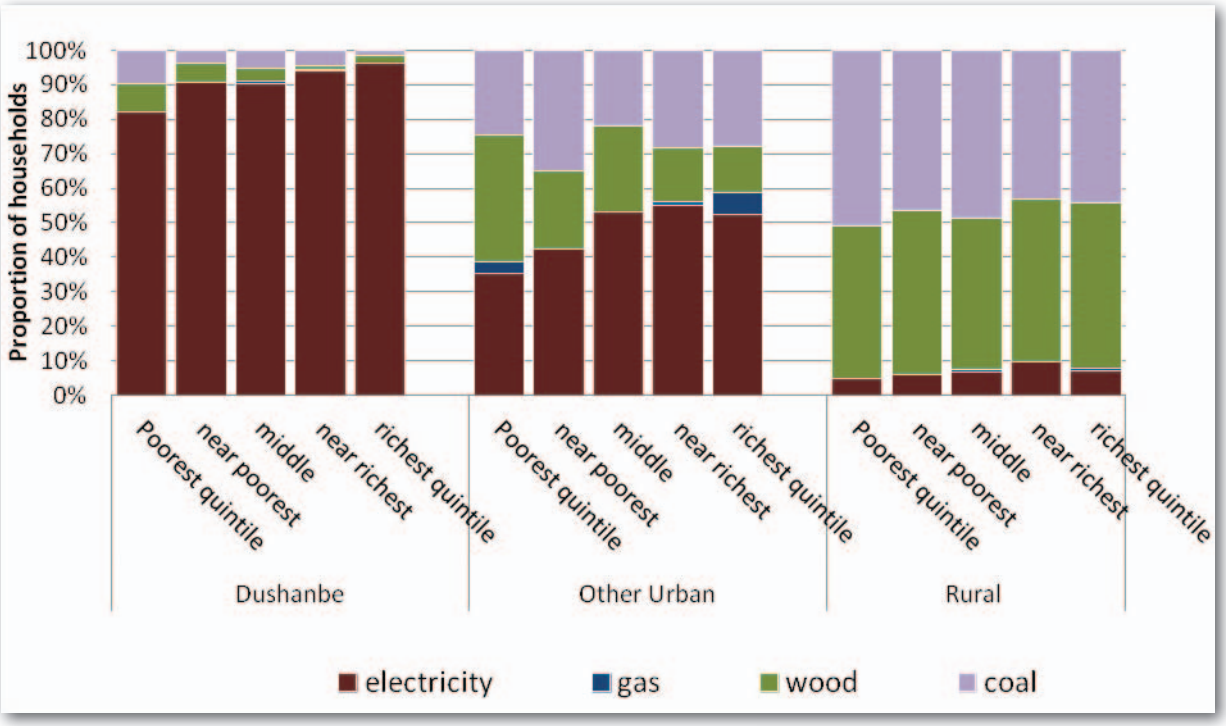


Source: World Bank staff, based on data from the Central Asia Longitudinal Inclusive Society Survey (CALISS), 2013

33. **The type of energy used for heating does not differ much between wealth groups within rural areas and also within Dushanbe differences are small**. In rural areas wood and coal are the most important heating sources for all wealth groups. Electricity only plays a minor role for all wealth groups, largely due to limits in its availability during the heating season. In Dushanbe, while electricity is the dominant source of heating energy, about 18 percent of households in the poorest quintile claimed they rely on coal (10 percent) and wood (8 percent) as their major source of heating energy. In other urban areas poorer households use relatively more wood while the wealthier ones rely relatively more on electricity for heating (Figure 8).

9 For detailed information on weather conditions in the winter season 2012-2013 see: Monitoring & Early Warning in Tajikistan (UNDP, Tajikistan) October 2012-April 2013.

Figure 8. Major heating source by wealth groups and by location (proportion of households)



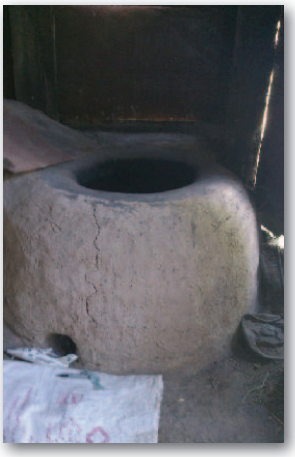
Source: World Bank staff, based on data from the Central Asia Longitudinal Inclusive Society Survey (CALISS), 2013

ENERGY USE WITHIN THE HOUSEHOLD

34. **Households in Tajikistan typically use at least three different energy sources in daily life.** Focus group discussions revealed that this was the case irrespective of location. The variety of sources available in the household has helped strengthen resilience to changing energy security conditions**.**

35. **Electricity and candles are the main sources of lighting in urban and rural areas.** During periods of unstable electricity supply in winter, many households use lanterns that work on batteries that can be recharged using electricity when it is available. In rural and semi-urban areas, more affluent households have generators to supplement system-supplied electricity for lighting and watching television.

36. **For cooking, households in Tajikistan typically use electricity, gas and wood.** Electricity, when available, is used for everyday cooking. To save time, or when guests are expected, households often switch to more rapid gas stoves. Traditional wood-fired tandoor stoves are widely used for baking bread in rural and urban areas. Most rural households in Tajikistan have one or several burzhuika stoves that work on coal, wood, and supplementary fuels, and can be used simultaneously for heating and cooking.



***Tandoor* stove.**
A traditional stove to bake bread. The main fuel for the stove is wood.

***Burzhuika stove. T**he stove is used for heating as well as cooking. The main fuels that households use for the stove are coal, wood, and dung.*

37. **Urban households who live in houses use coal-fueled *burzhuika* stoves in combination with electric heaters.** *Burzhuika* stoves provide better heat than electric heaters, for the generally larger rooms found in private houses. Urban house residents generally cannot rely on wood, dung,or cotton stalks for supplementary heating. As they have little land and are not allowed to keep livestook, such supplementary sources are difficult to obtain for them.

HOUSEHOLD ADAPTATIONS TO CHANGES IN ENERGY AVAILABILITY

38. **In the past twenty years urban and rural households in Tajikistan have experienced dramatic, though different, sets of changes in availability of energy sources.** Discussions with focus group participants and key informants revealed that rural households lost access to a continuous supply of electricity and access to coal and gas for prolonged periods of time during the 1990s. They also witnessed a significant rise in coal and gas prices. Urban residents lost access to district heating, piped gas, and hot water supply. Both rural and urban households, especially those outside of Dushanbe, have been forced to change their use of energy to cope with shortages of electricity supply, and periodic scarcity of coal and gas. Rural households have faced somewhat less dramatic changes than their urban counterparts. They have traditionally relied on coal, wood, dung and cotton stalks for heating and cooking. At the same time, an increase in coal prices has made heating in rural areas much less affordable.

***A gas tank.** Frequently, households have gas tanks (10-20 liters) that can be refilled in local gas stations. The price is set for 1 kg of gas. The average price is 5 TJS per 1 kg. Liquefied gas is used pnly for cooking.*

39. **The most radical worsening in energy supply occurred during the civil war period (1994-1997) when apartment buildings were disconnected from central heating and hot water supply. During this period electricity rationing was introduced,** which remains in place today during the heating season in areas outside Dushanbe. Focus group discussions in

urban areas revealed that to compensate for these shortages, urban households had to use homemade electrical devices and bottled gas to fuel stoves that would be left on for hours to heat their homes. Homemade heaters and gas stoves were said to cause headaches and create fatal fire hazards. Urban respondents claimed that they even installed burzhuika stoves in their apartments and used wood for heating. The energy shortages made apartment living unsafe and unbearable and some people moved in with rural relatives in order to survive. In rural areas, the civil war period was said to be also accompanied by scarce coal supply, and rapid increase in coal prices. Households burned anything available for heating and cooking, including wood (fruit trees were cut down), old clothing, and even old car tires. Candles and kerosene lamps used for lighting were said to be scarce in the local market and households often exchanged food or other items for them through black market trading with Russian soldiers.

40. **Since the early 2000s, coal has become more widely available but much less affordable. Coal is presently consumed prudently and many focus group respondents claimed that it is common for them to heat only one or two rooms in the house** and use supplementary fuels such as wood, dung and cotton stalks as substitutes for coal. During 2004-05, liquefied gas came on the market and households began using gas for summer cooking. Since the use of gas for cooking is more expensive than electricity, households prefer to use electric stoves for everyday cooking and use gas only when speed is important.

41. **During 2004-06, modern devices became available, such as energy efficient electric heaters, electric stoves and water heaters, and Chinese rechargeable lanterns.** Most households replaced kerosene lamps with rechargeable lanterns, which are cheaper, more convenient, and healthier. In Dushanbe and Khorogh, where electricity supply is stable during winter, households were said to have switched to new electric heaters and stopped using burzhuika stoves. In other cities and towns with severe rationing of electricity, households were said to have acquired electric heaters but some continued to rely on burzhuika stoves to heat their apartments.

ENERGY USE IN SOCIAL BUILDINGS

42. The impacts of winter electricity shortages on energy use in social buildings (including schools and clinics) were assessed through in-depth interviews with local leaders, representatives of schools and clinics, as well as local governments and civil society.

43. **The main energy sources for social buildings in Tajikistan are electricity and coal with parents often contributing to heating expenses.** Electricity is used for lighting, heating and cooking, while coal is used in burzhuika stoves for heating. Electricity and coal expenses are covered by local government funds and income from extra activities such as extra classes in schools, and proceeds from medical treatments in hospitals and clinics. Parents are also expected to contribute to paying school energy bills. A director or manager of logistics organizes purchase and delivery of energy sources for social buildings.

44. **Winter energy problems can have a serious negative effect on public health and on school attendance**. According to a WHO report (WHO and Ministry of Health 2008), during the 2007/2008 winter energy crisis access to basic health care declined significantly, as reduced access to heat and electricity (and therefore running water) forced many hospitals and health centers to close or work restricted hours—in some cases discharging patients. No heating systems were operating in 26 percent of Tajikistan's schools that winter; attendance rates dropped by 40-50 percent, according to a Instead write: UNESCO report (UNESCO 2007). Schools, orphanages, support facilities for street children and homes for the elderly struggled to maintain minimum service levels.

45. **Our findings suggest that these problems continue to affect the rural population of Tajikistan. Some schools and clinics/ hospitals face the same electricity supply limitations as residential areas and thus operate mainly during daylight.** In some locations, parents have supplied gasoline-fired generators to schools to allow computer use in classes but these are not often used due to high gasoline prices. Box 1 provides three case studies of the heating situation in social buildings.

46. **Densely populated areas have a special electricity line for social buildings (a so-called "red line"), which supplies unlimited electricity during the heating season.** However, focus group participants and key informants noted that it is common for private houses or small shops to connect illegally to the red line resulting into social buildings receiving less energy than they need.

47. **Heating schools and clinics with coal was said to have negative consequences for children's health and damage to equipment.** In rural areas more schools rely on coal for heating. Rural children spend many hours per day in classrooms and then at home with coal-fired burzhuika stoves. This exposure to indoor smoke and particulate matter is believed to increase

the incidence of childhood diseases. Indoor smoke was claimed to damage walls and equipment in schools and hospitals. Expenditures needed for their repairs were said to be at the expense of upgrading of school and hospital equipment, raising staff salaries, or investing in long-term energy efficiency strategies. This confirms findings by WHO and the Ministry of Health (2008) which reported higher incidence of acute respiratory diseases, and preventable maternal and infant deaths; pregnant women, children, the elderly, and the mentally ill were particularly at risk.

Box 1. Access to Energy in Social Buildings

During the study three social buildings were visited resulting in the following observations on energy consumption provided below.

General clinic, Khujand. This clinic has an unlimited electricity supply due to its central location in the biggest city of Sughd region. The main heating source is electricity and every room has an electric radiator; the original central heating system no longer functions. The local government authority of Khujand and the clinic pay the electricity bill, which is high during November through February, and declines in the summer, despite use of air conditioning. The amount allocated for electricity is enough for a year. During the past two years there have been no electricity shortages but prior to that, the clinic experienced shortages of two or three hours per day.

Secondary school, Vose (rural Khatlon). The school's main energy sources are electricity, coal, firewood, dung, dried cotton sticks and shrubbery growing in the school yard. The school receives annual state funding based on the number of students, which is typically used for fuels and other sources of energy, school improvements and repairs, and teaching supplies. In winter, the school faces the same electricity supply limits as the residential sector so the main source of heating is coal. Annual state funding provides 10-12 tons of coal–enough for only 1.5 to 2 months. As a result, a parents' association was organized to supply the school with additional dung, firewood or dried cotton sticks. It was claimed that parents provide around 40 percent of winter heating supplies, especially in elementary schools. The 'on-duty' teacher and student arrive early in the morning and heat the classroom. This is common in rural areas.

Secondary school, Dushanbe. The main energy sources are electricity, coal and wood. The school budget comes from two sources: state funds and payments for extra classes, which are collected by the school cashier and sent to the Raion financial department and then to the bank. Some funds are returned to the school. Sixty percent is for school staff salaries and the remainder is used to improve school infrastructure, and buy fuels. This year the school experienced some electricity supply shortages and had to rely on their 16kWgenerator.

Source: key informant interviews conducted for this study

3.

HOUSEHOLD ENERGY EXPENDITURES AND WILLINGNESS TO PAY

HOUSEHOLD ENERGY EXPENDITURES

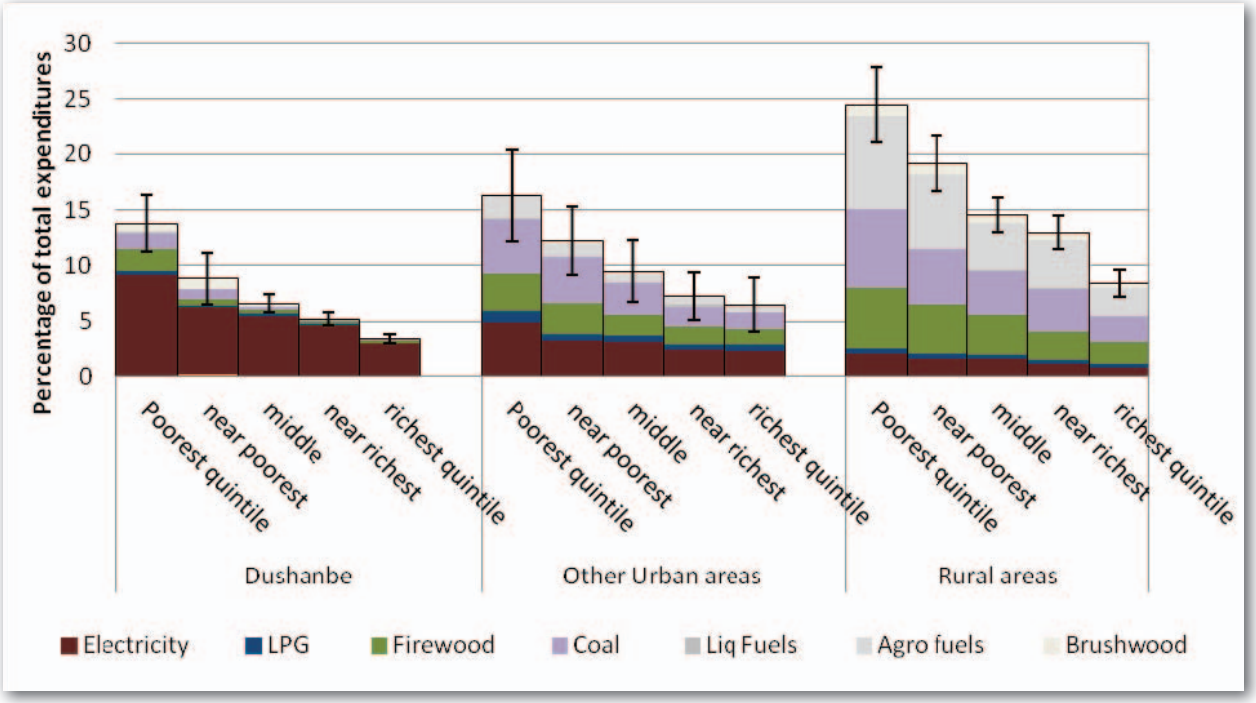
48. The previous chapter presented household energy consumption patterns in Tajikistan and how these differed across location, type of dwelling, wealth groups and time. This chapter discusses the expenditure that households incur on energy for heating their homes and for other purposes. It identifies groups that suffer from a particular high energy expenditure burden, and assesses the most stressful times for energy payments during the year. The chapter then explores households' willingness to pay for higher electricity tariffs, and the conditions under which this would be acceptable.

49. **While, overall, energy sources have become more accessible over the past fifteen years, they have become less affordable, affecting in particular low income households** according to study respondents. Unlike a decade ago, local entrepreneurs sell and deliver coal and wood to households, which makes it unnecessary to travel to a regional center to purchase these items. Petrol stations have proliferated, which has increased the availability of bottled liquefied gas. Many respondents also noted that reliability of electricity supply has improved since the civil war ended in 1997, despite wintertime shortages (see also chapter 2). However, its affordability was said to have declined, especially for the poorest groups.

50. **Rural households spend an alarmingly large share of their total consumption expenditure on energy.** Calculations using the CALISS 2013 household survey data show that, in rural areas, households spend on average almost 10 percent of their total consumption on energy, but this reaches 15 during the heating season. In Dushanbe the annual average is 5 percent but increases to 7 percent in the heating season. In other urban areas, households spend 6.5 percent of their total consumption on energy on average and 11 percent in the heating season.

51. **The energy expenditure burden is alarmingly high for the poorest parts of the population, especially in rural areas, suggesting large groups of rural households are struggling to meet their energy needs and keep warm.** The poorest and near poorest fifths of the population in rural areas spend 24 percent and 19 percent respectively of their total consumption on energy during the heating season. This is much more than the 10 percent that is often used a benchmark for defining 'energy poverty'. Coal and agro-fuels form the bulk of the expenditures. For the richest fifth of the population in rural areas the energy burden is much lower at 8 percent. The poorest fifth in urban areas outside Dushanbe spends approximately 15 percent of their income on energy, while in Dushanbe this figure is 14 percent (Figure 9).

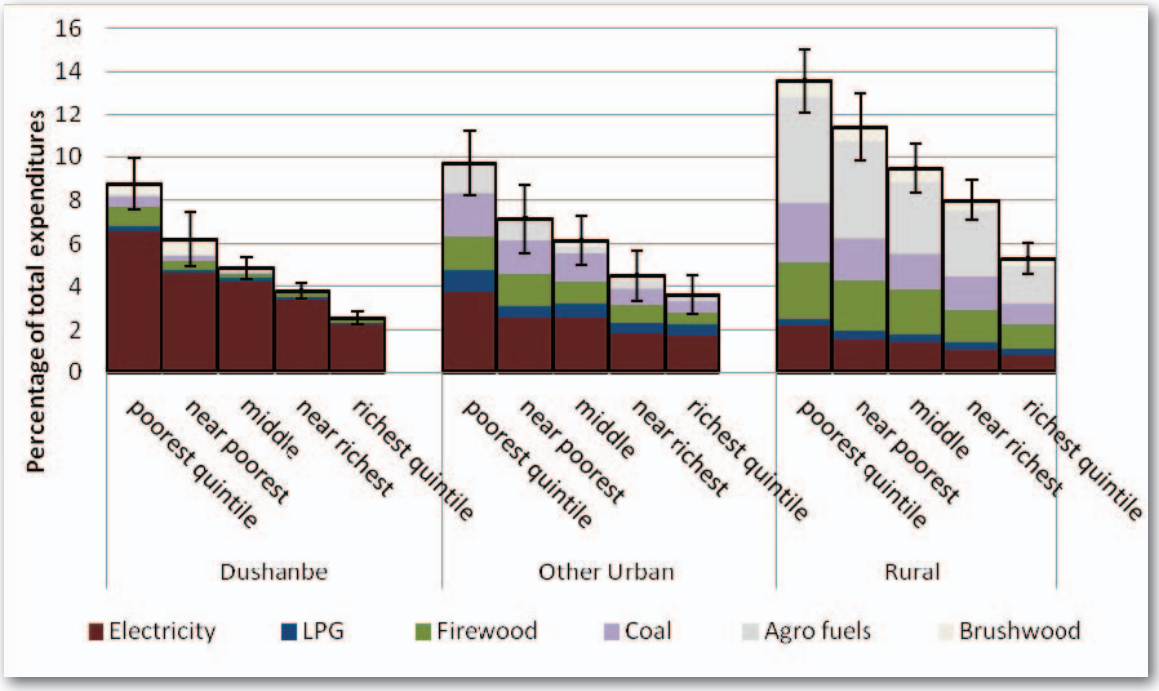
Figure 9. proportion of total household consumption spent on energy by wealth groups and by location (during the heating season)



Source: World Bank staff, based on data from the Central Asia Longitudinal Inclusive Society Survey (CALISS), 2013
95% Confidence Interval shown in error bars

The annual average proportion of household expenditure on energy for the poorest quintile is 14 percent in rural areas, 10 percent in other urban areas and about 9 percent in Dushanbe (Figure 10).

Figure 10. Proportion of total household consumption spend on energy by wealth groups and by location (annual average)



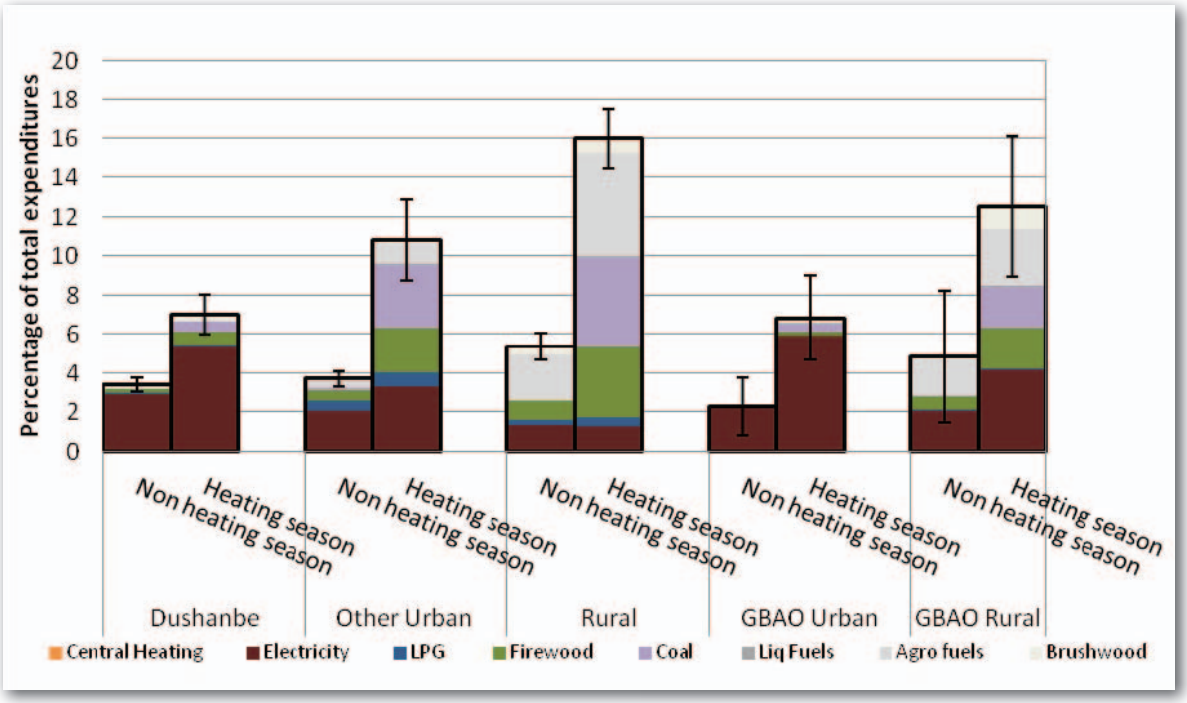
Source: World Bank staff, based on data from the Central Asia Longitudinal Inclusive Society Survey (CALISS), 2013
95% Confidence Interval shown in error bars

52. **The largest proportion of energy expenditure in rural areas is spent on agro-fuels (dung and cotton stalks), followed by firewood and coal. In urban areas electricity forms the largest energy spending component.** Agro-fuels are often produced on the farm and for many rural households acquiring these does not involve a cash outlay. However, they have a market value which households forego if they use these as fuel. Moreover, agro-fuels such as cotton stalks are often used as a form of payment to cotton harvesters. Therefore, we have included the market value of agro-fuels in the calculations of the value of total energy consumed by the household. Focus group participants in rural areas mentioned coal as the largest energy cash expense for them. In Dushanbe, nearly all energy expenses are on electricity. In other urban areas electricity represents the largest single expenditure, but other fuels combined comprise half or more of the total energy spending burden (Figures 9 and 10).

53. **During the heating season in rural areas, the proportion of total household consumption that is spent on energy in rural GBAO (12.5 percent) is lower than for the rest of rural Tajikistan as a whole (10 percent) (Figure 11)**. The relatively lower energy expenditure burden in this region despite its colder temperatures is caused by the almost continuous and fairly stable supply of electricity to households at subsidized rates for the first 50 and 200 kWh until end 2012, and for the first 360 kWh[10] since early 2013.

10 only for those that consume below this threshold

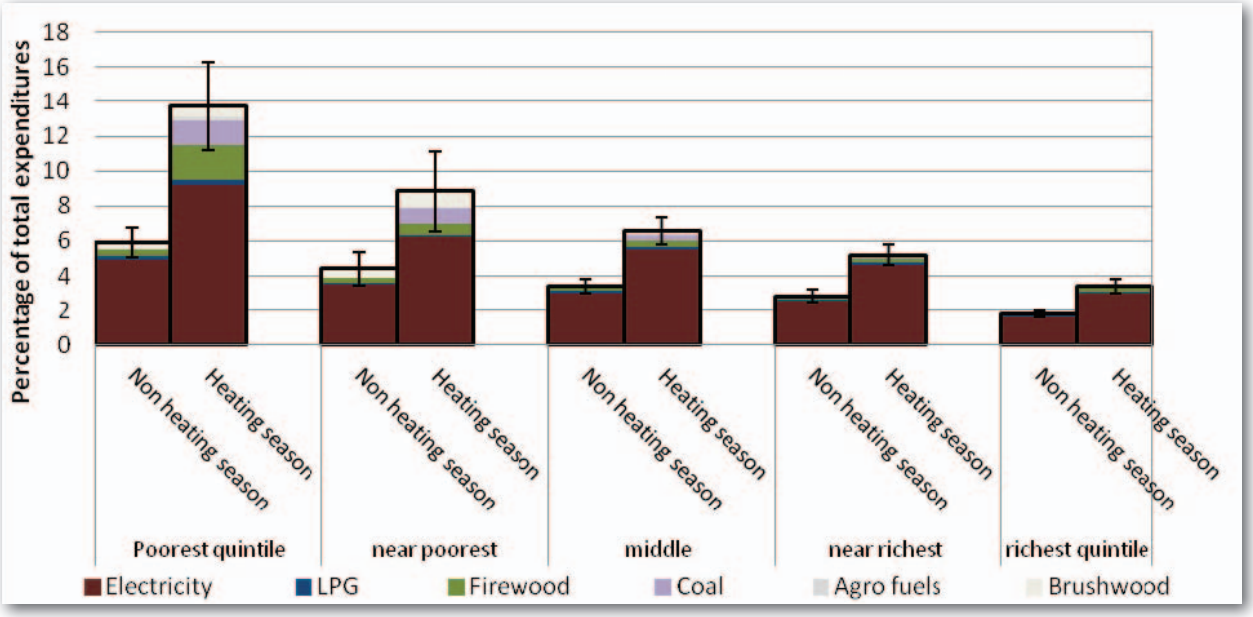
Figure 11. Proportion of total household consumption spent on energy by seaSon and by location



Source: World Bank staff, based on data from the Central Asia Longitudinal Inclusive Society Survey (CALISS), 2013
95% Confidence Interval shown in error bars

54. **At 14 percent, in Dushanbe the energy expenditure burden is also relatively high for the poorest quintile during the heating season. The energy spending is primarily on electricity** (Figure 12). In urban areas other than Dushanbe, this figure is 15 percent.

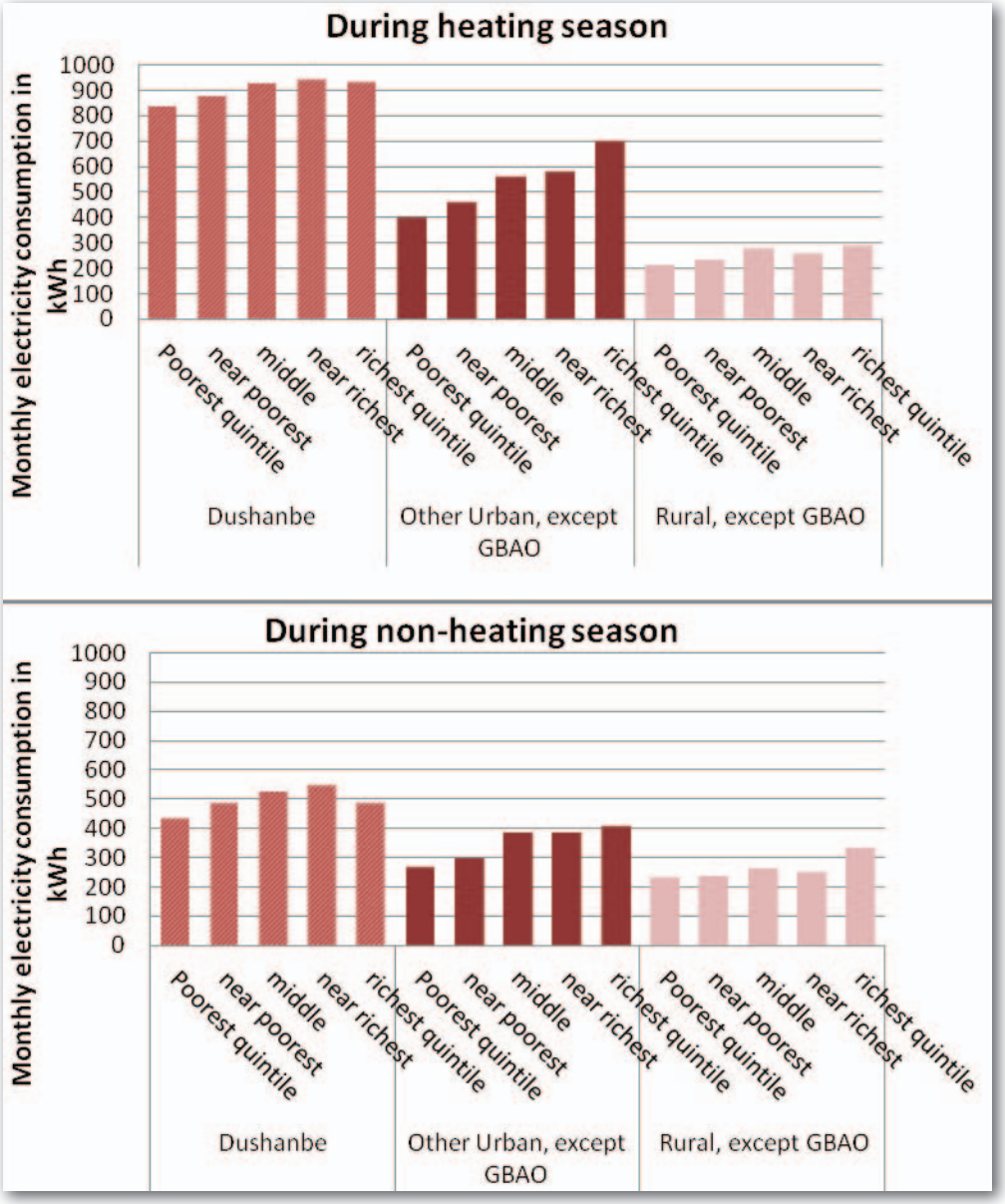
Figure 12. Proportion of househoLd expenditure in Dushanbe spent on energy during the heating season by wealth group



Source: World Bank staff, based on data from the Central Asia Longitudinal Inclusive Society Survey (CALISS), 2013
95% Confidence Interval shown in error bars

55. **Households in Dushanbe consume very large amounts of electricity during the heating season:** 800-900 kWh per month, compared to 400-600 Kwh in other urban areas and 200-250 kWh/ month in rural areas where power supply is severely rationed (Figure 13). This explains why even with the current low electricity prices, the poorest households in Dushanbe suffer from high energy expenses during the heating season (Figure 12).

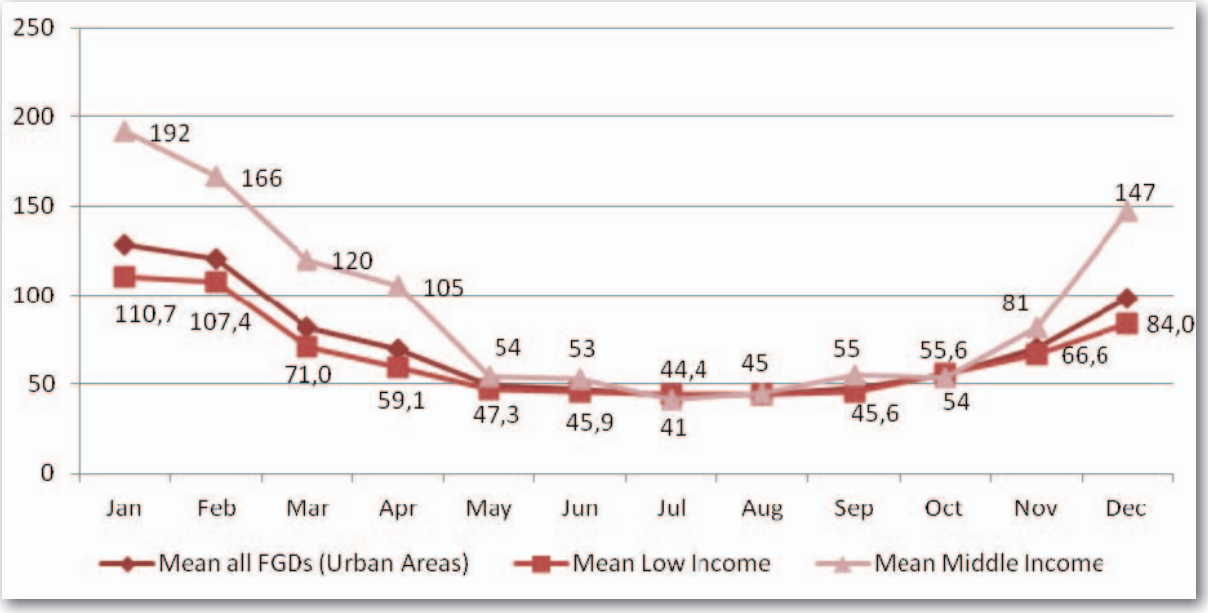
Figure 13. Electricity consumption by wealth group by location and during the heating season and non-heating season.



Source: World Bank staff, based on data from the Central Asia Longitudinal Inclusive Society Survey (CALISS), 2013

56. **Focus groups discussions confirmed the high expenditures for electricity in winter months**. Middle income urban participants reported much higher spending on electricity in winter than low income households. In summer months the difference with low income household appears almost negligible (Figure 14). This suggests that low-income household stake specific measures to lower their electricity bill during winter. In addition, as a somewhat larger proportion of poorer urban households live in houses rather than apartments compared to better off urban households, they are on average, somewhat better able to use non-electricity heating energy sources such as coal and wood.

Figure 14. Monthly expenditures on electricity for low and middle income urban groups (in Somoni per month)



Source: Focus group discussions conducted for this study

57. **Most urban households in houses spend more on energy than households in apartment buildings due to larger dwelling space and larger size families living in them.** Typically, households in Tajikistan consist of one of the following types: (a) a nuclear family living in a house/apartment; (b) an extended family comprising multiple families/generations living under one roof but with separate budgets; (c) an extended family living under one roof and sharing one household budget. Among focus group participants, the average number of household members for urban apartment dwellers was five; for urban private houses this was six; and for rural houses, eight. However there was significant variation among households, and some rural households had more than 15 members. Private houses typically have a higher number of household members, consisting of either multiple generations or several related families, and one electric meter so they receive a single bill for the household.

58. **Having a secure job and income essentially determines a household's ability to pay for high energy expenses in winter.** Focus group participants had, on average, only two family members with a stable labor income. Urban respondents reported that one member was supporting four others without income (elderly parents, unemployed spouses, and children). In rural areas, this figure was 4.5. Both urban and rural respondents attributed this to scarce employment opportunities, and low salaries at available positions. This is illustrated by one focus group participant who said: "When we receive salary or pension we save some money right away to pay for electricity expenses".

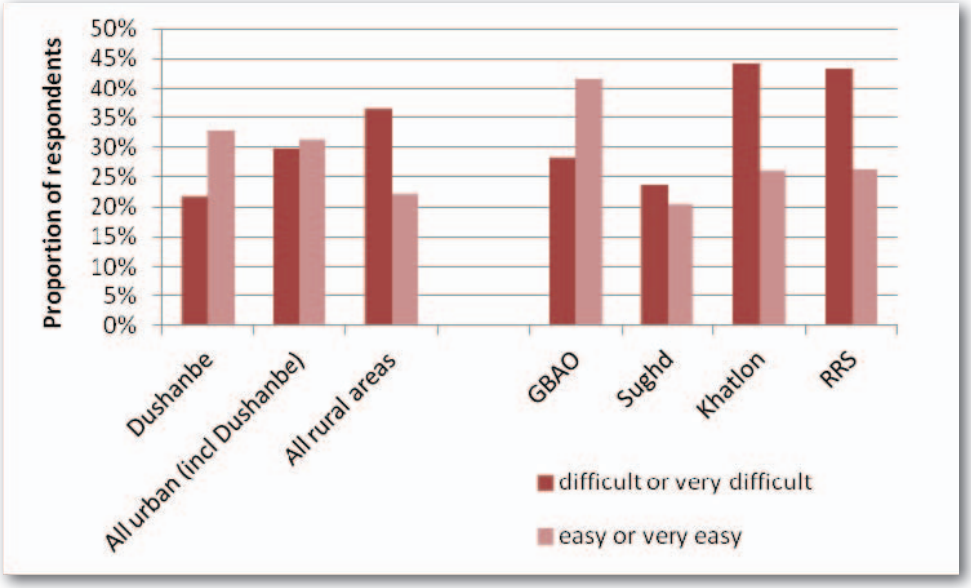
59. **Receiving remittances is another very important factor that influences a household's ability to pay for energy expenses during the heating season.** Over the years, labor migration has increasingly become a primary source of cash income for rural and urban households. It is a common strategy for securing payments to meet their expenses for basic necessities. Most migrants leave Tajikistan in early summer and come back in late fall or winter. Remittances are often brought or sent in the summer or early fall specifically for the purchase of winter fuels. Among respondents in the focus group discussions, 38 percent of rural and 18 percent of urban households had at least one migrant in Russia who sends remittances.

60. **Focus groups and key informants suggest that the highest consumption expenditures for electricity are faced by urban and rural household entrepreneurs** who run their small businesses out of their homes. These include for example business activities such as tailoring, or food preparation such as baking bread, which require large amounts of energy. Box 2 provides an example of a household in Sarband and how it is coping with energy expenses.

61. **The citizen report card survey confirmed that the affordability of energy is a larger problem in rural areas than in urban areas.** While about 36 percent of rural respondents claimed access to electricity in terms of affordability was difficult or very difficult, this was the case for only 30 percent in urban areas and 21 percent in Dushanbe. Affordability also differed across regions (Figure 15).

3. HOUSEHOLD ENERGY EXPENDITURES AND WILLINGNESS TO PAY

Figure 15. Household ratings on affordability of electricity across locations and regions (proportion of household saying access in terms of affordability is 'difficult/ very difficult' or 'easy/ very easy')



Source: Citizen report card survey on access and quality of public services for the population (World Bank, forthcoming)

Box 2. Coping with Energy Spending in Sarband

Sarband is an urban area in Khatlon province. An ethnographic interview was conducted with the husband (44 years old, with secondary technical education in accounting; currently unemployed), and his wife (33 years old, completed secondary education, janitor at the local school). The household also comprises the family's, daughter (2 years old) and father of the husband (78 years old, secondary technical education, pensioner). The respondent had been working as an accountant in Sarband for 10 years. Last year he was fired due to budget cuts. After that in order to provide living to his family, he borrowed some money from friends and relatives and went to Moscow region in December 2012 to work as a heaver for a beer factory. However, after 10 days, his hand got hurt very badly and he had to come back to Tajikistan. Since then he is unemployed. Due to lack of working places he has not been able to find any work in Sarband. He is afraid to go back to Russia, as it would require significant amount of money and there is no guarantee that he will be able to earn anything.

Since the household lives in an urban area, they are not allowed to have livestock, and their main income consists of the father's pension (150 TJS) and wives' salary (190 TJS). The household does not receive any social transfers or financial support from relatives. Thus, the total monthly income of the household is 340 TJS or 85 TJS per person.

The household's monthly expenditures on energy sources depend heavily on the season. During the summer, the family usually pays 20 TJS for electricity, 95 TJS to refill the gas tank, and32 TJS for other utility bills (water and garbage disposal, fixed tariff is 8 TJS a month per person). In total, during the summer the household pays 147 TJS a month (43% of income) for energy sources and other utilities. However, during the winter the expenditures rise drastically. In an average winter month, the household pays 50 TJS for electricity, 95 TJS to refill the gas tank, 150 TJS for wood and 32 TJS for other utilities. In total, during the heating season, the household pays around 327 TJS per month (96% of monthly income) for energy sources and other utilities.

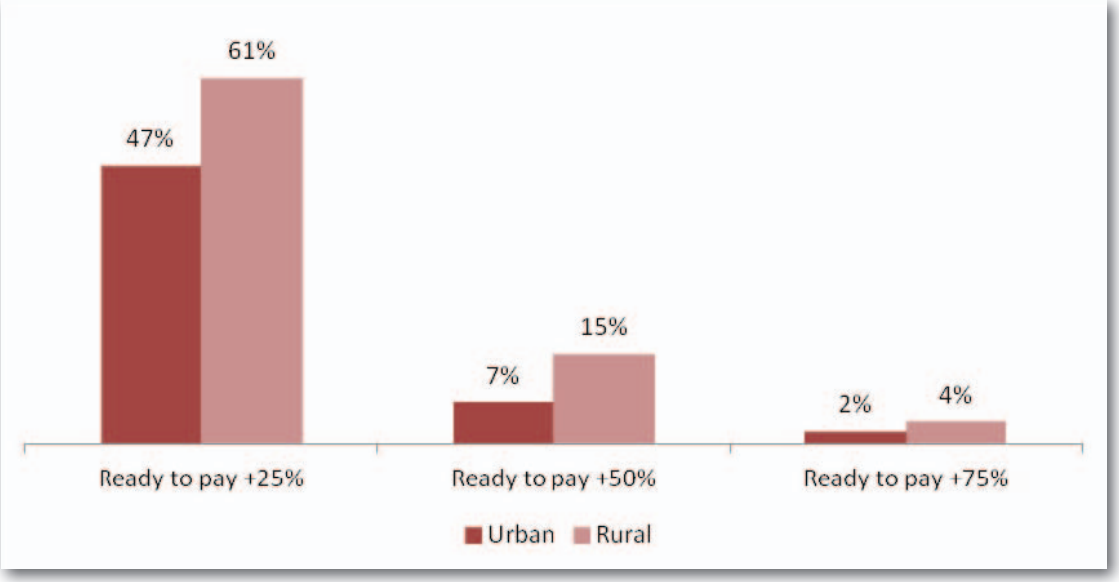
To manage the situation members of the household apply strategies such us negation of payment timing with controllers (ask controllers to come some other day); borrowing wood from local entrepreneurs and paying them later when the household gets money; borrowing food from a local shop. If there is no money to pay for particular fuel, they switch to available ones, electricity being the default source (for example, if cook only on electricity). Selling jewelry has been another strategy to cope with high energy bills - this year to manage the high expenditures, the wife of the respondent had sold several pieces of jewelry.

Source: key informant interviews conducted for this study.

WILLINGNESS TO PAY FOR HIGHER ELECTRICITY TARIFFS

62. **There is a notable difference in willingness to pay higher electricity tariffs between urban and rural study participants.** The topic of electricity tariffs was discussed during the focus group discussions and sparked heated debate among participants. Most focus groups participants were aware that tariffs for electricity may rise. Discussions therefore focused on the conditions that could make higher tariffs perceived as fair and socially acceptable. While 61 percent of focus group participants in rural areas would be willing to accept a tariff increase of 25 percent, this was the case for only 47 percent of focus group respondents in urban areas. An increase in electricity tariffs of 50 percent was acceptable to only a small portion of rural or urban residents, and even fewer accepted a higher increase (Figure 16). Urban residents, even middle-income groups, noted that electricity bills are a spending burden and since they have no alternative energy sources, even slight increases in tariffs will force them to cut other basic expenditures such as food and clothes. In contrast, rural households appeared to be keen to pay somewhat higher tariffs in exchange for longer and better service.

Figure 16. Willingness to pay at higher electricity tariffs in rural and urban areas (proportion of households)



Source: Focus group discussions conducted for this study

63. **Respondents named three major conditions that would make electricity tariff hikes more acceptable to them. The first condition is continuous and good quality electricity supply**. For rural respondents eliminating rationing of supply is the highest priority. This will allow households to make use of electric heaters, water boilers, and ovens, and decrease their expenditures on coal and wood. Most rural respondents believe that they would be able to reduce their overall energy spending if they were able to substitute some spending on coal for electricity.[11] For both rural and urban residents, greater reliability of supply also entails less frequent voltage drops, which cause damage to household appliances.

64. **Secondly, all respondents emphasized the importance of better customer service and addressing of maintenance and repairs.** Particularly, they stressed the need for the electricity supplier to take financial responsibility for repair of electric lines. Lines and electricity panels were said to break frequently, especially during the heating season, causing power outages that last for several days. Households claimed they are usually asked to contribute money for such repairs with money being collected by a local leader. Respondents from Dushanbe mentioned that they would accept higher tariffs if a contract with Barki Tajik clearly stated the responsibilities of that company to consumers.

65. **Third, focus groups participants conveyed that strict control of illegal connections is essential before they will consider paying higher tariffs.** There is a widespread view that illegal electricity connections, especially by businesses and large consumers, contribute to raising the cost for legal customers. Respondents also claimed that small enterprises that consume a lot of electricity–retailers, hairdressing salons, restaurants and bakeries make under-the-table deals with suppliers and pay less than what they consume. Moreover, some consumers are connected to the "red line" from the building elevator or basement and get an unmetered supply of free electricity. Focus group participants claimed that illegal users contribute to system breakdowns and that the local community often has to pay to repair the lines.

66. **Households in Khatlon and GBAO, who were among the poorest households in our sample made it clear that even existing electricity tariff levels are barely affordable**. Without additional sources of employment in their area, or without any other form of compensation, higher tariffs are out of the question for them.

11 Note that these perceptions are based on current electricity tariffs.

4.

COPING WITH HIGH WINTER ENERGY EXPENSES

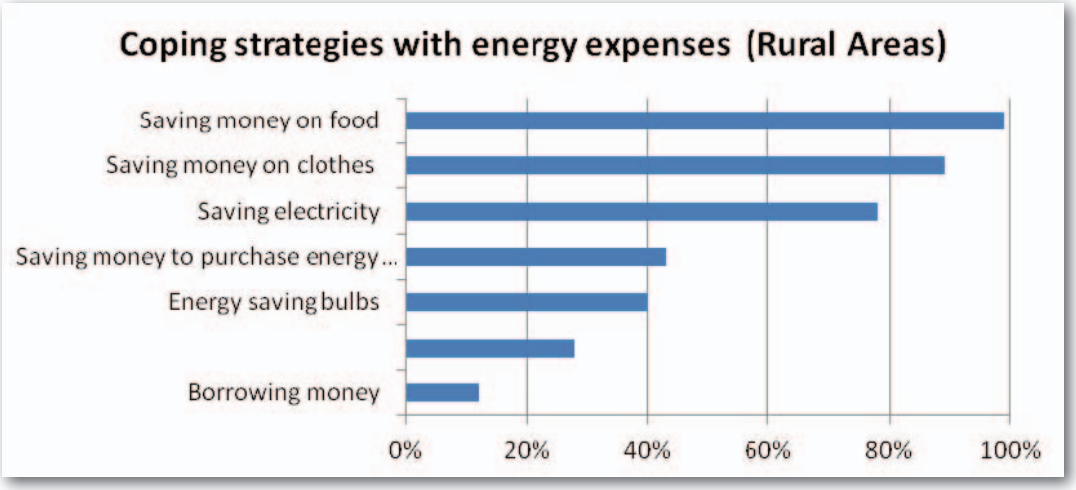
4. COPING WITH HIGH WINTER ENERGY EXPENSES

67. The previous chapter showed the very high winter energy expenditure burden of poor rural households and the relatively high electricity payments faced by poor urban households. This chapter presents mechanisms that households apply in order to cope with these energy expenses. It also discusses households' incentives and options to apply energy efficiency measures. It concludes with a discussion on social groups that are perceived to be most vulnerable to rising costs of energy.

RURAL COPING STRATEGIES

68. **Cutting expenditures on food and clothes are the two most common strategies applied by rural households for dealing with high energy expenses, followed by taking electricity saving measures.** The majority of focus group participants reported trying to reduce their consumption of electricity to the extent possible. Rural households try to reduce consumption of fuels by heating less space in the winter and substituting coal with cheaper energy sources such as wood, dung, and cotton stalks. Borrowing money from relatives and neighbors is the least preferred strategy (Figure 17).

Figure 17. Coping strategies with energy expenses in rural areas (proportion of households reporting a particular strategy)



Source: Focus group discussions conducted for this study

69. **Most study participants conveyed that they were willing to reduce food intake to be warm.** In fact, 99 percent of rural focus group respondents reported that higher energy costs force them to reduce spending on food. Commonly this means reducing meat consumption, buying cheaper cuts of meat, or substituting chicken, eggs and beans for beef and mutton. A kg of beef costs Somoni 35 and mutton Somoni 40-45, but a kg of chicken is only Somoni 10-15. Some low-income households reported buying beef and mutton only for special occasions, and claimed this affects their health, especially among children, some of whom suffer from malnutrition (see also Box 3).

70. **Households also reported cutting expenditures on winter clothes.** Adults were said to wear one set of winter clothing for several years and younger children wear hand-me-downs from older siblings. Lack of warm winter clothes can lead to increased illnesses. Younger children were claimed to be uncomfortable and embarrassed sometimes to wear worn or ill-fitting clothes from older family members. Some families stated they must cut expenditures on school supplies and uniforms, which are usually purchased at the end of summer and thus compete with bulk purchases of coal and wood to be stored for winter.

71. **The poorest households often have difficulty with taking advantage of the low seasonal prices of coal and firewood in early fall due to cash liquidity constraints and competing expenses (e.g. back to school demands).** As prices of coal and wood vary from season to season, households save money during the year and buy as much as they can afford in late summer/early fall. Focus group participants reported that on average rural households spend Somoni 1600-2000 (US$ 300-400) on coal per year. However, the exact amount depends on multiple factors such as size of household, size of dwelling, wealth status, and geographic location, among others.

72. **Among low-income groups there is an especially strong incentive to save energy, which is expressed through daily behavior.** Respondents noted that older family members monitor younger ones so household members become habituated to using electricity efficiently. An example is switching off lights and other devices when leaving a room. Water is boiled on electric stoves and kept hot all day in thermoses. Wasting electricity can lead to friction in the household. Forty percent of focus group respondents reported using energy saving bulbs, despite significant complaints about higher prices and lower quality light that undermines good vision and sometimes causes headaches.

73. **Saving money in advance to pay for energy sources and electricity bills is a common strategy but only available to those with stable income sources such as pensions, salaries, or social transfers.** Most people noted that paying their electricity bill punctually is a priority in their budget because getting disconnected would plunge the household into a crisis, making it impossible to heat the home, cook, heat water, or light the house. One female respondent recounted her daily habit of putting one Somoni aside to ensure that she has money to pay for the electricity bill when bill collectors come to the house.

74. **Twenty-eight percent of rural focus group participants noted that they use alternative fuels as much as possible in order to reduce cash expenses for electricity and coal.** Respondents from Khatlon in particular, rely heavily on dung and cotton stalks. Sughd respondents buy powdered coal for Somoni 0.65/kg and then make hand-made fuel balls. This is a labor-intensive process, but much cheaper than buying regular coal at Somoni 1.40 /kg. Alternative fuels are time-and-effort intensive to gather and prepare (and primarily a female responsibility). But substituting them for electricity and coal cuts expenditures and prepares the household for winter. Respondents from the poorest households said that they are unable to save enough money to buy coal and are forced to use anything they can find to burn, such as discarded clothing, plastic bottles, paper, and cardboard for example.

75. **Borrowing money from relatives or neighbors to buy fuel is a strategy of last resort for most households in Tajikistan.** Only 12 percent of rural focus group participants (all from Khatlon region) reported doing this (See also Box 3).

76. **Strategies for energy affordability exhibit some gender differences.** For example, male household members appear to be more aware of energy prices and consumption, perhaps because they are primarily responsible for earning money, purchasing fuels, and arranging delivery. Male migrant workers in Russia often transfer money to their families in Tajikistan specifically for the purchase of winter fuels during July-October. In general, female household members are more aware of household expenditures on food, clothes, school supplies and are responsible for preparing and storing alternative fuels such as pressed dung, cotton stalks, and coal powder balls. Box 3 presents a case study of how a household in Istravshan region is dealing with high energy expenses.

4. COPING WITH HIGH WINTER ENERGY EXPENSES

Box 3.Rural coping strategies with energy expenses (Istravshan region)

Household characteristics: The household comprises four members: a 38-year old husband who completed secondary education and works as a driver, a 34-year old wife who completed secondary education and works as a teacher, and two children–a 7-year old boy and a 5-year old girl. The husband picks up casual work for several companies but has no stable income; he worked in Russia for two years for a construction company but health problems have kept him at home this year. The wife works for a private company teaching cooking skills. She earns Somoni 350/month.

Coping strategies with rising heating expenditures: They use a *burzhuika* stove, a traditional stove (*sandal*), and an electric heater for warming the house. During the heating season, they heat only one room using both *burzhuika* and *sandal* stoves and everyone eats and sleeps in this room. Coal, which costs 1 Somoni/kg, is their primary fuel for heating. Last fall the household could afford 500kg of coal for 500 Somoni, which was enough until November, when they started buying coal in smaller lots (24-100kg at a time) at the higher winter price of 1.3 Somoni/kg. They purchased coal six times during the season. The family burns firewood and dung purchased from their neighbors. Last season they bought four pails of dung for 10 Somoni. The dung is then mixed with ashes, formed into discs that are dried in the sun for 5-6 days, and usually burned with firewood.

Winter brings not only higher energy costs but also less employment for the husband. When money is scarce for fuel and electricity, the wife borrows around 250 Somoni from her aunt. The household economizes on food to pay energy costs – decreasing meat purchases to no more than 2 kg per month.

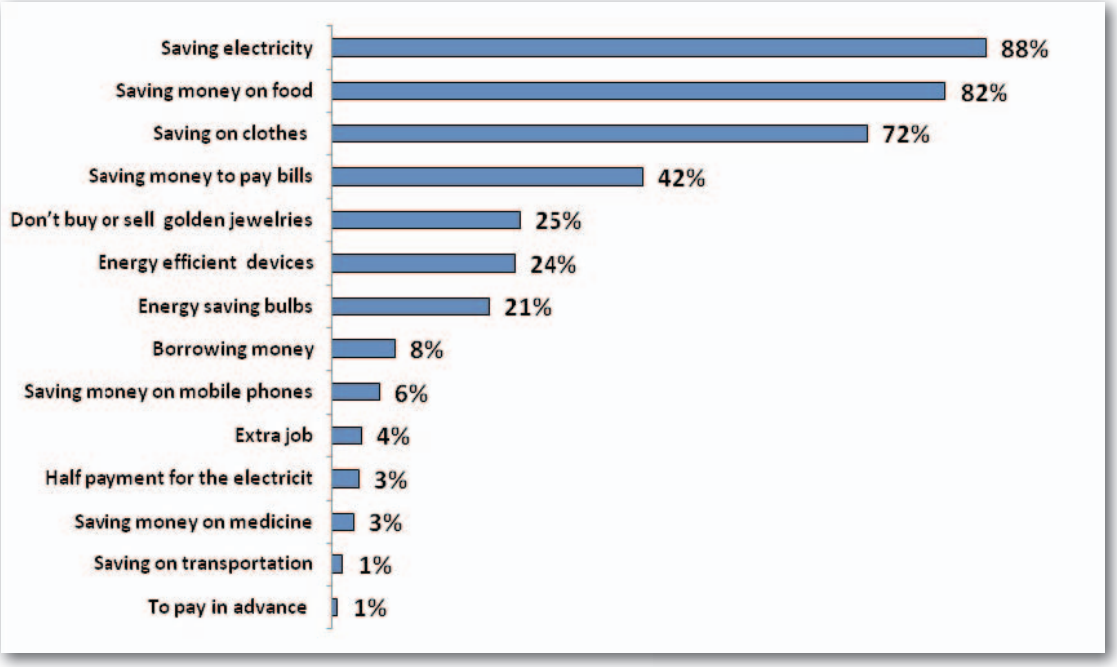
Source: key informant interviews conducted for this study.

URBAN COPING STRATEGIES

77. **Urban households apply a wider spectrum of coping strategies to deal with higher energy expenditures than those in rural areas.** Reducing electricity consumption is the most widespread strategy. For urban households economizing on food and clothing are also among the most common coping strategies to meet energy payments. A quarter of urban respondents mention selling (or not buying) old jewelry as a coping strategy.[12] Strategies that were mentioned in cities and less often in rural areas include negotiating with the utility provider and paying later for services received, using cheaper mobile phone packages (or asking people to call them back rather than calling), seeking additional employment, negotiating with bill collectors to pay the bill in installments to avoid being disconnected, paying for electricity whenever money is available even before the bill arrives, and economizing on medications and public transportation. Borrowing money from relatives and neighbors is a less preferred strategy, yet more prevalent than in rural areas (Figure 18 and Box 4).

12 Gold jewelry is traditionally bought for weddings. During the focus group discussions there were diverging opinions - some respondents noting that they have to ignore the tradition in order to cope with financial obligations including payments for electricity; others maintained that if the family has daughters gold jewelry has to be provided for them, and this takes precedence over payments for energy.

Figure 18. Coping strategies with energy expenses in urban areas (proportion of households)



Source: Focus group discussions conducted for this study

78. **Compared to middle income households, low-income households reported taking much more drastic measures in response to high winter energy expenses**. Among low-income households, high energy expenditures translate into cutting back on basic needs such as food and clothing. Middle-income households more often mentioned reducing electricity bills by adopting energy-saving habits such as switching off lights after leaving a room, and setting aside funds in advance to pay for electricity. Middle-income groups much less frequently conveyed they have to economize on food, clothes, or mobile phones. Box 4 presents an example of an urban household's struggle to cope with energy expenses in winter.

Box 4.Coping with energy payments in urban apartments (Dushanbe)

General household information: The interview was conducted with the head of household (54 years old, permanently disabled) and his wife (53 years old, homemaker) in an apartment in Dushanbe, where they live with their two married sons, their daughters-in-law and grandchildren. The couple has seven children–four sons and three daughters. The three daughters are married and live with their husbands, two sons work in Moscow as taxi drivers, one son serves in the army, and one son works as a handyman in Dushanbe. This year was particularly difficult for the family.

Most of the family income comprises remittances from the two sons working in Russia, about 1,944 Somoni/month (US$400) and the household head's disability pension (436 Somoni/month). The household head has suffered from diabetes for the last 20 years; he was admitted to hospital with gangrene in November 2012 and was discharged in March 2013 after his foot was amputated in January. The surgery and medical treatment significantly strained the family's budget. Expenses were even more of a hardship because two sons who are the family's primary support returned to Dushanbe from Russia to take care of their father, and remained in Tajikistan for four months, foregoing their earnings in Moscow.

Coping strategies: Living in an apartment, the family's only option for heating is electricity. They use three electric heaters but to conserve energy, they put two layers of carpets on the floor and cover windows with plastic sheets and blankets during the heating season. Even so, during extremely cold weather, the only option to stay warm is to stay in bed all day under the blankets because electric heaters provide too little heat.

The household faces significant seasonal differences in electricity expenditures and paying electricity bills on time is a high priority. In summer, monthly electricity charges are about 40-50 Somoni or 2 percent of monthly income; in winter, monthly electricity charges rise to 7 percent of family income. This expenditure is manageable when the household income includes remittances, and excludes exceptional circumstances, such as substantial medical expenses. However, during the most recent winter the family struggled to meet electricity bills on time due to medical expenses and temporary loss of remittances. When they cannot make timely payments, they negotiate with the bill collector to pay a few days later. To meet winter energy expenses, the family decided to economize on food expenditures, in particular to consume less meat.

Source: key informant interviews conducted for this study.

VULNERABLE GROUPS

79. **Focus group participants were asked which population groups they would consider most vulnerable to high winter energy expenses**. The responses were consistent across all groups in the country. Ranked from most to least vulnerable, they mentioned the following:

- Urban and rural single mothers. During the 1992-97 civil war, many families lost their primary income earners, but female-headed households have since increased in number due to a growing numbers of men in Tajikistan who migrate to Russia for work, and in some cases, abandon their families and start a new life and new families there. Most abandoned families are headed by a woman, often with little education, few marketable skills, and several children to support.

- Large families. Traditional Tajik families usually have more than three children, which stretches household resources, especially among low-income families, or those without stable incomes. Food, clothing, and school supply expenses deplete household

budgets and make it difficult to afford energy expenses, especially since school supplies and clothes must be purchased in the same season as the winter coal supply.

• Pensioners and people with disabilities. Elderly men and women who are no longer employed, or men and women with disabilities (especially those who live alone or have no children to support them), are vulnerable to high energy costs. Pensions for retired workers and people with disabilities average about 180 Somoni/month, not enough for an independent livelihood, so additional financial support e.g. from family is required. Tajik social norms dictate that after marriage, women live with their in-laws and contribute to their husbands' extended families and are rarely allowed to help their own elderly or sick parents. Therefore, respondents frequently noted that pensioners and people with disabilities who have only daughters, or have no children, face more difficulties meeting daily needs (see also Box 3).

• Doctors and teachers in rural areas. Despite professional credentials, doctors and teachers receive very low salaries, lack farming income, and have scant opportunity to find other income sources in rural areas. As a result, they face difficulty paying for energy sources.

80. **Families with children, abandoned by labor migrants, are considered most vulnerable by the majority of respondents.** Vulnerability of such families has also been flagged by donor reports. A significant consequence of male labor migrant is a rising number of divorces. A reported 98 percent of labor migrants from Tajikistan go to Russia, and of these, more than 95 percent are men and almost 80 percent of them are married with children (Khakimov and Mahmadbekov (2009). An IOM (2009) study estimates that up to one third of labor migrants may settle permanently in the host country. Based on the Tajikistan Living Standards measurement Survey (2008) it was concluded that remittances tend to diminish the longer the labor migrant stays in the host country. IOM research on abandoned families by labor migrants[13] revealed that the majority live in poor to primitive conditions and do not receive much family or extended family support.[14]

INCENTIVES AND OPTIONS TO SAVE ENERGY

Carpet on the wall. Households hang carpet on the wall to save heat during the winter season.

81. **The main obstacle to make energy-efficient improvements to their dwellings was said to be lack of money.** Meeting existing energy expenditures already requires households to cut spending on food and clothing, so buying construction materials to improve energy efficiency, or purchasing energy-saving appliances was reported to be unaffordable. Modern energy-efficient strategies such as plastic windows and insulation are available in the local market. However low-income households choose the following low-tech low-cost strategies:

13 In-depth interviews with 77 wives of migrants from different parts of Tajikistan, whose husbands have stopped sending remittances or stopped any contact with the family (IOM, 2009)

14 In the research conducted by IOM, more than half of the abandoned wives in the sample lived on their own with their children, about one third had moved back with their parents, and approximately 14 percent had remained with in-laws. Most of these women were responsible for providing for themselves and children, yet only 48 percent of them had found part or full-time jobs.

- Heat only one room throughout winter where everyone cooks and eats together. In extended family households two rooms are heated–one for males, one for females. In rural and semi-urban households of some means, people build a single-room house or extension for winter with smaller windows and low ceilings to conserve energy.
- Hang carpets on the wall and seal windows with polyethylene film or blankets.
- Monitor household member behavior to conserve energy, for example, making sure they switch off lights when leaving a room.
- Heat beds with hot bricks or bottles filled with hot water.
- Boil water in electric appliances and store in thermoses for the whole day.
- Use solar energy to heat water. Rural and semi-urban households often use water, heated in the sun, for cleaning and washing.
- Install plastic windows.
- Use energy saving bulbs.

82. **Some respondents claimed that plastic windows are unhealthy due to chemicals used in manufacturing them**. They also stated that although plastic windows insulate the home against incoming drafts and prevent the escape of heated air, there is concern about the lack of oxygen when using coal stoves inside the house. This is illustrated by a 47 year old teacher who claimed: "We didn't put the plastic windows yet. In the winter there is not enough air in the room. You can suffocate. Also the noises do not disturb us. Personally, I do not like this kind of windows, and even if I will receive the financial opportunity I will not replace ordinary windows with plastic ones". Plastic windows were said to save up to 25 percent of energy for heating. But at US$ 75/ m^2 these windows were said to be unaffordable except for well-off households.

83. **Urban apartment residents are more likely than rural ones to install plastic windows.** Due to the smaller size of apartments, residents can control the use of electric heaters, and feel the pay-back on the investment more rapidly in their reduced electricity bills. Insulation materials and energy-saving appliances are also more widely available and relatively cheaper in urban areas. Apartment residents noted that building-level improvements (roof repairs, boiler installation for hot water and heating) are much less likely to be implemented, as it would be difficult to make all residents contribute to the investment.

84. **Respondents noted that the law requires them to use energy-efficient bulbs but most do not like them.** Many claimed these are expensive, burn out quickly, produce insufficient light and often cause headaches. Consequently, most households use a mix of new and old illegal bulbs.

85. **The majority of respondents demonstrated good knowledge of locally available energy efficiency materials.** They referred to plastic windows, roofing and flooring, insulating foam, and radiant heating in floors and energy-saving appliances such as ovens, water heaters, and electric heaters. A primary source of information on energy saving measures is labor migrants who have worked in the Russian construction industry. Respondents from GBAO also cited the availability of energy-saving training workshops in their region offered by Pamir Energy and GIZ as a source of information. Box 5 presents an example of a household's struggle to cope with energy expenses in winter in a semi-urban area.

86. **Support in the form of vouchers for taking energy efficiency measures on their houses received the lowest scores from participants among a range of options to make energy more affordable.** Poor households already have tight budgets and consider that even a minor outlay for energy efficient improvements would be unaffordable for them. Respondents (especially those in urban areas) are wary of potentially complicated bureaucratic application procedures. In addition, all groups raised the issue of distribution fairness; distribution could be misused by local officials to support friends and relatives rather than most needy groups. Concerns were also voiced that vouchers could be traded on the black market and not used for energy efficiency improvements. Some respondents suggested universal voucher distribution, eliminating the risk of corruption, and ensuring that households who can afford energy efficient improvements would be able to invest. Respondents noted that better-off households and young families who are willing to invest in energy efficiency could use this extra incentive to invest in such measures.

87. **A number of programs for improving energy efficiency of homes exist in Tajikistan.** The GIZ supported Warm Comfort program in GBAO for example has installed home improvement solutions in rural areas for energy efficiency using

material manufactured and supplied by local cooperatives. Such financial services through are important and would be suitable in particular for middle-income families for more comprehensive residential energy efficiency investments. Evaluations have shown that these home improvements can reduce heating requirements by up to 40 percent.

Box 5: Coping with energy payments in semi-urban areas (Vahdad)

General household information: The interview was conducted with the husband (43 years old, secondary education, unemployed, former migrant worker); his wife (41 years old, homemaker, secondary education) and the husband's mother (74 years old, pensioner). The household comprises an extended family of 14: the husband and wife and their six children, the husband's brother and sister-in-law and their two children, the husband's sister (divorced, unemployed), and the husband's mother. Household members share a yard and occupy three separate houses, each with two rooms on one floor. All family members cook and eat together and share a budget to cover food and energy expenses. The husband's brother covers most of the energy expenses.

Expenditures on energy sources: Last year the brother purchased four tons of coal–two for his own house, and two for the respondent, his mother and sister to share. The coal was delivered in August and cost 1,360 Somoni (about 375 Somoni /ton). The extended family used all four tons of coal for winter heating, supplemented with wood and gas for cooking. The household tries to avoid buying more coal in the fall and winter when prices increase up to 600 Somoni and as high as 800 Somoni /ton. Their measures for enhancing energy efficiency in their homes include using fuels sparingly, installing a carpet on the wall of the mother's room, and polyethylene film on all windows.

The logistics of coal purchases are easy–local entrepreneurs canvas house-to-house to take orders and then deliver coal to a client's yard. The household also purchases firewood to bake bread in the tandoor stove–some 10-12 bundles/month at 15 Somoni /bundle; and gas, which costs about 70-80 Somoni /month–10 kg gas tank refills cost 35-40 Somoni at local gas stations. The household has one electric meter and pays a monthly bill of around 30-40 Somoni. During 2013, the biggest bills came in March and April (43 and 45 Somoni). A controller comes each month to collect electricity bill payments.

The high energy source expenditures force the household to cut back on food spending and they purchase only 1kg of meat each month, which lasts two days.

Potential increase of electricity tariffs: According to the respondent, a minor increase in electricity tariffs would not affect their budget much since their highest energy expenditures are for coal, wood, and gas. In fact, local people are accustomed to relying on coal and firewood for heating and cooking instead of electricity. Electricity is used for watching television and lighting. People are in the habit of planning a year's worth of energy consumption so they save money to buy fuels at specific times. Well-off households have purchased one or two generators, which gives them a stable electricity supply even during the winter.

Source: key informant interviews conducted for this study.

5.

SOCIAL ASSISTANCE PROGRAMS AND IMPLICIT SUBSIDIES

5. SOCIAL ASSISTANCE PROGRAMS AND IMPLICIT SUBSIDIES

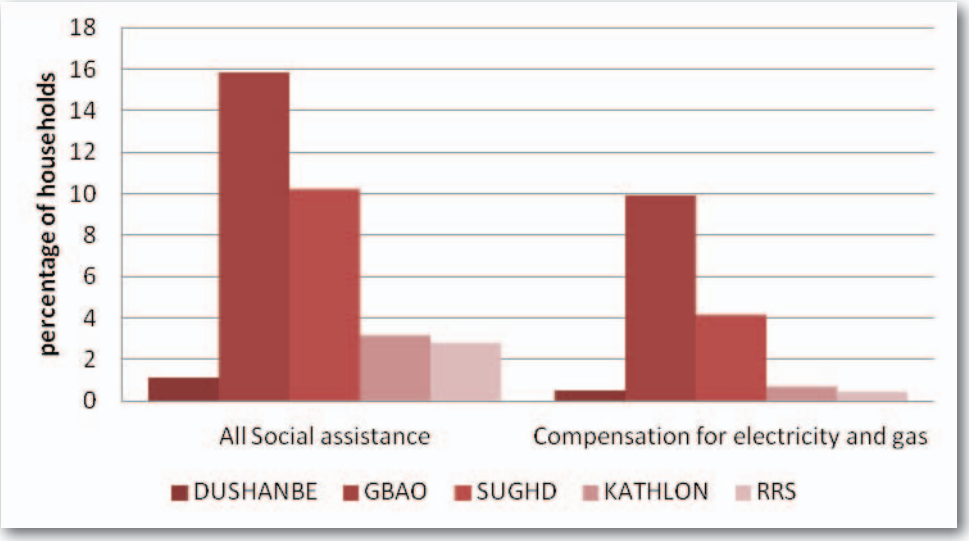
88. The previous chapter presented household coping strategies for dealing with high winter energy expenditures. To make energy more affordable for the poor and vulnerable, social assistance mechanisms could potentially play an important role by providing cash transfers or other means of support to those that are unable to meet their winter energy needs. This chapter looks into the coverage, access to, and perceived effectiveness of the current (old) social assistance program that is being phased out. This includes the existing gas and electricity subsidies. It then looks at the new improved targeted social assistance program that has been piloted and is currently rolled out. Finally the chapter presents the 'implicit electricity subsidy', that is the subsidy that is currently provided to electricity consumers by not charging them the amount that would recover the cost of generating it and providing it to them.

EXISTING SOCIAL ASSISTANCE SUPPORT MEASURES

89. **The currently existing social support mechanisms for energy expenses are decentralized and therefore vary significantly across regions and locations.** Study respondents claimed that there is no single set of guidelines or rules regarding the types, amounts, or duration of social assistance benefits. In some regions people receive social assistance in cash to pay for energy expenses; in other regions social assistance takes the form of prepaid bills for a specified number KWh, or free energy-efficient light bulbs. A World Bank study using TLSS 2009 data showed that social assistance made up less than 3 percent of the total income of the poorest twenty percent of households.

90. **Social assistance plays a very limited role in assisting the poor and vulnerable in Tajikistan and does not reduce poverty because benefits are small and poorly targeted.** The Government spent 0.2 percent of GDP on social assistance in 2009. This made the social assistance program one of the smallest, even in relative terms, when compared to similar countries in Eastern Europe and Central Asia. Social assistance more broadly comprises child benefits, scholarships, a veteran subsidy as well as electricity and gas benefits that cover about five percent of the population. Data from the CALISS household survey show that that social assistance is not distributed evenly across regions. While almost 16 percent of households in GBAO receive some kind of social assistance, this is only one percent in Dushanbe even if 21 percent of the population in Dushanbe belongs to the poorest national quintile. Energy-related benefits cover less than two percent of the population, but reach ten percent of the population in GBAO, four percent of Sughd population, and a very insignificant part of the population in the other regions (Figure 19).

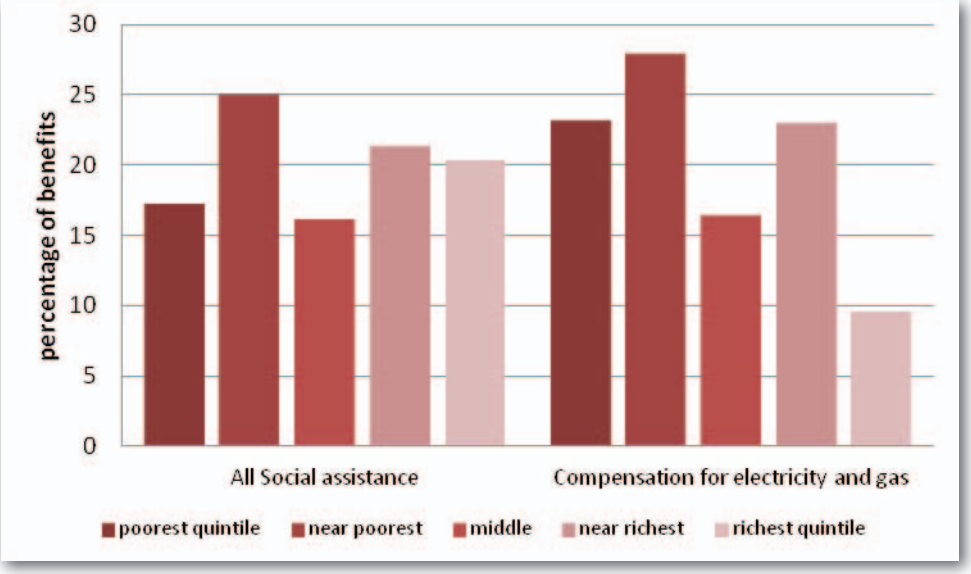
Figure 19. Coverage of social assistance programs by region (proportion of households having access to)



Source: World Bank staff, based on data from the Central Asia Longitudinal Inclusive Society Survey (CALISS), 2013

91. **The social assistance program that is being phased out is weakly targeted to the poor: according to the CALISS survey of 2013 the poorest fifth of the population received only about 17 percent of the total social assistance budget with the remaining 83 percent leaking to households in the richer four quintiles** while the richest fifth still received 20 percent of it (Figure 20 left panel). The old electricity and gas benefit seems to be somewhat better targeted to the poorest groups, but here only half of these benefits go to the poorest two fifths, with the rest going to middle class and better off households (Figure 20 right panel). Actual amounts of benefits involved are however very low.

Figure 20. Distribution of social assistance benefits across wealth groups (proportion of benefits)



Source: World Bank staff, based on data from the Central Asia Longitudinal Inclusive Society Survey (CALISS), 2013

92. **The low coverage of the existing social assistance programs among the population was confirmed by focus group participants**. In eight out of the 28 focus group discussions, none of the respondents reported receiving any social benefits. In the remaining twenty groups, an average of one or two respondents reported receiving assistance. Focus group respondents claimed not to know who is entitled to social assistance and noted that eligibility criteria are not clear. Beneficiary selection was said to be largely at the discretion of local authorities. Identifying people in need according to income level is problematic because unofficial income sources and remittances are almost impossible to track.

93. **Respondents conveyed that in their views, the main obstacles to accessing social assistance[15] include**: (a) a widely held perception that an application for social assistance requires substantial documentation and time investment of the applicant; (b) limited access to information on existing social assistance programs and little awareness of their existence among the population; (c) a perception that the social assistance system operates in an unfair manner and that the distribution mechanism is corrupt; this has led to (d) an overall low motivation to apply for social assistance.

- Most respondents with some experience of applying for social support shared the belief that any assistance they might receive would be of less value than the time and money invested in applying, i.e. in gathering all the documents, and reporting formal and informal earnings.

- Low-income households have little access to information on existing mechanisms of social support. Respondents are rarely aware of their eligibility, what is required to apply, or how much support they would receive. They report that some social support programs have been established or even canceled without informing the public.

- Fairness and transparency of distribution is a major concern of most respondents. In general, people do not believe that social transfer distribution is fair and equitable and many expressed doubts that all those who deserve and need assistance will receive it. They expressed the belief that some local authorities abuse their power when distributing social assistance support by misdirecting funds to ineligible friends or relatives who are of better-off households rather than needy families. This is illustrated by a 57 year old female teacher, who claimed: "A commission should be created to identify those who need assistance. The benefits should be delivered to needy groups of the population, not as it was before where the jamoat and khukumat leaders distribute this assistance according to their own opinion."

- Participants claimed that members of vulnerable groups have little or no knowledge of their eligibility for social assistance and lack skills necessary to access their entitlements or defend their legal rights to it.

15 This largely refers to the old social assistance program

94. **Respondents suggested a number of improvements to existing social support mechanisms for reaching low-income households**. These include: (a) conduct an intensive multi-media awareness campaign that communicates clear and detailed information on programs, target groups, eligibility requirements and applications processes, focused in particular on people in need, and provide legal support to families for claiming benefits; and (b) simplify application processes for social support programs. Urban respondents suggested that energy assistance should be included in the electricity bill, removing the potential for officials to redirect the funds.

THE NEW TARGETED SOCIAL ASSISTANCE PROGRAM

95. **The Ministry of Labor & Social Protection (MOLSP) launched a pilot of a reformed Targeted Social Assistance (TSA) scheme in two districts in 2011-2012.** The new program was piloted in two districts: Yevon and Istaravshan. It included a proxy means test where households are asked to indicate their physical assets, education level etc. This information enables an approximation of their wealth category and an identification of the poorest households that are eligible for social assistance. It had been advertised widely in local media and at government offices. In total about 18,000 households applied representing about 29 percent of the population.

96. **An evaluation conducted in 2012 showed that the new program considerably improved targeting: 48 percent of all benefits went to the poorest quintile.** Only 8 percent of benefits under this program went to the wealthiest quintile, compared to 12 percent under the old program. However the coverage remained weak: only 22 percent of households in the poorest quintile were covered by the program because many of the poor did not apply (De Laat et al 2013).

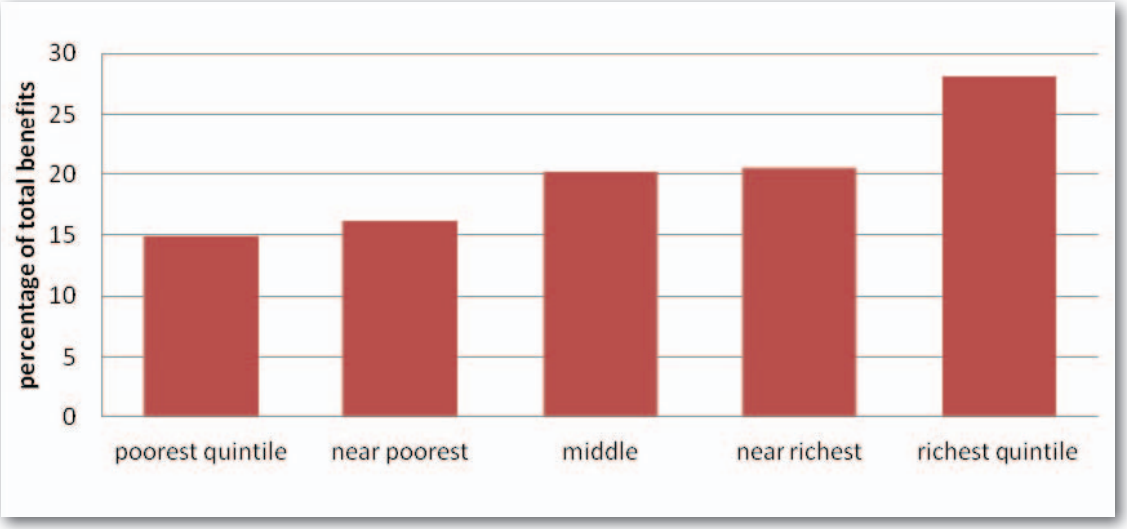
97. **In spite of the low amount transferred, the new targeted social assistance program increased self-reported life satisfaction and perceived financial situation.** The transferred amount was Somoni 100 per quarter (US$ 21) or US$ 7 per month per household. This represents only 2.4 percent of average household consumption in the pilot districts. In spite of this low amount, the transfer improved food security perception and raised actual food consumption by 16-25 percent in the week before the survey. At the same time, several areas for improvements were identified. These include work to further assess the effectiveness of the proxy mean test formula and operational design of the scheme. In 2013, the TSA was expanded from two to ten districts. Further roll out of the new program to 25 districts is planned for 2014, with subsequent national roll out by 2016.

CURRENT IMPLICIT ELECTRICITY SUBSIDIES

98. **Implicit electricity subsidies are provided to all electricity consumers through the low electricity tariff policy,** where electricity tariff for residential users does not recover costs of generating and distributing it to customers. It thus provides a subsidy to them at the expense of the balance sheet of the public power supply company Barki Tajik.

99. **Current implicit subsidies are regressive in terms of distribution and benefit well-off groups more than the poorest groups (Figure 21).** This is not surprising given that on average electricity consumption is higher among better off households than among the poor (Figure 13). High income households benefit disproportionally from the current implicit electricity subsidies, making the current low electricity tariff policy not a very efficient means for providing support to the poor and vulnerable to meet energy expenditures. Strengthening the supply of energy that is affordable to households in all wealth groups will require a different series of measures that better distribute available budgetary means to those that need it most.

Figure 21. Distribution of current implicit electricity subsidies across wealth groups (proportion of benefits)



Source: World Bank staff, based on data from the Central Asia Longitudinal Inclusive Society Survey (CALISS), 2013

6.

MEASURES FOR MITIGATING THE IMPACT OF HIGH ENERGY COSTS AND RISING ELECTRICITY TARIFFS

6. MEASURES FOR MITIGATING THE IMPACT OF HIGH ENERGY COSTS AND RISING ELECTRICITY TARIFFS

100. The previous chapter reviewed the current social assistance mechanisms, the pilot of a new targeted social assistance program and the distribution of the present implicit subsidies for electricity. It concluded that a different series of measures is needed that better distributes public resources to the most needy. This chapter assesses the effectiveness of alternative policy measures that will reduce the quasi-fiscal burden of the current electricity subsidization policy, while, at the same time, ensure affordability of electricity for the poorest groups. These include measures that provide transfers to targeted groups through existing social assistance mechanisms, as well as simulations of the distributional impact of block tariff scenarios that protect low volume consumers.

101. **The policy measures selected for simulation are based on current realities in Tajikistan but also include some that reflect regional best practice. These include a life line with block tariffs, volume differentiated tariffs and social benefits targeted to the poorest.** Block tariffs for electricity would involve charging lower tariffs for consumption below a certain monthly threshold. Volume differentiated tariffs are similar to block tariffs except that households that consume above the threshold pay the higher tariff for their entire consumption. Under these tariff structures, households that consume less (assumed to be the poorest) will pay less while those that consume more (assumed to be less poor) will pay more per unit of electricity. Even if, as we have seen, in Tajikistan the relationship between electricity consumption and household wealth is not very strong due to rationing (in rural areas) and lack of alternative heating sources (in Dushanbe), the experience with Pamir Energy in GBAO shows it can be applied when these issues are addressed and adequate metering is in place. Such a tariff structure also provides incentives to households to reduce energy consumption, which in turn would help reduce the current electricity rationing in other towns and rural areas and associated social costs. Targeted social benefits can be an important means for transferring cash or other benefits to the poorest, provided the program can identify and reach them. The simulation uses data on electricity consumption of different household income groups, and on access to targeted social assistance programs, collected by the CALISS 2013 household budget survey. Data from Barki Tajik were also used (see Annex D).

102. **Three caveats of the policy simulations should be mentioned at the outset.** First, it is only possible to simulate the impact of the policy measures under the present supply scenario of severe rationing in many areas of the country. Assessing the impact on the budgets of different wealth groups under a situation of improved electricity supply where the whole country receives electricity (of adequate quality) during long periods of time cannot be done. Second, as a reformed targeted social assistance program is only now being rolled out across the country, the CALISS household survey (conducted in 2013) does not include data on access to this new program. This limits the analysis that can be conducted. Third, the analysis of the impacts of rising tariffs addresses only the direct effects on households' budgets, ignoring the indirect effects. The latter include price increases of other goods caused by the initial increase in electricity prices.

SIMULATION OF POLICY SCENARIOS

103. A number of scenarios for protecting the poor from high energy costs and rising electricity tariffs are considered and analyzed for their impact on household benefits and on ensuring benefits are targeted towards the poorest. The criteria used to compare these include (a) total fiscal and quasi-fiscal resources spent, (b) average monthly amount of the implicit subsidy or social transfer going to a household in the poorest quintiles, and (c) to the richest quintile, (d) proportion of households in the poorest quintile receiving the implicit subsidy or transfer, (e) proportion of the total amount of implicit subsidies or transfers that goes to the poorest quintile, and (f) to the richest quintile. Each of these criteria is represented by a column in Table 2 below. The objective of the simulations was to find a package of measures that produces the best performance along these criteria and provides the best balance among them. Annex C provides further detail on the methodology of these simulations.

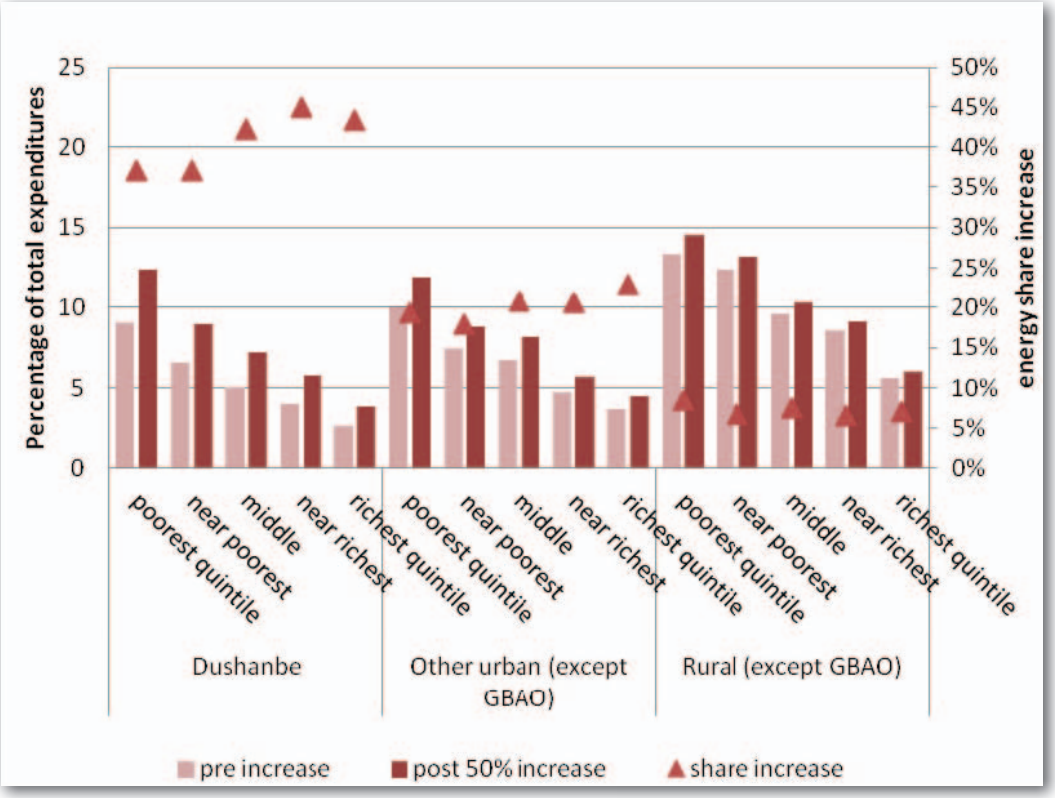
104. **Maintaining current household electricity tariffs implies continuing the current untargeted implicit subsidy to all residential users**, where both low-income and high income households pay the same subsidized tariff of 11 diram/ kWh. Under this scenario there are no quasi-fiscal savings and a large amount of public resources continue to leak to the non-poor. Based on current consumption, the total subsidy amounts to Somoni 22.5 million per month (0.75 percent of GDP) if we assume that a zero implicit tariff subsidy would imply charging a tariff that recovers the marginal cost of electricity generation and delivery and a minimum set of investments. For our analysis we assume that such a tariff would be 16.5 diram/kWh (World Bank 2012). This would imply a tariff increase of fifty percent[16] . Overall, better off households tend to consume more electricity than those

16 The Government of Tajikistan has committed under recent power sector investment projects to increase electricity tariffs by about 50% during 2014-2016.

that are less well-off, and thus they also receive a larger part of the current implicit subsidy at the current tariff of 11 diram/ kWh. The poorest fifth of the population receive only 15 percent, while households in the richest fifth would receive 28 percent of that implicit subsidy (see figure 21 and Table 2 second row).

105. **A fifty percent increase in tariffs without compensation for low-income households would have a significant impact on household energy expenditures in Dushanbe where electrical consumption levels are high** (Figure 13). Annual household expenditure on energy as a share of total household consumption expenditures would increase from about 9 percent to 13 percent for the poorest quintile of households. In rural areas the impact would be much smaller as electricity forms a much smaller part of total energy expenditure (Figure 22). As mentioned in chapter 3, households indicated that an increase of fifty percent would not be acceptable to most households without accompanying compensatory measures and actions to improve the quality of service and remove illegal connections.

Figure 22. Proportion of household consumption expenditure spent on energy by wealth group, with and without a 50% tarif increase (left axis) and increase in share of energy in total expenditure with the tariff increase (right axis) (annual average)



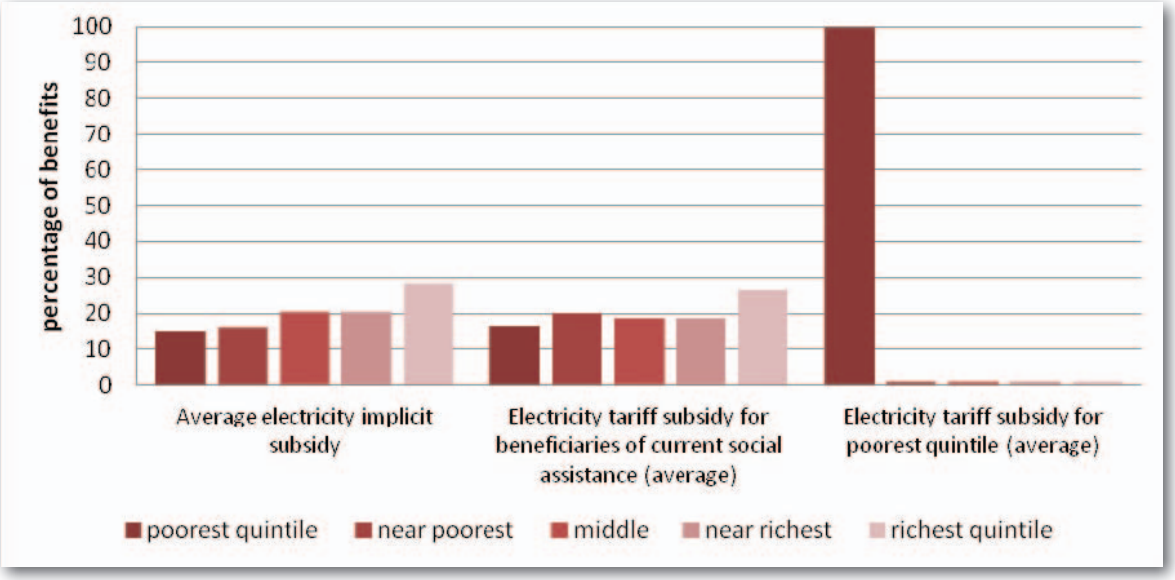
Source: World Bank, based on data from the Central Asia Longitudinal Inclusive Society Survey (CALISS), 2013

During the heating season, monthly spending on energy would rise from about 14 percent to almost 19 percent of household consumption of the poorest households in Dushanbe and would reach 20 percent for the poorest households in urban areas outside Dushanbe.

106. **Another option would be a situation where all households in the poorest quintile pay the current subsidized tariff and all others would pay the cost recovery tariff (a fifty percent tariff increase). It assumes perfect targeting of the implicit subsidies to the poorest fifth** and as a consequence all implicit subsidies would go to this group (see right panel in figure 23). Under this scenario total implicit subsidies would reduce to Somoni 3.4 million per month compared to Somoni 22.5 million per month under the current universal electricity implicit subsidies (Table 2, third row). This scenario is however hypothetical as it is hard in practice to identify the poorest fifth of households and even harder to make sure that billing systems automatically apply a lower tariff to this group. In GBAO, electricity consumption is used as a proxy for household wealth and households that consume below a particular threshold automatically receive bills that apply lower tariffs. Such a system would

not work in the current situation where the poorest consume not much less electricity than the rich, as is the case in Dushanbe and rural Tajikistan.

Figure 23. Distribution of subsidies across welfare groups under various subsidy scenarios.



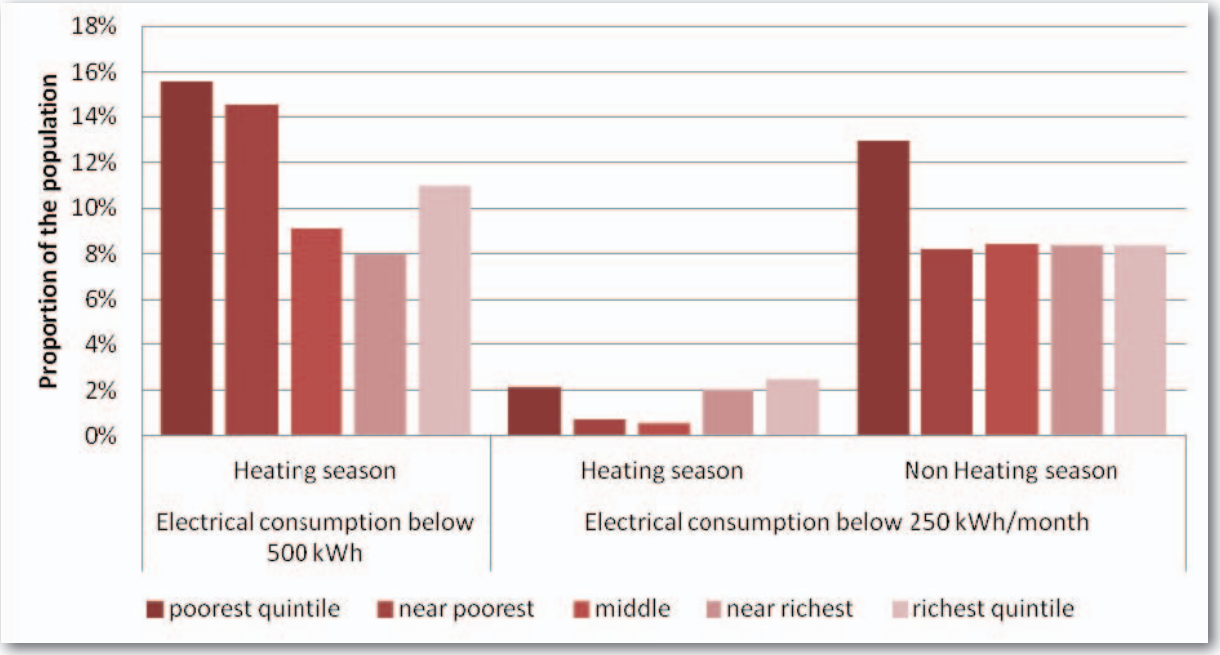
Source: World Bank staff, based on data from the Central Asia Longitudinal Inclusive Society Survey (CALISS), 2013

107. **The new targeted social assistance program could be used as a vehicle to compensate the poorest households for an increase in the electricity tariff**. As said in chapter 5, the new social assistance program targets and identifies the poorest fifth of households through a proxy means test. As shown in Table 2 (fourth row), this scenario would reduce the total monthly implicit subsidy and transfer from Somoni 22.5 million to Somoni 3.9 million per month. However, under the current performance of the program, only 22% of households in the poorest quintile would receive this transfer (see Chapter 5). Only if the coverage of the poor is substantially improved would this scenario provide an adequate mechanism for compensating the poorest households.

108. **Another possible scenario would be the introduction of an increasing block tariff for all households.** It would involve an electricity tariff of 11 Diram/kWh below a certain threshold, and a tariff of 16.5 Diram/ kWh for consumption above this threshold. An increasing block tariff would provide implicit subsidies to all users (i.e. to both rich and poor households alike) for the first block of consumption. Different thresholds have already been applied in Tajikistan (50, 200 and 360 kWh/month in GBAO depending on the season and 250 kWh/month in the rest of the country until 2007).

109. **Compared to subsidizing all electricity consumption of all households at the national level, limiting the implicit subsidy (arising from a tariff of Diram 11/kWh) to the first 500kWh/ month in winter and 250 KWh during the rest of the year** would cut the implicit subsidy from Somoni 22.5 million per month to Somoni 14.2 million/ month. A household in the poorest quintile would 'receive' Somoni 12.6 per month compared to Somoni 18.2 per month under the current tariff policy (Table 2 fifth row). Such a block tariff would weakly target subsidies to the poorest and benefit large parts of the better-off households (see also Figure 25 second panel). However it would make a minimum of electricity available at a low cost for all electricity consumers. Under the current situation of severe rationing, this would mainly benefit rural households and those in other towns. During the heating season few households in Dushanbe consume less than 500 kWh per month (Figure 13). Even a threshold of 500 kWh per month (a fairly high threshold by international standards) would not be well targeted towards the poor in Dushanbe as here only about 15 percent of the poorest two quintiles consume less than that amount in winter season (Figure 24). Therefore no clear distinction in consumption levels can be observed between the poorest groups in Dushanbe and the richest groups there that would help to define consumption blocks for lower tariffs targeted at the poor (as is done in GBAO).

Figure 24. Proportion of people consuming less than 500kWh and 250kWh per month across welfare groups in Dushanbe

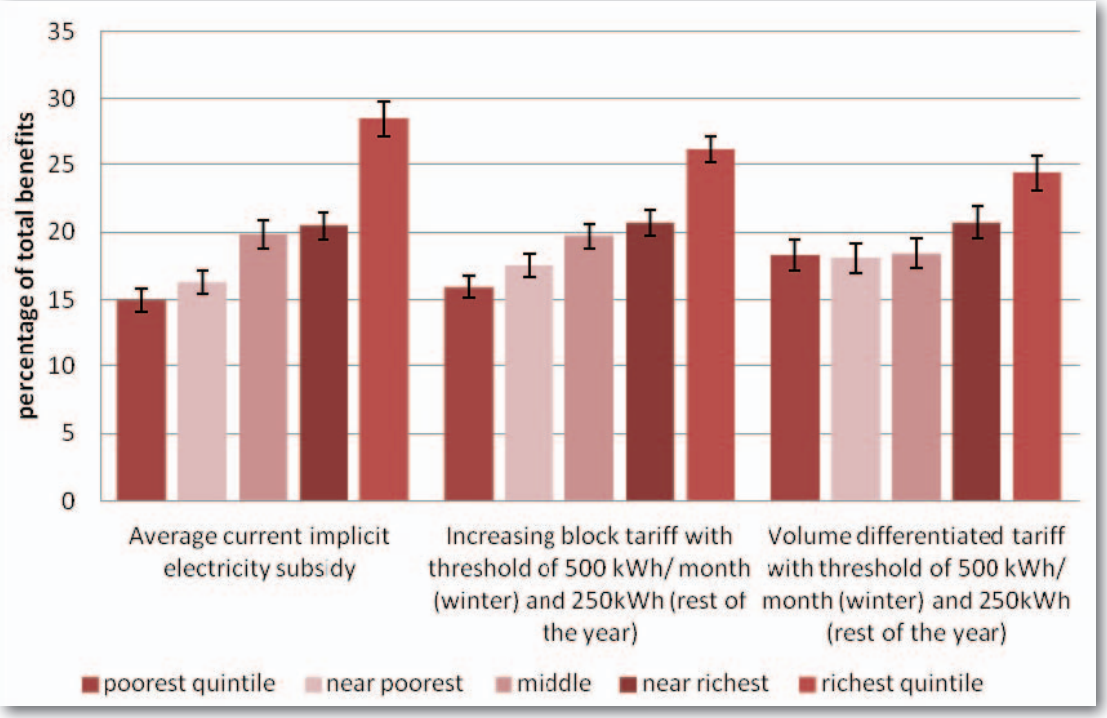


Source: World Bank, based on data from the Central Asia Longitudinal Inclusive Society Survey (CALISS), 2013

110. **A volume differentiated tariff of 500 kWh per month in winter and 250 kWh per month in the non-heating season would improve targeting. A somewhat higher share of the implicit subsidies will go to the poorest quintiles compared to the current situation and the increasing block tariff scenario** (Figure 25). This scenario would reduce the total monthly implicit subsidy from Somoni 22.5 million to Somoni 6.2 million. A household in the poorest quintile would 'receive' Somoni 7.8 as an implicit subsidy per month compared to Somoni 8.2 per month for the richest quintile. This is much less than the Somoni 18.2 under the current tariff policy. Only 18% of all implicit subsidies would go to the poorest fifth of the population, compared to 15% now (Table 2, row 6). Even with such a high threshold, only 10 percent of the Dushanbe population would benefit and 20 percent of the poorest fifth would. Many poor households in Dushanbe have limited alternative options to reduce their electricity consumption as there are no cheaper alternatives. Without a specific policy to help urban households reduce their electricity consumption during the heating season, electricity consumption will remain high for all wealth groups across the population and a volume differentiated tariff would fail to sufficiently benefit the poorest.

111. **While acknowledging that it would have the potential to motivate some households to save electricity, focus group respondents and interviewed officials noted that both in rural and urban areas a block tariff or volume differentiated would be money-saving only for small households**, such as those of single pensioners and nuclear families. But rural households in particular comprise extended families with only one meter. Applying a block tariff might not prevent electricity bill increases for large families. Urban households living in houses were more positive about such a 'lifeline' than urban apartment dwellers because houses have access to a broader range of energy types. People who live in houses are more confident that they can control their electricity consumption so as not to exceed an affordable limit.

Figure 25. Distribution of subsidies across wealth groups under three scenarios in all of tajikistan (proportion of benefits going to each group)



Source: World Bank staff, based on data from the Central Asia Longitudinal Inclusive Society Survey (CALISS), 2013
95% Confidence Interval shown in error bars

112. **From the above simulations and household assessment we can derive that block tariffs and even volume differentiated tariffs would target electricity subsidies to low volume consumers in rural areas and urban areas outside Dushanbe, but they would not necessarily target them much better at the poorest**. In Dushanbe these would protect the poor from higher tariffs for only part of their consumption. Given the high electricity consumption by the poor and the relatively small difference in electricity consumption levels across welfare groups within Dushanbe (or within rural areas), electricity lifelines would not be well targeted to the poorest and there would considerable leakage of subsidies to the non-poor. In Dushanbe it would not protect the poor from high energy expenses.

113. **Block tariffs (life lines) and volume differentiated tariffs require that advanced metering systems and automatic billing systems are in place to prevent leakages of lifeline tariffs to high volume and better-off consumers**. This was a major worry expressed by focus group participants who thought that block tariffs or volume differentiated tariffs would only work if all users are provided with a specified amount of KWh/months at a lower tariff. As these advanced metering systems are not yet in place across the country, this can only be an option for the medium term. Once this has happened increasing block tariffs and volume differentiated tariffs could in principle be an attractive option for urban areas outside Dushanbe (and rural areas once electricity is provided there on a continuous basis).

Table 2. Total cost to the budget and distribution of benefits under different electricity price reform and targeted social assistance scenarios (in Tajik Somoni).

Scenario*)	(a) Total monthly transfer/ implicit subsidy (Som. Millions/ month)	(b) Average monthly 'transfer' or implicit subsidy per recipient household in the poorest quintile (Som/ month)	(c) Average monthly 'transfer' or implicit subsidy per recipient household in the richest quintile) (Som/ month)	(d) Proportion of households in the poorest quintile receiving the transfer or implicit subsidy	(e) Proportion of the total transfer or implicit subsidy that goes to the poorest quintile	(f) Proportion of the combined annual implicit subsidy and SA that goes to the richest quintile
1. New Targeted Social Assistance Program**)	6.5	33.3	33.3	22%	48%	8%
2. No change in tariff (current situation)	22.5	18.2	23.7	97%	15%	28%
3. Compensate poorest quintile for electricity price increase using new targeted social assistance scheme**)	3.9	17.3	17.3	22%	48%	8%
4. Tariff remains 11d/kWh for poorest quintile and becomes 16.5 d/kWh for all other households	3.4	18.2	0	97%	100%	0%
5. Increasing block tariff. Tariff is 11 d/kWh for consumption below 500 kWh/ month in winter and below 250 kWh/ month rest of the year.	14.2	12.6	14.1	93%	16%	26%
6. Volume differentiated tariff: tariff is 11 d/kWh for those consuming less than 250 d/kWh / month in the non-heating season and less than 500 kWh in winter. Tariff is 16.5 d /kWh for consumption above these thresholds.	6.2	7.8	8.2	74%	18%	24%

Source: World Bank, based on data from the Central Asia Longitudinal Inclusive Society Survey (CALISS), 2013, the Targeted Social Assistance Pilot (De Laat et al 2013) and data from Barki Tajik (see also Annex C).

*) All scenarios assume a cost recovery of 16.5 diram/kWh which stands as an intermediate value between different investment scenarios (World Bank 2012) and would imply a 50% increase compared to 2013 tariff.
**) Simulation based on results of the pilot (De Laat et al, 2013)

114. **Targeted social assistance programs could provide a better vehicle for protecting the poor nationwide from high energy costs. However, the reformed social assistance program needs to expand its coverage in order to provide a good vehicle for providing energy top-up transfers to the poor.** If the roll-out of the reformed social protection program appears successful and manages to reach a large proportion of the poorest households it could play a very important role in assisting the poorest to meet rising energy costs.

115. **The new targeted social assistance program will never be able to reach all the poor.** The proxy mean test approach to identify poor households will inevitably lead to exclusion errors implying that there will always be poor people that will be rejected wrongly for the program. Compensating households for tariff increases through the new targeted social assistance

program will work for households that are in this program. But given that current coverage of the poor of the targeted social assistance program is still limited and will never be 100%, alternative measures to protect the poor from high energy expenses would be needed.

116. **In conclusion we can say that in order to compensate the poorest for high energy costs, the key priority on the medium term would be to increase the coverage of targeted social assistance program through further improving the proxy mean test, raising the confidence of the population in this program and increasing the number of poor households that apply, even if other measures will also be needed.** Our study shows that currently people have very low confidence in the current social assistance mechanism which could explain the low level of applicants of the new social assistance program. An intensive effort is therefore needed to expand its coverage including a multi-media awareness campaign to spread clear and detailed information on programs, target groups, eligibility requirements and applications processes. Special attention should be given to assist application by vulnerable groups such as female headed households without remittances, large families, the elderly and the disabled. One of the advantages of social assistance transfers over block or volumetric tariffs is their capacity to address both direct and indirect effects of phasing out subsidies. In areas were pre-paid metering is in place such as in parts of Khatlon, prepaid cards for electricity consumption could be included in the handouts for the poorest through the new targeted social assistance program once their targeting and coverage have further improved.

117. **On the medium term, increasing block tariffs or volume differentiated tariffs might be considered in areas where electricity consumption levels are a good proxy for household welfare levels, such as in urban areas outside Dushanbe and perhaps rural areas once winter rationing there is stopped.** Location based tariff differentials (i.e. lower tariffs for rural areas) would be an option if the billing mechanisms is fully automated and risk of households 'cheating the system' are minimized. Urban respondents of our study also suggested that energy assistance is preferably included in the electricity bill, removing the potential for officials to redirect the funds. As said, increasing block tariffs or volume differentiated tariffs would work better for households living in houses than for apartment dwellers because houses enable access to a broader range of energy types. People who live in houses are better able to control their electricity consumption so as not to exceed an affordable limit. Special attention needs to be paid to larger families living in houses that might have difficulties keeping their consumption below a lifeline threshold.

118. **Lessons can be learned from Pamir Energy company in GBAO region which has a long tradition of providing subsidies to electricity consumers in the form of a 'lifeline' or more recently through increasing block tariffs.** Further research would be warranted to assess the true targeting efficiency (the extent to which these subsidies actually reach the poorest) of this approach. The current tariff is 13.1 diram (2.7 US$ cents) per KWh, with low volume consumers paying between Somoni 2.4 and 0.260 (0.05 and 0.45 US$ cents) per kWh. About 15,000 households out of a total of about 27,500 receive a subsidy. This amounts to a total subsidy of about US$ 79,000 per month or about 25 Somoni (US$5.3) per eligible household per month. Box 6 provides further detail.

Box 6. Targeting the poor in the Pamir Energy Subsidy Scheme

The subsidy schemes applied by Pamir Energy in GBAO illustrate some examples, within the context of Tajikistan, for mitigating poverty impacts of rising electricity tariffs. The Gorno-Badakshan electricity supply company, "Pamir Energy", was founded in 2002 as a public-private partnership between the Government of Tajikistan, the Agha Khan Fund for International Development, and the International Finance Corporation of the World Bank. The creation of Pamir Energy significantly improved electricity supply in the mountainous GBAO province. Three quarters of GBAO residents receive 24-hour electricity supply, and 23 percent receive 18-20 hours of electricity throughout the year; by contrast the majority of Tajikistan's residents in other provinces receive only 3-7 hours of electricity in the winter.

Affordability has been a concern for the sustainability of Pamir Energy since its creation. Poverty rates in GBAO are the highest in the country and over 90 percent of Pamir Energy customers are residential households. Since the company's creation, an Early Year (EY) subsidy and a Lifeline subsidy were applied to support affordability. The EY subsidy was intended to compensate the company's losses from setting tariffs below cost recovery levels. The EY subsidy was financed from a Swiss grant. It was effective between 2003 and 2007, and consisted of a total of USD 1.19 million. The lifeline subsidy was applied universally, and consisted of a lower tariff (0.25 US cent/kWh) for consumption under the limit of 200 kWh/month, in the winter, and 50 kWh/month in the summer.

The lifeline subsidies expired in 2011, but under the Concession Agreement, Pamir Energy continued to provide the subsidies through the end of 2012. As of January 1, 2013, the Pamir Energy electricity tariff for the residential sector is 13.1 diram (2.7 US$ cents per KWh), up from 10 diram (2.1 US$ cents). For 2013-2014, the universal lifeline was replaced with an Increasing Block Tariff. It consists of three levels of subsidy, each based on a different monthly consumption threshold: 0-190 kWh (subsidy of 2.65 US cents per kWh), 191-220 kWh (2.45 US cents), 221-360 kWh (2.25 US cents). Through individual metering (21,000 new meters have already been installed with donor funding), as well as improved billing systems these different classes of customers can be targeted with the right level of subsidies. About 15,000 households out of a total of about 27,500 receive a subsidy. This amounts to a total subsidy of about US$ 79,000 per month or about US$5.3 (about 25 Somoni) per eligible household per month.

Source: Pamir Energy. July 2013. "Pamir Energy Subsidies 2013-2014 and Re-metering Programme. Conceptual Review for the World Bank"

7.

CONCLUSIONS AND RECOMMENDATIONS

7. CONCLUSIONS AND RECOMMENDATIONS

119. This chapter summarizes key findings from the study on household energy deprivation and offers policy considerations that would help promote energy security, enhance resilience of different groups of vulnerable consumers to energy price shocks, and increase social acceptance of potential energy and tariff reforms. These options can hopefully provide an input into discussions for the preparation of a comprehensive energy sector reform package that meets these objectives.

120. **Our findings provide a stark picture of high winter energy expenditure burdens in particular for the poorest two fifths of the population. For many of these households ensuring adequate heating in the winter comes at the expense of meeting basic needs such as proper nutrition and clothing.** All households in Tajikistan have experienced significant changes in energy availability and price over the past twenty years. Access to gas supplies has virtually ended and even if solid fuels such as coal have become progressively more accessible, their affordability has become a major concern. The wide majority of respondents in the study confirm that they take conscious measures to save on basic expenses and reduce energy consumption to the extent possible in order to meet cash expenses for fuels and electricity.

121. **Energy deprivation and affordability challenges are especially stark for rural households where the share of total consumption expenditure on energy – up to 25 percent in the heating season – is among the highest in Europe and Central Asia**. Rural households also demonstrate fewer coping strategies to meet energy expenses. They face pressure to purchase fuels at a high one-time cost in the fall, or face even higher prices for fuels during the heating season. Competing expenses in the fall, such as back to school expenditures, further decrease cash liquidity for households and their capacity to take advantage of the most economical price.

122. **Electricity shortages in rural areas affect the quality of social service delivery. Some schools and medical facilities face the same electricity rationing as residential areas which affects their functioning. They can only operate during daylight.** In the winter of 2008, no heating systems were operating in 26 percent of Tajikistan's schools and health centers (WHO and the Ministry of Health of Tajikistan, 2008). Reduced access to heat and electricity (and therefore running water) forced many hospitals and health centers to close or work restricted hours—in some cases discharging patients. Our findings suggest that these problems continue to affect the rural population of Tajikistan.

123. **The type of energy used for heating differs highly between locations, but does not differ much between wealth groups within a location with the exception of urban areas outside Dushanbe**. In urban areas outside Dushanbe the poorer households use relatively more wood and the wealthier ones rely relatively more electricity for heating. Urban apartment dwellers rely almost exclusively on electricity for heating their homes, while urban house residents use electricity, wood and coal with almost equal intensity. In rural areas, wood and coal are the main heating sources used. Yet rural households also use electricity intensively, including for heating, when it is available.

124. **Implicit electricity subsidies (the subsidies that exist because households pay less than what it costs to generate the electricity and transport it to them) are regressive and benefit well-off groups more than the poorest groups.** This is not surprising given that for the country as a whole, electricity consumption is higher among better-off households than among the poor. Urban and better-off households benefit disproportionally from the current implicit electricity subsidies. This counts especially for households in Dushanbe where electricity is available on a near continuous basis. Clearly, the current low electricity tariff policy is an inefficient and ineffective means for protecting the poor and vulnerable from high energy expenditures.

125. **Volume differentiated tariffs would provide a minimum amount of electricity at a low price for all electricity consumers. But the subsidies involved would not be well targeted to the poorest given the small differences in electricity consumption across wealth groups within a location, except for urban areas outside Dushanbe**. This situation is caused by severe rationing in areas outside Dushanbe, high energy inefficiencies and lack of alternatives in urban areas especially in apartments. Block tariffs or volume differentiated tariffs can only target the poor if a household's electricity consumption is a good proxy for its wealth level. This is not the case in Tajikistan. Moreover, block tariffs would do little for rural dwellers who suffer the highest energy expenditures in the country and for whom electricity is a relatively unimportant source of energy.

126. **Volume differentiated tariffs could potentially lead to misuse, unless automatic billing is put in place.** There is a widespread public perception of corrupt practices and consumer trust in the electricity utility company is very low. In areas were pre-paid metering is in place such as in parts of Khatlon satisfaction rates with electricity services are above the national average (although below GBAO), according to preliminary findings of a recent World Bank report card survey. Pre-paid metering systems and automatic billing systems leave less scope for corruption and facilitate more transparent billing. However, pre-paid systems

require households to pay for electricity before they have received it instead of paying for it afterwards. This may be problematic for the poorest households.

127. **An increase in electricity tariffs – needed to make plans for addressing Tajikistan's electricity crisis financially viable- would best be accompanied by measures to protect low income households**. A fifty percent increase would have the largest impact on poor households in Dushanbe and other urban areas. During the heating season, spending on energy would rise from about 14 percent to almost 19 percent of household consumption in Dushanbe and would reach 20 percent for the poorest households in other urban areas. This assumes that electricity consumption patterns remain unchanged, a realistic assumption on the short term, especially for apartment dwellers for whom there are no safe heating alternatives.

128. **A reasonable rise in tariff is acceptable to households provided electricity supply, service and transparency of the electricity provider Barki Tajik improve.** More than 60 percent of rural households would accept an electricity tariff increase compared to about 40% of urban households. But higher tariffs would be acceptable only on three conditions: (i) continuous and good quality electricity supply (especially in rural areas), (ii) better customer service with Barki Tajik taking care of maintenance and repair needs, and (iii) strict control of illegal. It must also be kept in mind that acceptable bills are based on current level rationed consumption and would automatically rise in case of improved supply, even prior to any tariff increase.

129. **The new targeted social assistance program could be a vehicle for transferring compensations to the poorest households for high energy costs.** But for that to happen, its coverage of households in the poorest quintile(s) needs to be improved.

RECOMMENDATIONS

130. **There is a need to redirect the current implicit electricity subsidies that largely benefit urban households, to households that are affected most by energy deprivation, which are those in rural areas.** For rural households the first priority is to minimize or end the current rationing of electricity supply. Many rural households are prepared to pay higher electricity tariffs in exchange for an improved supply of electricity. This will improve their quality of life, lower their energy burden, improve their energy security and strengthen the operation of school and clinics . It will also reduce their dependency on fossil and solid fuels that expose families to health hazards caused by indoor air pollution and, in the case of firewood, contribute to environmental degradation.

131. **The most important measure to improve the energy security of the poor and to protect them from the impact of necessary tariff increases is to drastically expand the coverage of the social assistance program.** The first priority here is to further improve the proxy means test and roll out the reformed safety net as soon as possible across the country. This should take into account that the rural poor spend the highest percentage of expenditures on heating in the winter, and have fewer coping strategies. On the other hand urban poor apartment dwellers would be the most directly and negatively affected by an increase in electricity tariffs due to their lack of safe heating alternatives. An improved social assistance program would need to address the needs of both population groups. It would be the most effective way of helping the poor with high energy expenditures regardless of what energy source they use.

132. **There is a need to not only conduct intensive communication campaigns around the new more transparent proxy means test approach for identifying poor households but also consider including grievance redress mechanisms for households applying to the new targeted social assistance program.** This would be important, given the very poor household perceptions about the integrity of current social assistance programs. Also, the new proxy mean test approach to identify the poor could be used to deliver pre-paid electricity cards to poor households or channel funds through pre-paid electricity accounts for them to pay for electricity costs below a lifeline threshold. This could build on the experiences ongoing in Khatlon and GBAO. It will be important to coordinate any electricity tariff increases for the residential sector with the roll-out of the reformed social safety net program which is scheduled to be completed by 2016.

133. **The funds that are currently in the national budget and allocated for compensation of poor households for gas consumption expenses should be redirected to compensate these households for high electricity or other energy (non-gas) expenses**. Options for using the new targeted social assistance program for delivering this transfer to the poorest should be explored. These funds currently go unused and are returned to the Ministry of Finance every year.

134. **To protect households from high energy expenses, various measures could be contemplated to enhance residential energy efficiency of poor and middle income rural households. Work by GIZ and the NGO GERES has**

shown that there is a large potential for improving the energy efficiency of rural homes using local materials. Lessons from their various rural pilot programs should be used to scale up successful measures. The GIZ Warm Comfort program has installed thermal insulation and energy efficient solutions for households in the Gorno-Badakshan region (GBAO). In this program, home improvement solutions for energy efficiency were manufactured and supplied by local cooperatives. The GIZ program has trained and certified craftsmen in making double glazed wooden windows and double doors. Demand for these products is said to be large. Research by GERES in Sughd has identified nine promising technologies which have been published in a catalogue (GERES, undated)[17]. Further Research and Development (R&D) to develop (region specific) energy-saving technologies such as coal-heating stoves is needed. And financial mechanisms to make energy efficient investments available for the poor would also be important. The ADB Access to Green Finance Project as well as similar efforts by KfW seem promising in this respect. Eliminating misinformation about the health effects of some energy efficiency measures would also be important. Further assessment of these past efforts and initiatives to improve the energy situation of rural households and for enhancing energy efficiency in rural areas and schools and clinics would be essential. This could the help develop a plan for expanding successful components. These lessons can be fed into new activities such as the community support program of the CASA-1000 project which intends to finance community initiatives that improve energy efficiency, among others.

135. **A better enforcement of energy efficient construction standards would go a long way in improving the energy-efficiency of private and public buildings in urban areas.** In addition, university curricula development for architects and civil engineers and vocational trainings would be important. The work of GERES in Afghanistan could possibly be used as a reference (GERES, 2010).[18]

136. **In rural areas, initiatives could be introduced that promote energy diversification and that address seasonal price fluctuations.** These could include (i) production of eco-fuels, e.g. biomass coal briquettes from existing farm bi-products; and (ii) where relevant and economically viable, renewables such as solar wind and small hydro. In addition, savings or community funds could be introduced that would relieve cash constraints for poor families for the autumn purchase of winter fuels. Such mechanisms would allow purchasing coal and other energy sources at the optimal price and providing short-term storage. This would allow families to smooth seasonal expenditure shocks and pay when money is available from their income or remittances. Community funds could also be used to supplement the available budget for fuels in schools, childcare centers, and clinics.

137. **Taking measures to help make sure alternative types of energy saving light bulbs are on offer in the market would be important.** This would help address current negative opinions on the quality of the energy saving light bulbs that are now available in the country,

138. **Improving the governance of the power sector by introducing measures to enhance the transparency and accountability of Barki Tajik, improve billing systems and remove illegal connections would be an important part of the reform package.** This should include introducing steps to set clear standards of company and consumer responsibilities for quality of service, respond to maintenance requests, and create consumer feedback mechanisms. Box 7 provides an example of an ICT-enabled feedback mechanism of electricity utility companies in the Dominican Republic.

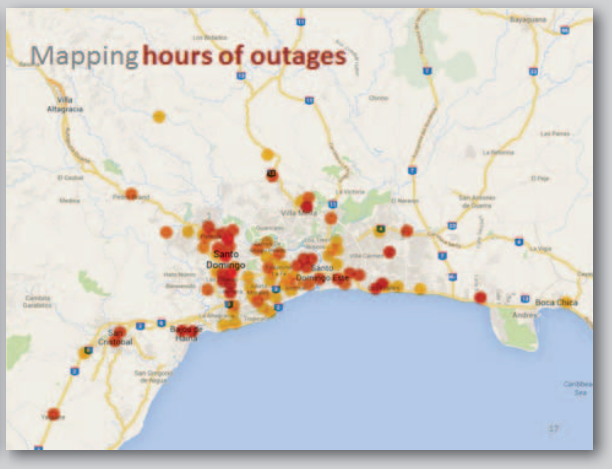
17 http://www.geres.eu/images/publications/catalogue-tajikistan-en.pdf
18 http://www.geres.eu/en/resources/publications/item/164-energy-efficient-public-buildings-in-afghanistan

Box 7. Using ICT-Enabled Citizen Feedback to Improve Service Delivery in the Electricity Sector – the example of the Dominican Republic

For decades, the power sector in the Dominican Republic has suffered from poor service, inadequate generation, and frequent power cuts. This has resulted into consumer frustration and illegal usage. At the same time, lack of transparency and accountability at the provider level opened the door to corruption and irregularities. To reduce electricity losses and increasing consumer satisfaction, a national pilot project called *Vozelectrica* (Electric Voice) was launched to test the use of an ICT enabled citizen-feedback system in 2013. This work complemented social compacts between the electricity utility company and communities of consumers. The ICT tool enables scaling up community monitoring of this compact

Vozelectrica developed an independent online geo-referenced consumer portal in a short time period and at a reasonable cost. The online platform was jointly managed by utility companies and eight voluntary local civil society organizations. It enabled each citizen to send feedback on issues such as power shortages, complaints about impolite technicians or reports of electricity theft. This was done via phone, e-mail, social media, a mobile app, and also in person. Each report could then be viewed on a map at the www.vozelectrica.org website in real time. The participating electricity distribution companies could evaluate the reports and post their responses in public.

The online platform Vozelectrica has generated great interest. It has provided extensive information to the electricity utility companies about the quality and equity of service delivery, how to reach consumers, and what channels to use for that. It transformed the "noise" of complaints about the quality of the service into systematically collected citizen feedback. The utility companies have requested to mainstream the platform beyond the pilot areas and aim to fully integrate it in their customer response system. Civil society organizations have played an active role in monitoring the resources spent in the sector and have gained experience in the use of ICT tools for social accountability. Many other countries across the world have become interested in the use of ICT enabled citizen-engagement tools to improve service delivery in sectors such as transport, water, and urban development.



Sources: World Bank. 2014. "Citizen Engagement Could Bring Dominicans Out of the Dark". Available at: http://intranet.worldbank.org/WBSITE/INTRANET/INTRANETHOME/0,,contentMDK:23537923~pagePK:6426483~piPK:6402841~theSitePK:86048,00.html

World Bank. 2014. An 'Ecosystem Approach' to Reducing Electricity Losses while Increasing Consumer Satisfaction: Dominican Republic. Powerpoint presentation.

139. **Any residential electricity tariff increases would need to be accompanied by a strong communications campaign**. Communications are key in making sure that consumers understand why tariff increases are necessary and what will be done to protect the poor and vulnerable from the impact of a tariff increase, to improve the quality and integrity of utility services, and to support households with managing electricity consumption and improving energy efficiency.

140. **Speeding up the roll-out of metering systems and automatic billing systems across the country would make it feasible to introduce block tariffs and volume differentiated tariffs.** Once electricity is provided on a continuous basis

these could then be introduced in urban areas outside Dushanbe and rural areas. Such a tariff policy could also be expanded to Dushanbe once measures for reducing the dependency of households on electricity for heating their dwellings and for enhancing energy efficiency are more widely accessible.

141. **The information gained on household experiences, perceptions and budgets in this study illustrates the potential for gathering quality evidence from the field to inform policy decisions. Continuing to bringing such regular evidence to the debate on energy deprivation and reform in the energy sector in Tajikistan will be important going forward.** This has been important in many other countries in Europe and Central Asia (Lampietti et al 2007). Strengthening the existing household expenditure survey to better capture variations in energy use and expenditures would be a priority, given the very important place energy occupies in household expenditures. This could be done by making sure the household survey is conducted during different parts of the year, and by incorporating an energy module to that survey, based on the questionnaire that was applied for the quantitative data collection for this study. This would make it easier to provide evidence of the impact of energy reforms on different consumer groups and provide a more accurate basis for targeting of dedicated assistance programs.

REFERENCES

REFERENCES

De Laat, Joost, Robin Audy, Federico Torracchi and Menahem Prywes (2013). The impact of small unconditional cash transfers on the lives of the poor in Tajikistan. Unpublished draft, 2013.

Fields, Daryl, Artur Kochnakyan, Gary Stuggins and John Besant-Jones (2012).Tajikistan's Winter Energy Crisis: Electricity Supply and Demand Alternatives. World Bank, Washington DC.

GERES (2010). Energy efficient public buildings in Afghanistan. Technical Guidebook.
http://www.geres.eu/en/resources/publications/item/164-energy-efficient-public-buildings-in-afghanistan

GERES (undated) 9 ways of saving energy for rural households. Efficient Technologies Catalogue http://www.geres.eu/images/publications/catalogue-tajikistan-en.pdf
www.agencynau.tj

IOM, 2009.Abandoned wives of Tajik labor migrants: IOM Study on the socio-economic characteristics of abandoned wives of Tajik labor migrants and their survival capabilities. IOM Dushanbe, Tajikistan.

Khakimov P. and Mahmadbekov M., "Economic Dynamics of Labour Migrants' Remittances in Tajikistan", Report Based on the Study of Remittances and Living Standard Measurement Survey (TLSMS conducted in August 2008), IOM, April, 2009. Pg. 70 (cited in IOM, 2009)

Lampietti Julian, Sudeshna Ghosh Banaerjee and Amelia Branczik (2007). People and power: electricity sector reforms and the poor in Europe and Central Asia. World Bank. Directions in Development.

Pamir Energy. July 2013. "Pamir Energy Subsidies 2013-2014 and Re-metering Programme". Conceptual Review for the World Bank.

SNC Lavalin (2011). Tajikistan electricity demand study. Prepared for the World Bank.

UNDP (2011b).Energy Efficiency Master Plan for Tajikistan.

UNDP (2011a) PSIA Energy Tajikistan. Poverty and Social Impact Assessment: Energy Sector in Tajikistan

UNESCO, 2007.Tajikistan country case study", Country profile prepared for the Education for All Global Monitoring Report 2008: Education for All by 2015: will we make it?; by Vladimir Briller,

WHO and the Ministry of Health of Tajikistan (2008): "Health Assessment for Tajikistan".

World Bank (forthcoming) Citizen report card survey on access and quality of public services for the population.

World Bank. 2014a. "Citizen Engagement Could Bring Dominicans Out of the Dark". Available at: http://intranet.worldbank.org/WBSITE/INTRANET/INTRANETHOME/0,,contentMDK:23537923~pagePK:6426483~piPK:6402841~theSitePK:86048,00.html

World Bank. 2014b. "An 'Ecosystem Approach' to Reducing Electricity Losses while Increasing Consumer Satisfaction: Dominican Republic". Unpublished.

World Bank (2013). Tajikistan: Financial Assessment of Barki Tojik, September.

World Bank (2012) Balancing Act: cutting subsidies, protecting affordability, and investing in the energy sector in Eastern Europe and Central Asia.

METHODOLOGY

ANNEX A

ANNEX A: METHODOLOGY

The primary data for this study were collected through qualitative and quantitative research methods. This chapter briefly presents the methodology applied for the study.

The qualitative research consisted of focus group discussions with households as well as semi-structured, open-ended interviews with local leaders and other stakeholders selected through purposive sampling. These allow for the collection of textual data, that is, data on social, political, and economic processes that explore issues from the perspective of different groups. The qualitative research was conducted between March and May 2013 and included 28 focus group discussions (FGD), 11 key informant interviews (KII) and 4 ethnographic interviews. Focus groups (FGs) were held in 11 locations in Tajikistan: the capital, Dushanbe, one rural and one urban location in each of the following regions–RRS, Sughd, Khatlon (Kuliab zone), Khatlon (Kurgan-tube zone) and GBAO (Map A1). Focus group locations were chosen to represent different districts, rural and urban areas and a range of geophysical characteristics (valleys/mountains), and use of different energy sources. The sampling method also ensured that different welfare groups were covered: 24 FGs were held with low income households (rural and urban), and 4 with middle income households (urban). Separate group discussions were held with men and women. Key informant interviews were conducted across each of the sites. An expanded description of each location and its socio-economic characteristics is found in Annex B.

Focus group discussions revolved around the following sets of issues: (i) seasonal consumption and expenditure on energy sources; most stressful times regarding availability and affordability of energy; (ii) coping and adaptation strategies to energy shortages and changes in energy availability in the past ten years; (iii) coping with energy expenses; (iv) perceptions on most effective government support to assist with energy expenses; (v) attitudes to prospective electricity tariff increase, and priority service improvements that would justify higher cost for electricity.

Map A1. Location of research sites for focus group discussions and In-Depth interviews

Semi-structured interviews were conducted with local leaders, officials responsible for social buildings (schools, clinics), and civil society leaders to complement and compare views of households on the same sets of questions (Table A1).

Table A1. Participants of key informant interviews

Key Informant Interview #	Key Informant Interviews sub-group	Population point
1	Representative of local government	Khorogh
2	Representative of local government	Istaravshan
3	Representative of local government	Sarband
4	Representative of local government	Nurek
5	Local leader	Shahrinav
6	Local leader	Vanch
7	Social buildings (school)	Vose
8	Social buildings (school)	Dushanbe
9	Social buildings (clinic)	Khujand
10	Civil society representative	Consumers Union of Tajikistan
11	Civil society representative	NGO "For the Earth"

In total, four ethnographic interviews were conducted for the study in the following population points: Dushanbe, Vahdad, Sarband and Istaravshan. Each interview was conducted by two facilitators each covering the male and female members of the household separately. This technique has helped to identify certain gender differences in perception of energy deprivation and coping strategies that the household applies. All ethnographic interviews took place in the houses of respondents; thus, in the process of interviews respondents could show interviewers the energy sources and devices they use for cooking, lighting and heating, and any energy-saving improvements they had made.

Quantitative survey data were collected through the 2013 Central Asia Longitudinal Inclusive Society Survey (CALISS), a randomly sampled formal household survey conducted in Tajikistan, Kyrgyzstan, Uzbekistan. In Tajikistan this survey was implemented during July-August 2013. It covered a nationally representative sample of 2,000 respondents supplemented with a booster sample of 1,300 Dushanbe respondents. The booster sample was applied in order to capture the potential impact of changes in electricity prices on both poor and middle class urban households for whom electricity is the only available source of energy. The survey included an improved energy module designed to (i) better capture seasonal variations in energy spending for electricity and fuels during the heating and non-heating season; and (ii) put value on collected fuels (cotton stalks, dung, brushwood). The survey was conducted in July 2013, six months after the heating season. In a few cases this led to poor recall of electrical consumption during the heating season and some subsequent data discrepancies.

It is important to note that the sites and the households sampled for the qualitative research are chosen to represent a range of different circumstances in Tajikistan. These households are different from those selected for the quantitative research.

CHARACTERISTICS OF LOCATIONS CHOSEN FOR THE QUALITATIVE RESEARCH

ANNEX B

ANNEX B: CHARACTERISTICS OF LOCATIONS CHOSEN FOR THE QUALITATIVE RESEARCH

Focus group discussions were conducted in 11 locations in Tajikistan: the capital Dushanbe, one rural and one urban location in each of the following five regions–RRS, Sughd, Khatlon (Kuliab zone), Khatlon (Kurgan-tube zone) and GBAO. The study chose locations representing the country's range of geophysical characteristics (valleys/mountains) and socio-economic groups (income levels and sources, available energy sources, rural/urban, etc.). In Shahrinav, Vanch, Istravshan, Shaartuz, and Vose regions focus groups were conducted with rural residents from villages outside the regional center. These groups represent the rural sample. In Dushanbe, Vahdad, Khorog, Khujand, Sarband and Nurek focus group were conducted in the city/town. These groups represent the urban sample.

Key characteristics of the locations in the sample are as follows:

Dushanbe. Dushanbe residents work in education, justice, culture, medicine, nongovernment organizations and other professional and technical occupations. People live in apartment buildings and private houses. There are around 3,400 multi-story apartment buildings (2-16 story) and more than 35,000 private houses, distributed among the six districts and the suburbs of the city.[19] Piped gas connection and central heating are present only in few apartment buildings. Electricity is the main source of energy used for residential heating, lighting and cooking, and the supply is 24 hours seven days per week without limitation.

Vahdad. Vahdad is a city located 20 km east from Dushanbe. People live in apartment buildings and private houses. They work in several local plants. Electricity supply is provided just a few hours a day during winter. Fuels for heating are coal, wood and dung, which are used in apartment buildings and private houses.

Shahrinav. Shahrinav is a district center - a small town, located 30 km west of Dushanbe. Most people are employed in agriculture. People live in apartment buildings and private houses. Mainly available sources of energy are wood, cotton stalks, and dung.

Khorogh. Khorogh is an administrative center of Gorno-Badakhshan Autonomous Province (GBAO) located 700 km from Dushanbe. Most Khorogh residents live in apartment buildings. Buildings have two floors. Most people are working in education, medicine, trading and banking. The most affordable source of energy is electricity, which is provided without limit during winter, and is used for cooking, lighting and heating.

Vanch. The regional center of Vanch is 120 km from the town of Khorogh and 520 km from Dushanbe. Most people work in governmental offices, schools and other public institutions. Some households have a plot of land and breed livestock. People live in private houses, but there are also apartment buildings. Electricity supply is limited for more than six months of the year so residents use candles and flashlights for lighting, and coal, wood and dung for heating.

Khujand. Khujand is the capital of northern Tajikistan and second largest city in the country. Most people work in education, medicine, trading, industrial plants, and small and medium enterprises. The majority lives in apartment buildings.

Istaravshan. Istravshan is a city, 78 kilometers southwest of Khujand. The city is surrounded by 10 jamoats[20] with 68 villages. The district has a favorable geographical location close to the Sulyukta region of the Kyrgyz Republic, which produces high-quality coal. The coal is brought and sold in the area. People live in apartment buildings and private houses. Households in apartment use electricity; households in private houses use electricity, firewood, coal, cotton stalks, and dung. Istaravshan was one of the first regions in the country, in which the new targeted social assistance program was implemented in 2010.

Sarband. Sarband is a city in southwest Tajikistan. It is the administrative capital of Sarband district in Khatlon Province, located east of the provincial capital Kurgantyube and about 120 km south of Dushanbe. Several years ago, a local economic mainstay, a fertilizer manufacturing plant, which employed 1500-2000 people from Sarband cut production dramatically and retained only 200 employees. Since then, many households who were employed at the factory now have income from small trading activities, social transfers, labor migration and remittances from family members working in Russia. In August 2012, a new system of pre-paid electricity was established in the city. People transfer money to a plastic card, insert the card into the electricity meter (new meters with the application were installed in apartment buildings by Barki Tajik for free) and electricity is supplied to the apartment up to the value of the card, then the card is recharged. A main goal of the program is to solve the problem of arrears in electricity bills.

19 Source: http://www.academia.edu/3745426/Analysis_of_energy_consumption_in_the_multi-apartment_residential_buildings_of_Dushanbe_and_assessment_of_potential_for_energy_efficiency (accessed 20 July, 2013)
20 Third-level administrative division unit in Tajkistan (similar to commune or municipality)

Shaartuz. This is a rural area in southwestern Tajikistan, 230 km from Dushanbe. People live in private houses and are involved mainly in agriculture.

Nurek. Nurek is a city in Khatlon province situated on the Vakhsh River, 70 km southeast of Dushanbe. Most people live in apartment buildings. The area is close to the Nurek Hydro-Power Plant (HPP), which produces more than 60 percent of electricity in Tajikistan, and is the main employer in this region.

Vose. Vose is a rural settlement located in Khatlon province, 184 km of Dushanbe. Most people live in private houses and are involved in agriculture.

METHODOLOGICAL NOTE ON THE SIMULATIONS

ANNEX C

ANNEX C: METHODOLOGICAL NOTE ON THE SIMULATIONS

The descriptive analysis compares energy and total consumption patterns as reported in the CALISS 2013 household survey conducted in July and August 2013 in Tajikistan. Because of the seasonality pattern of energy expenditures, alternative welfare variables have been constructed and include all expenditures, including durables, health expenditures, and rent as well as consumption from own collection (whether food or fuels). The reference welfare variable uses current expenditures while an alternative welfare variable uses average energy expenditures (constructed from heating season and non-heating season energy expenditures). Households are ranked and divided into five groups of equal size (quintiles), based on total household consumption per capita adjusted for regional differences.

Caveats in the quantitative analysis of energy consumption due to seasonality issue:

The survey was conducted in July and August 2013, outside of the heating season. Because of the high differences in energy consumption between seasons, energy expenditures during the heating season as well as in the non-heating season were recorded, including for electricity. (In contrast, in previous surveys electricity expenditure was only recorded for the 'current' period). Annual consumption is estimated using average heating season and average non heating season energy expenditure under the assumption that a heating season lasts 5 months.

Regarding electricity, inconsistencies have been identified in comparing electricity expenditures in the month preceding the interview and average non heating season electricity expenditures. These have been eliminated. Also, there are more missing variables for seasonal data than for 'last month' data, especially in Dushanbe where season variation is high and recall was more difficult. As a consequence, although it is critical for the analysis to capture the seasonality of energy expenditures, seasonal data is less consistent than 'last month' data. Average electricity consumption suffers from the same caveats as seasonal data, with an underestimation bias due to missing electricity seasonal expenditures.

Table C1 Proportion of respondents with missing data or no expenditures for electricity

	'Last month'	Heating season	Non Heating season
Dushanbe	8%	13%	14%
GBAO	4%	7%	7%
Sughd	3%	6%	5%
Kathlon	2%	12%	2%
RRS	2%	4%	4%
TOTAL	3%	8%	5%

Note that using last month data as an approximation of the average electricity expenditure would lead to a severe underestimation bias in Dushanbe where consumption varies highly with the season. The same would counts for areas outside Dushanbe (with a bias most likely in the other direction) where electricity rationing constrains electricity consumption during winter.

Thus average energy data, although imperfect due to missing values remains a better proxy for energy expenditure than 'last month's' data.

Analysis of electricity subsidy distribution analysis and price impact simulation

The main analytical tool applied in the subsidy distribution analysis and price impact simulation is the comparison of forecasted electricity expenditures shares under a constant price scenario and simulated electricity expenditures shares after the electricity tariff increase across the welfare distribution.

The simulations of the price increase consider the impacts of a 50 percent rise in electricity tariffs by in terms of increase in the share of energy expenditures in total household consumption expenditures.

Cash revenue requirement to cover the required operating and maintenance (O&M) costs, debt service (interest expenses and repayments of principal amounts), payments to Independent Power Producers (IPPs) and tax obligations is estimated at 11.9 diram/kWh while the 2013 residential tariff is 11 diram /kWh (World Bank 2013). Several investments scenarios have been drafted leading to unit costs of 20 diram/kWh in 2010 for limited investment to 36 diram/kWh in 2020 to tackle the energy deficit (World

Bank 2013). As an intermediary value in a shorter term, a cost recovery of 16.5 diram/kWh, corresponding to a 50% price increase compared to the 2013 tariff is used for the analysis.

To estimate the impact of the change in electricity tariffs on the share of electricity expenditures in total household expenditures, we calculate the change in the electricity share as follows:

$\Delta S\_el = S\_el_1 - S\_el_0 = (S\_el_0(P_1-P_0)/P_0)(\varepsilon+ \varepsilon(P_1-P_0)/P_0+1) - S\_el_0= (S\_el_0*\Delta P/P)(\varepsilon+ \varepsilon(\Delta P/P +1) - S\_el_0$

whereS_el_0 is the electricity share before the price change; P_0 and P_1 are the tariffs before and after the increase ($\Delta P/P$ is the price increase to cost recovery); and ε is the price elasticity of demand. .Because of severe electricity rationing during winter outside Dushanbe and the lack of heating alternatives for Dushanbe dwellers, the simulations presented are for a constant consumption level (no price-elasticity taken into account in the short term).

In the alternative of no price increase, the corresponding implicit subsidy is calculated as the difference between the consumption if paid at the cost recovery level and the actual expenditures given the tariff applied. Alternative block tariffs are also simulated, assuming that only the consumption above a given threshold is priced at cost recovery level (50% increase) while the consumption below the threshold remains priced at the previous tariff.

$Sub =Cons\_el .P_1-Cons\_el .P_0 = (El/P_0). P_1- (El/P_0). P_0 = El (P1-P_0)/P_0$

where Cons_el is the electricity consumption, El is the electricity expenditure; P_0 is the tariff and $P_1$is the cost recovery.

The simulation of social impact mitigation programs uses the performance results of the the pilot of the targeted social assistance program (De Laat et al 2013), ie 48 % of the total social assistance transfers are supplied to the poorest quintile and 8% to the richest. In terms of coverage, where the program covers 19% of the population, 22% of the poorest quintile is covered by the targeted transfer, 18% of the near poorest and 16% of the richest households.

UTILITY DATA

ANNEX D

ANNEX D: UTILITY DATA

Table D1: Residential Electric Distribution in 2011

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	**Total**
Residential consumption in 2011														
Tajikistan	GWh	556	512	335	198	215	199	222	224	206	296	414	504	**3,881**
Including:														
Dushanbe city 2011	GWh	191	175	139	94	71	64	67	68	50	105	180	233	**1,436**
Sogd region 2011	GWh	136	120	76	37	43	42	50	57	55	78	102	116	**911**
RRS 2011	GWh	105	92	51	32	51	47	46	48	46	52	52	64	**686**
Khatlon region 2011	GWh	125	125	68	35	50	46	59	50	55	62	81	91	**847**
Electric Power Distribution per customer														
Dushanbe city	kWh	1129	1033	820	549	415	376	394	395	294	612	1053	1360	
Sogd region	kWh	348	307	193	95	108	105	124	143	138	194	255	290	
RRS	kWh	424	373	208	130	202	187	183	192	182	205	205	255	
Khatlon region	kWh	418	424	232	130	168	154	197	169	185	207	270	306	

Figure D1: Average Residential Electric Consumption in kWh/month, Tajikistan2011, Barqi Tojik Service Area

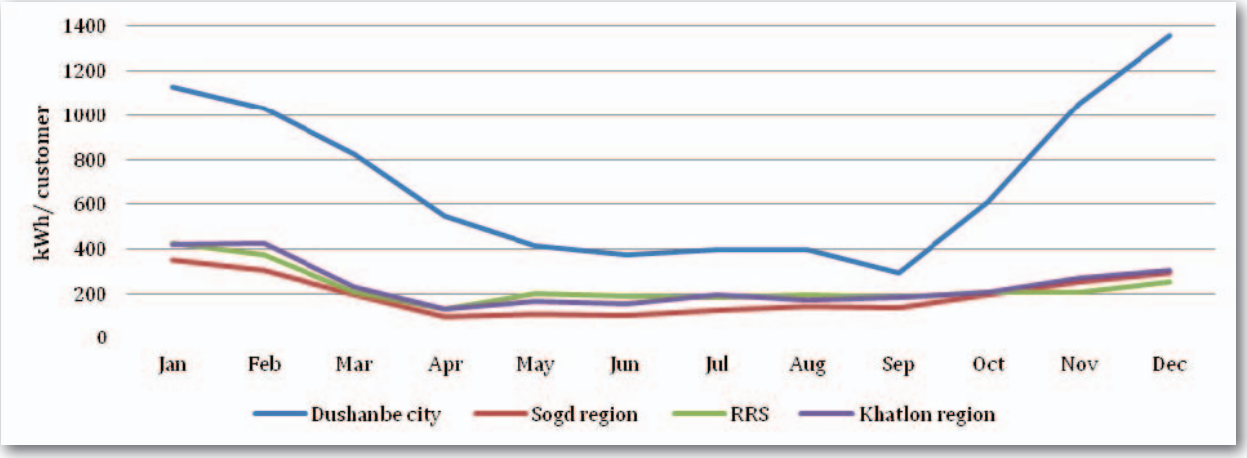
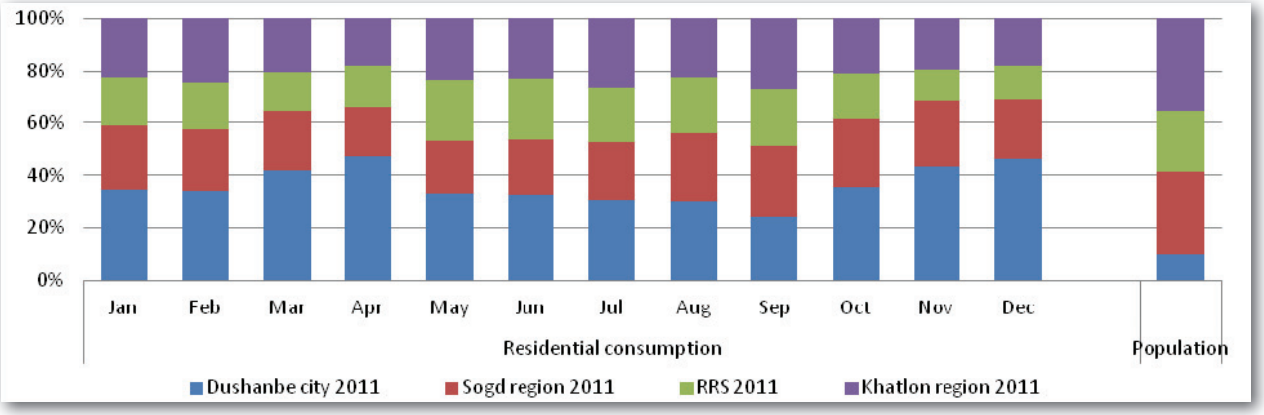


Figure D2: Residential consumption in Barqi Tojik service area, Tajikistan 2011



Socioeconomic data by location

Location	Region	Type	Populations (thousands)	Average number of employed per 1000	Average monthly salary in Somoni (TJS)	# of educational institutions	# of hospitals/ clinicis
Dushanbe	Capital	Urban	780.7	135.4	885.32	136	41
Vahdad	RRS	Urban	290.4	16	305.03	144	11
Shahrinav	RRS	Rural	99.9	7.3	192.13	55	1
Khorogh	GBAO	Urban	28.4	8.8	462.96	15	9
Vanch	GBAO	Rural	31.1	1.8	308.47	50	2
Khujand	Sughd	Urban	165.4	38.4	592.78	46	27
Istaravshan	Sughd	Rural	229.1	43.3	207.55	70	12
Sarband	Khatlon (Kurgan tube)	Urban	40.2	6.3	445.67	15	2
Shaartuz	Khatlon (Kurgan tube)	Rural	105.1	17.5	220.01	55	5
Nurek	Khatlon(Kuliab)	Urban	50.9	6.6	1,102.22	30	1
Vose	Khatlon (Kuliab)	Rural	183.2	10.7	264.37	71	6

Data source: The Statistical Agency under President of the Republic of Tajikistan – www.stat.tj