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HOUSEHOLD ACCESS TO ENERGY IN THE FERGANA VALLEY

A MULTIDIMENSIONAL
SURVEY-BASED ASSESSMENT
IN THREE CAREC COUNTRIES



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**CAREC INSTITUTE
ASIAN DEVELOPMENT BANK INSTITUTE
PUBLIC OPINION RESEARCH INSTITUTE**

Project report

Household Access To Energy In The Fergana Valley – A Multidimensional Survey-Based Assessment In Three CAREC Countries ¹ (Kyrgyz Republic, Tajikistan, Uzbekistan)

March, 2024

¹ The project - on which this report is based - was *commissioned by the Central Asia Regional Economic Cooperation (CAREC) Institute in partnership with the Asian Development Bank Institute (ADBI). The survey was organized, and its methods and findings summarized in this report by the Public Opinion Research Institute, Republic of Kazakhstan (PORI).*

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THE PROJECT – AN INTRODUCTION

Hans Holzhaacker, Chief economist at the CAREC Institute

The aim of the project

Access to energy is vital for many aspects of human life and for the socio-economic development of the CAREC region. At the same time energy systems globally and in the CAREC region are undergoing fundamental transitions, not least to adapt to climate change and to contribute to the fight against it.

In recent years, there has been an increased focus on energy and renewable sources also in the Fergana Valley, which spans over parts of Uzbekistan, the Kyrgyz Republic and Tajikistan. Uzbekistan, the Kyrgyz Republic, and Tajikistan are all working on major shifts in their electricity generation and distribution systems. All three countries have enacted several laws and programs in this respect. Part of the programs are decisive shifts towards renewables. Investigating energy access in the Fergana Valley provides the opportunity to study energy access in a subregion that is geographically smaller and more uniform than the CAREC region as a whole but that is divided between three different legislations and thus well-suited for comparative analyses.

The Fergana Valley was the site of several outbreaks of violence between different ethnic groups since the 1990ies. The causes of these outbreaks are complex and varied. However, lack of economic development also plays a role. The provision of sufficient and reliable energy access is of high importance not only for the wellbeing of its inhabitants but could possibly contribute to easing ethnic tensions and cross-border conflicts. Regional energy cooperation, including through grid connectivity and electricity trade can play an important role for energy supply and energy security, and perhaps facilitate regional cooperation also on other topics.

The project “Household Access To Energy In The Fergana Valley” initiated by the CAREC Institute aimed to generate detailed data about the situation households face when they need energy for various purposes, especially heating and cooking, what their awareness is of the potential harm fossil fuels can inflict on the environment or health, what their readiness and plans are for changing their energy sources, and where they get their information from.

The generated data shall serve as a source for analysis by the CAREC Institute, ADBI and PORI, but can also be shared with other interested researchers upon request.

The content of the project report

The below report explains the survey method, including the sampling and the questionnaire design and gives an overview of the data generated by the survey. It summarizes the main findings on problems with energy supply, type of heating installed, expenditures for heating, reasons for using more than one type of energy

source, experiences with changes in household heating systems and future plans, ways of controlling the temperature in the household; cooling systems in the household, plans for changes in the cooling system; sources of energy in the household for cooking, costs of the energy for cooking, electricity meters in the household; energy savings in households financial problems in paying electricity bills.

Some policy recommendations resulting from the project data

About 80% of respondents in the Kyrgyz Republic and Tajikistan, and 65% in Uzbekistan expressed that they are aware of the harm fossil fuels can inflict on the environment and on health. However, the main source of energy for heating in the Kyrgyz Republic and in Uzbekistan is coal, despite higher energy spending of households that use coal as main source of energy for heating than of households that use electricity. To change this the relative price between clean energy such as electricity and coal must be sharply adjusted in favor of clean energy by removing subsidies and taxing fossil fuels.

At the same time, in order not to cause social hardship, and a backlash against such reforms, households need to be compensated for higher energy bills.

To provide new opportunities to households to switch to cleaner energy such as electricity and to be able to satisfy their higher demand for electricity along with the new demand from other sectors such as electric cars or the production of hydrogen a new wave of (green) electrification is required.

To advance the movement towards cleaner household energy use timely information campaigns via the internet, social networks, and other communication channels about new technical and financial opportunities for the usage of clean and renewable energy sources would be helpful.

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List of Abbreviations

Mtoe	megatons of oil equivalent
Gtoe	gigatons of oil equivalent
UAE	United Arab Emirates
kW	kilowatt
MW	megawatt
CAPI	computer assisted personal interviewing
PAPI	paper assisted personal interview
USD	United States dollar
HH	household
TV	television

EXECUTIVE SUMMARY.

HOUSEHOLDS WANT RELIABLE AND CLEAN ENERGY – A STUDY IN THE FERGANA VALLEY

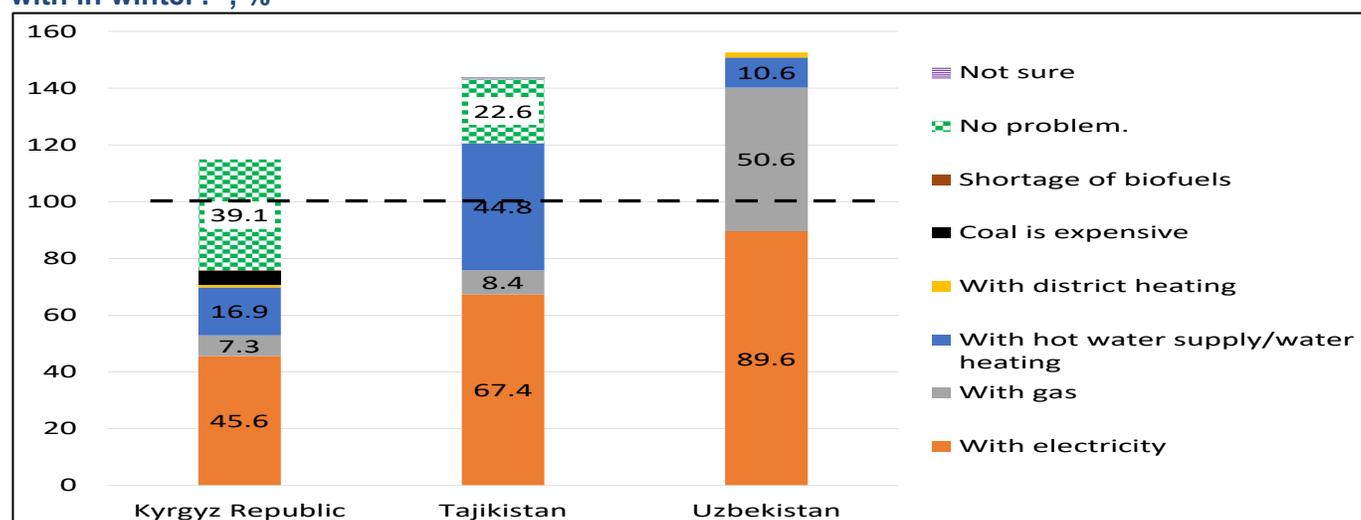
Hans Holzacker, Chief economist at the CAREC Institute

Energy systems globally and in the CAREC region are undergoing fundamental transitions to adapt to climate change and to contribute to the fight against it. To better understand the needs in the CAREC region, the CAREC Institute, together with the Asian Development Bank Institute and the Public Opinion Research Institute (Kazakhstan) organized a survey among households about their use of energy. To get valid insights while keeping the project financeable, it was conducted in a subregion that is geographically smaller and more uniform than the CAREC region as a whole, the Fergana Valley. The Fergana Valley spans over parts of the Kyrgyz Republic, Tajikistan, and Uzbekistan. It is well suited for studying differences and similarities among the three countries. The project was intended to serve as a pilot study and might be extended to a broader geographical area. The data generated by the project will be analyzed further and can be shared with interested researchers.

The survey testifies that a considerable share of households of the Fergana Valley is willing to change their ways of energy use. It also shows that there is quite broad awareness of the harm fossil fuels can inflict on the environment and on health. To some extent more affluent, higher educated, and female household heads are more likely to support switching to cleaner and greener energy sources but there is substantial general readiness to do so. However, households are most concerned about the reliability and uninterruptedness of energy supply. All three countries of the Fergana Valley have ambitious plans and projects under way to advance their energy systems, which opens new opportunities also for the household sector. Policies that combine greening policies with improving the reliability of energy supply and technical and financial support have a good chance to change household energy use to being more efficient, healthier, and more environmentally friendly.

Energy supply has not always been fully reliable in the Fergana Valley and households told so when interviewed for the survey. Only 39.1% in the Kyrgyz Republic said they had no problems with energy supply in winter, 22.6% in Tajikistan, and 0% in Uzbekistan (Figure 1). As many as 45.6% of answers in the Kyrgyz Republic, 67.4% in Tajikistan and 89.6% of answers in Uzbekistan referred to power outages. Problems with gas or hot water supply were also frequently mentioned.

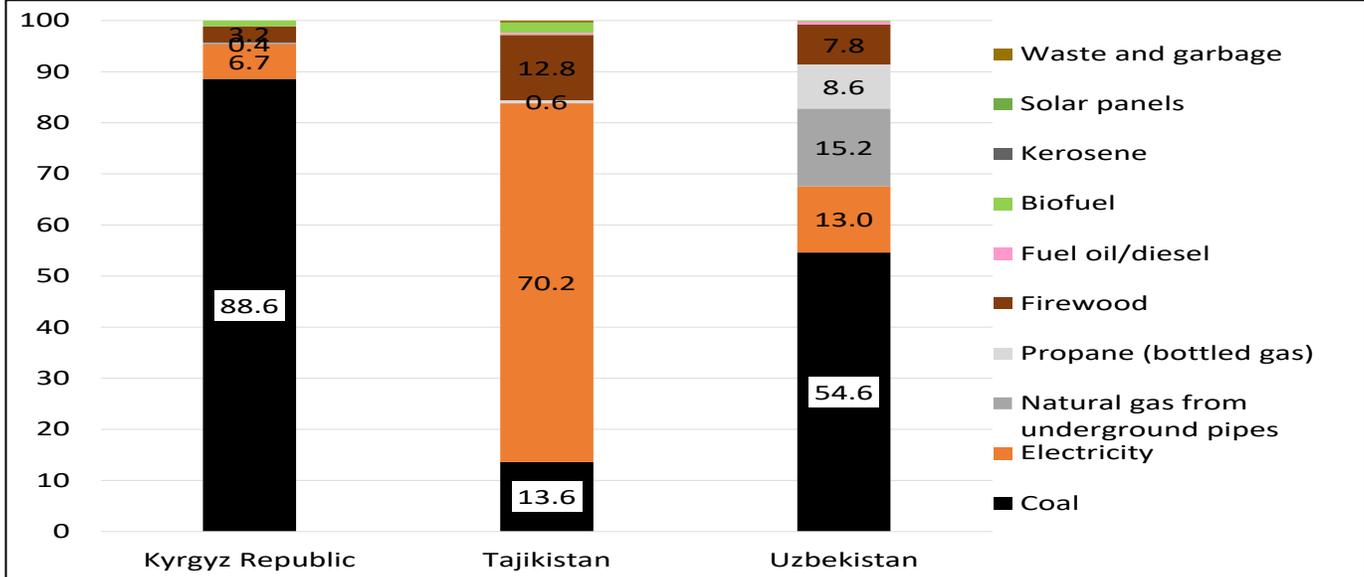
Figure 1: Answers to the question “Which type of energy supply does your household have problems with in winter?”, %



Note: The sum does not equal 100%, as respondents could mark more than one answer option

In the Kyrgyz Republic’s and Uzbekistan’s parts of the Fergana Valley households heavily rely on coal for heating. The dominant energy for heating in Tajikistan is electricity, 72% of the interviewed use it (Figure 2). However, as many as 54.6% of household heads interviewed in Uzbekistan reported that their household uses coal for heating, and as many as 88.6% in the Kyrgyz Republic, or still 79.1% taking into account the 2.9% in the Kyrgyz Republic that have district heating and the 7.8% that use heating from a boiler house.

Figure 2: Answers to “If you have an off-grid heating system, what energy source do you use to heat your house during the winter season?”, %



Note: This question is answered by those respondents who have off-grid or mixed heating. However, only in the Kyrgyz Republic some households were connected to district heating, and even there only 2.9% of the interviewed.

At the same time, households are quite aware of the harm fossil fuels can inflict on the environment and on health. As many as 80.5% in the Kyrgyz Republic, 80.0% in Tajikistan, and still 65.0% in Uzbekistan agreed that fossil fuel can be harmful (Figure 3). And about one-third of the interviewees in Tajikistan and in Uzbekistan declared they would be willing to pay a certain amount for environmentally friendly energy sources (Figure 4). In the Kyrgyz Republic more than 50% said so.

Figure 3: Answers to “Do you think that the use of fossil energy (coal, oil, gas) is harmful to the environment and your family's health?”, %

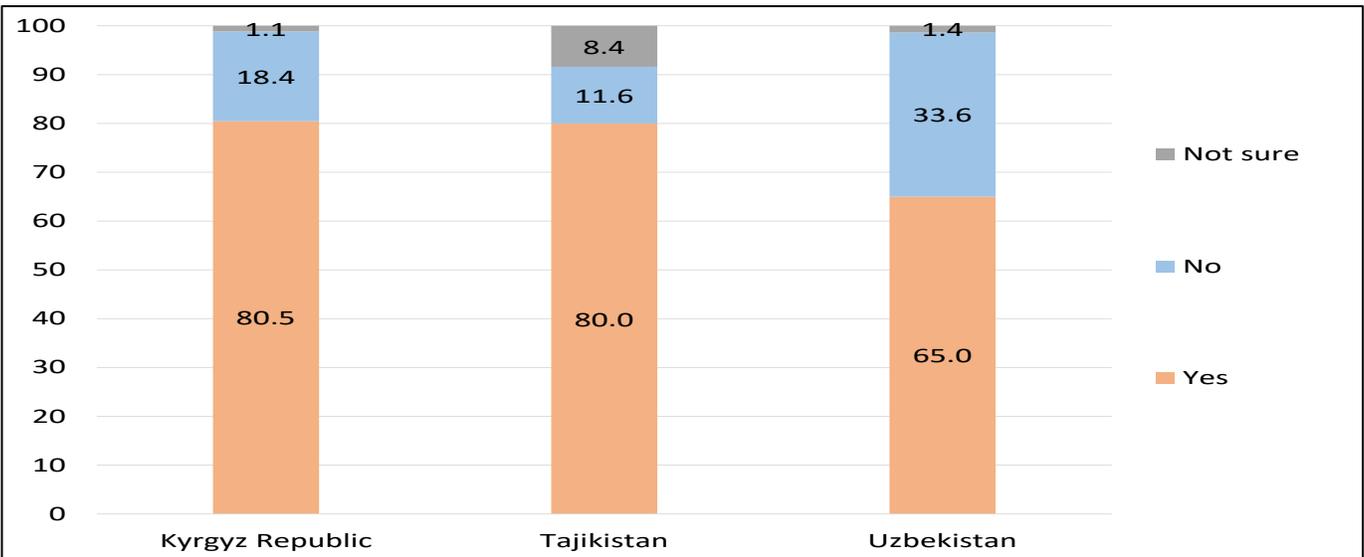
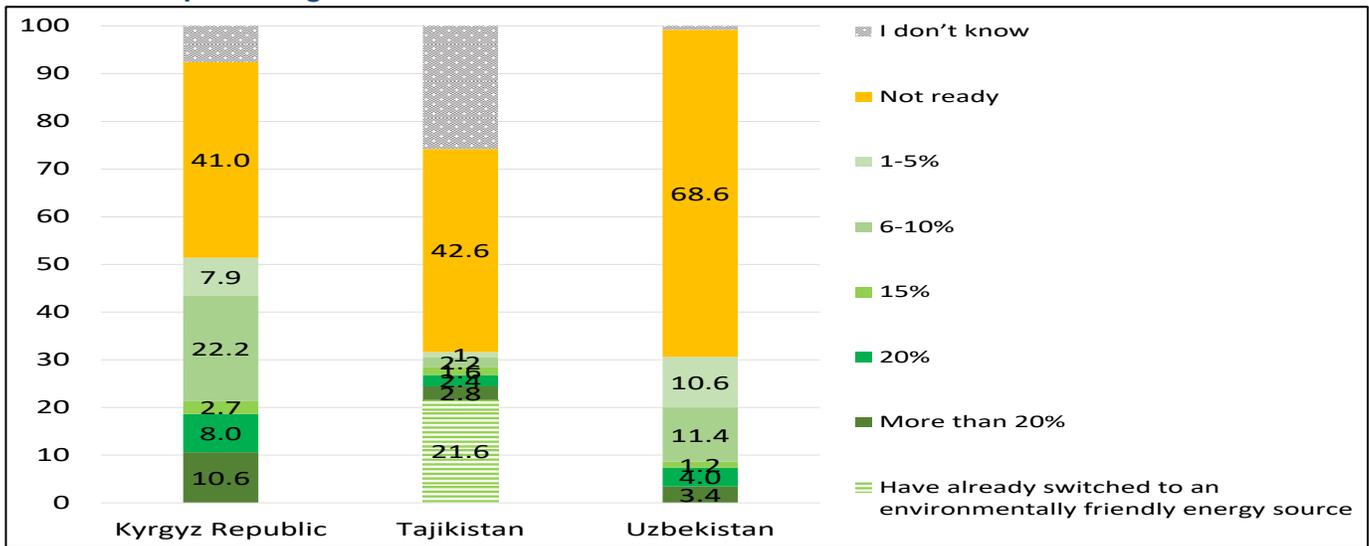
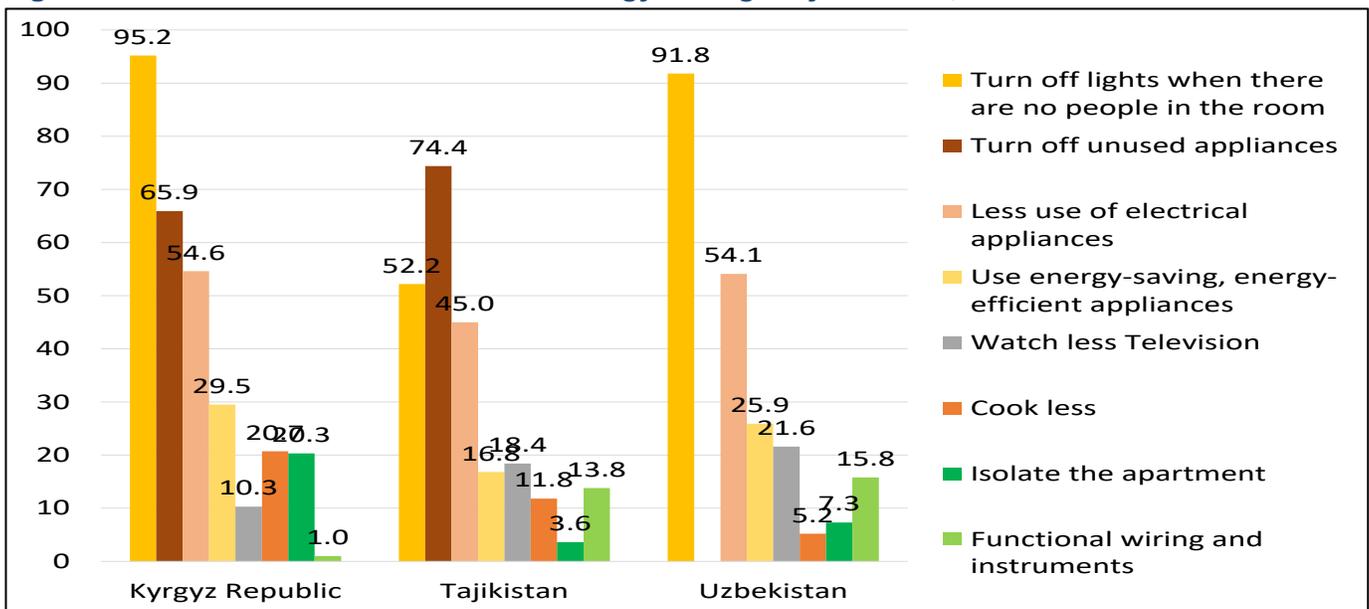


Figure 4: Answers to “Imagine that you have the opportunity to switch to more environmentally friendly energy sources, e.g. solar panels, windmills, etc. Based on the price you currently pay, how much more would you be willing to pay for more environmentally friendly energy sources? In terms of maximum percentage”



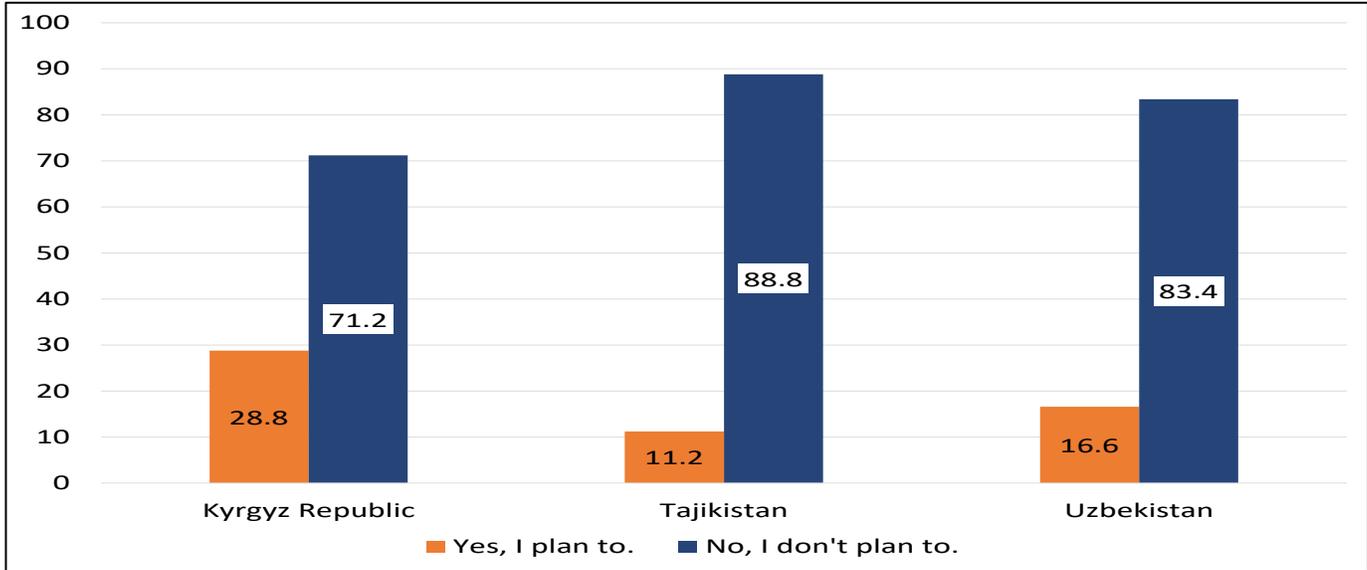
Households are willing to save energy. Most prominent methods to save energy are relatively easy ways to do so, such as turning off lights when there are no people in the room (Figure 5). However, 3.6% in Tajikistan, 7.3% in Uzbekistan, and 20.3% in the Kyrgyz also said that they isolate their apartments.

Figure 5: Answers to “What methods of energy saving do you use?”, %



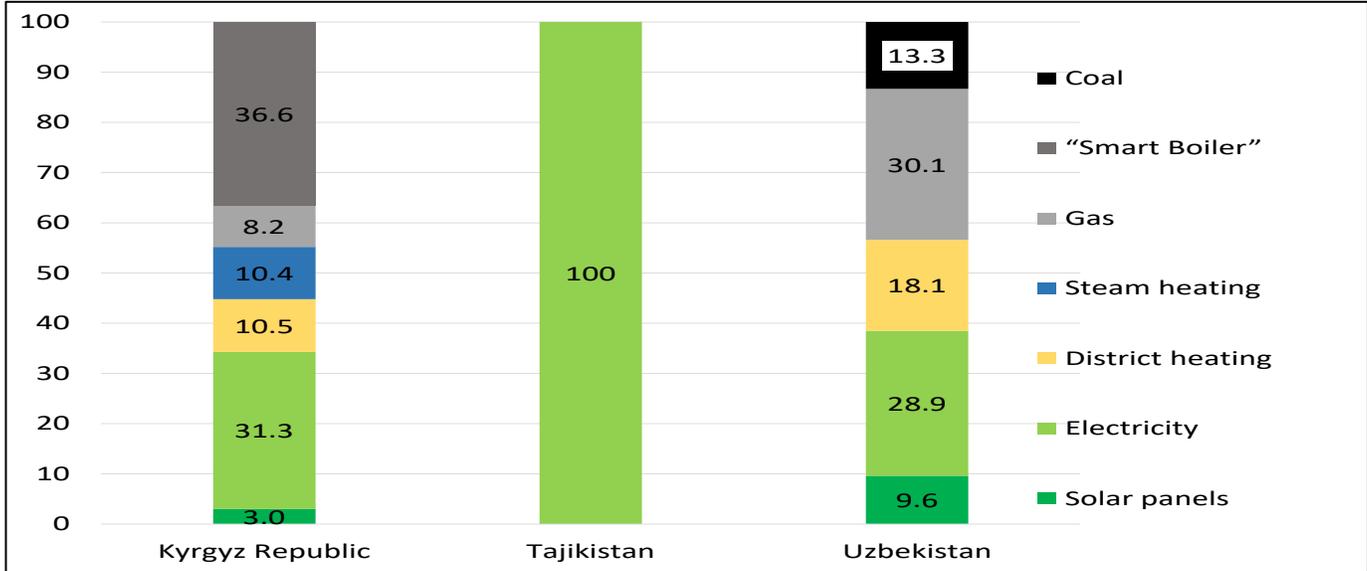
A significant part of the population of the Fergana Valley is thinking about changing their current energy systems. As many as 28.8% of the interviewees in the Kyrgyz Republic said they plan to change their heating systems within the next five years, 16.6% in Uzbekistan, and still 11.2% in Tajikistan (Figure 6). At the same time, switching to coal is not completely from the table in Uzbekistan and the Kyrgyz Republic, mostly because “smart boilers” would allow for a smarter and cheaper use coal of coal. Gas also continues to be viewed as an option. However, more than 40% of those who want switch in the Kyrgyz Republic, more than 50% of those in Uzbekistan, and 100% of those in Tajikistan would like to switch to electricity, district heating or solar panels (Figure 7). As opposed to the discourse in many other countries, there is almost no talk about heat pumps though.

Figure 6: Answers to “Do you plan to change your off-grid heating system in the next five years, including by relocation?”, %



Note: This question is answered by those respondents who have off-grid or mixed heating.

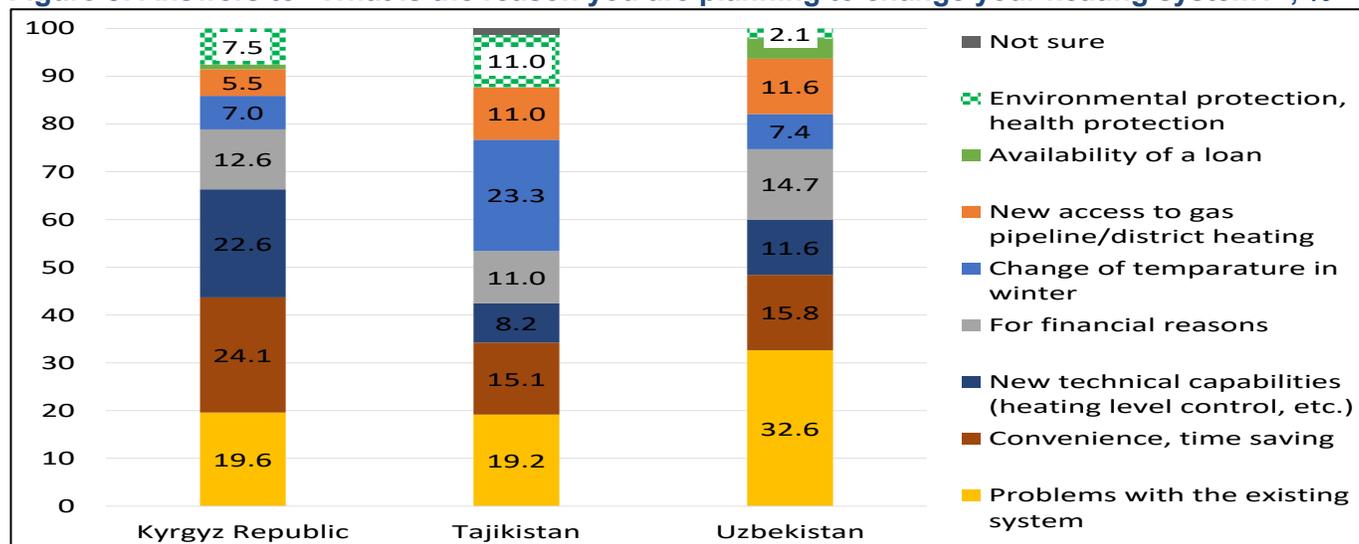
Figure 7: Type of heating respondents plan to switch to, %



Note: This question is answered by those respondents who have off-grid or mixed heating and have plans to change.

While there is awareness of the harmfulness of fossil fuels, environmental and health considerations are only two motives among many reasons that prompt households to change their heating systems. Households would like to change heating systems to overcome problems with existing ones, for convenience, for cost saving, etc. (Figure 8). They might act when new technical opportunities appear, or a loan becomes available. Only between 2% and 11% of the answers to the question “What is the reason you are planning to change your heating system?” point to environmental and health considerations.

Figure 8: Answers to “What is the reason you are planning to change your heating system?”, %



There is big renewable energy potential in the countries of the Fergana Valley; this can be a great source also for the household sector to switch to cleaner and greener energy. In Uzbekistan, for example, the theoretical potential of renewable energy sources is as big as 118 gigatons of oil equivalent². The technical potential is still 179 megatons of oil equivalent (Mtoe). The bulk of this is in solar energy with 67 Mtoe, followed by hydropower with 2.0 Mtoe, and wind with 0.3 Mtoe. The solar energy’s technical potential is almost four times the country’s primary energy consumption. The geothermal theoretical potential (67 Gtoe) even exceeds that of solar. However, insufficient development of cost-effective technologies limits the technical potential to only 0.3 Mtoe currently though. The Fergana Valley is one of the main locations of Uzbekistan’s geothermal and hydropower potential.

Uzbekistan has shown great resolve recently in developing its renewables potential, especially solar and wind power. In his address in December 2023 at the occasion of the launching of major green energy projects, Uzbekistan’s President mentioned that six large solar and wind plants built by UAE-based company Masdar with a total capacity of 2.4 gigawatts are going to be connected to the grid; that the first construction phase of solar power plants in the Jizzakh, Samarkand and Surkhandarya regions has been completed; that a 100 megawatt wind power station in the Tomdi district is being commissioned; that the China Gezhouba Group is about to launch the generation of first 400 megawatts at solar power plants in Bukhara and Kashkadarya. Projects by the China Energy Engineering Corp are also under way. The President also declared that according to estimates “in the next six years, our country’s electricity demand will increase from the current 83 billion to 120 billion kilowatt hours. We will cover this primarily through renewable energy sources.”³

Uzbekistan adopted several new regulations to promote decentral renewable energy generation. According to a Presidential decree, starting from 1 April 2023 individuals and legal entities that have installed installations for renewable energy generation with a capacity of up to 100 kW can get a 3-year tax holiday on the property tax on these devices from the date of the commissioning of the devices, on the land tax on the plots where these devices are installed, and on the tax charged on income from electricity sold by legal entities to the grid. When installing electricity storage systems with a capacity of at least 25% of the installed solar panels capacity a 10-year tax holiday applies. According to the decree, business entities are allowed to sell electricity generated from renewable energy installations to state institutions and territorial electric networks at the established tariffs, to other customers at mutually agreed prices, including under long-term contracts; they can implement renewable energy installations at facilities leased from other persons and sell the electricity generated by these installations. From 1 May 2023 on, on new multistorey buildings solar panels

² <https://review.uz/post/vozobnovlyaemaya-energiya-dlya-ustoychivogo-razvitiya>

³ <https://president.uz/en/lists/view/6952>

must be installed on at least 50% of the free part of the roofs. For the illumination and the technical needs of filling stations (gasoline, liquefied or compressed gas) at least 50% of the electricity shall be generated by solar panels installed at these facilities.⁴

In the Kyrgyz Republic and in Tajikistan green energy in the form of hydropower plays already a major role, but also these countries intend to further expand the use of renewables. In the Kyrgyz Republic large hydropower plants provide as much as 30% of the total energy supply. However, only 10% of the hydropower potential has been developed. To reduce the country's fuel import reliance as well as to reduce emissions, one of the government's top priorities is the development of small hydropower plants. The "Strategy for Fuel and Energy Sector Development" (for 2010-25) calls for the rapid expansion of renewables, especially hydro, and supports the construction of approximately 100 small hydroelectric plants with a total capacity of 180 MW. Other options for decentralized renewable energy development are generating heat from solar energy and biogas, and electricity from wind and solar resources. However, not very many projects have been implemented. A further option is collecting scattered low-temperature (5°C to 10°C) geothermal heat through heat pumps. Heat pumps are nevertheless not widely used yet because of low electricity tariffs, and because of the lack of consumer knowledge and of specialized installation companies.⁵

In Tajikistan more than 95% of energy is generated in large hydropower stations. According to the Strategy 2030, adopted in 2016, the goal is to diversify generation sources by 10%, including through renewables. The Government adopted a "Program for the development of renewable energy sources and the construction of small hydroelectric power plants for 2016-2020" in 2015 with the aim to increase the electric power supply to the population of remote and high-mountain regions and to improve the economic and energy efficiency of small power plants. Meanwhile more than 285 small hydroelectric power stations with a capacity of 5 to 4300 kW have been registered.⁶

The countries' energy sector development plans and projects provide fresh opportunities to their economies and households. The programs mentioned above are just a few examples, there is substantially more. Electricity generation, the grid, storage, distribution, tariffs, metering, company organization, internal and external electricity trade and markets are all about to undergo major reforms.

Conclusions and policy recommendations

A significant part of households of the Fergana Valley is ready to change their ways of energy use towards cleaner, greener, and healthier modes, even if this increases their costs to some extent. However when it comes to actual plans for change, a variety of motives comes into play with recognizable improvements in the reliability of energy access and convenience playing a crucial role. And households need technical and financial support to support their intended changes. To win over the part of the population that is not yet ready to modify their energy use, this will be even more important.

Authorities and energy companies therefore should

- inform households timely and detailed about new opportunities the countries' energy sector programs offer to them
- carefully craft technical and financial support programs – probably best by reaching out to interested households and setting up focus groups among them for developing such programs
- adjust relative prices of fossil fuels and cleaner/greener energy and tariff policies by stepwise shifting subsidies from fossil fuels to more desirable forms of energy
- intensify cross-country cooperation and energy trade that would help to serve households across borders, secure reliable supply of electricity, and facilitate supply and demand-balancing by using the comparative advantages of the energy systems of each of the Fergana Valley countries.

⁴ <https://lex.uz/uz/docs/6385720>

⁵ <https://www.iea.org/reports/kyrgyzstan-energy-profile>

⁶ https://www.mewr.tj/?page_id=585

The following chapters of this report offer more detailed insights into the design and results of the survey. The tables, summaries, and the box are breaking down findings by demographic indicators such as income, gender, rural-urban, and education. Energy policies might need to be adjusted to the specific needs and attitudes of these groups.

After a short summary of the design and main results of the survey, the first chapter gives a more detailed overview of the methodology, and the second over the socio-demographic parameters of the respondents. The chapters following then are divided according to the thematic blocks of the survey questions. To allow comparison, the results are shown by country. The third chapter is devoted to the seasonal characteristics of energy supply problems in winter and in summer. The fourth chapter describes the type of heating systems. The fifth chapter is devoted to district heating, the satisfaction with its quality, and respondents' expenses for heating in winter. The sixth chapter discusses issues of off-grid heating. The seventh chapter reflects the results about household cooling, and the eighth chapter the results about cooking. Chapter nine focuses on electricity, metering, blackouts, and financial issues. Chapter ten describes the survey results with regard to energy saving, and the awareness about the impact of the types of fuels on the environment and on health. Chapter eleven displays the sources of information on renewable energy. Each chapter concludes with a summary of findings.

SHORT SUMMARY OF THE SURVEY DESIGN AND OF MAIN RESULTS

The survey was devoted to the study of household and community access to energy, problems with access, the ways households use energy, and the readiness to switch to cleaner and greener ways of energy use.

The geography of the study included regions of the Kyrgyz Republic, Tajikistan, and Uzbekistan located in or near the Fergana Valley. Respondents living in Jalal-Abad, Osh and Batken regions and Osh city (Kyrgyz Republic), Sughd region (Tajikistan), Fergana, Namangan, Andijan Regions (Uzbekistan) were interviewed during the study.

The survey was conducted using interviews with respondents who were heads of households or family members who make decisions related to energy supply, heating or cooling of the house. A total of 1,522 respondents were interviewed (522 respondents in Kyrgyz Republic, 500 respondents in Tajikistan, 500 respondents in Uzbekistan). The survey was conducted in July-August 2023.

Male and female heads of households from the three countries, living in urban and rural areas, participated in the survey in equal proportion. The majority of respondents have family experience, live in families with five or more people, including children and representatives of the older generation. Most respondents have secondary, specialized secondary or higher education, and have permanent or temporary employment with a variety of income levels.

Most of the households surveyed are living in individual detached houses (87% in the Kyrgyz Republic, 86.2% in Uzbekistan, 64% in Tajikistan), which have off-grid heating (stove, electric heater). Other respondents live in apartments in more-storey buildings which are heated through district heating or with boilers serving several apartment blocks.

The majority of households are heated by using a stove or an electric heater. In the Kyrgyz Republic and Uzbekistan, stoves are more used, in Tajikistan - electric heaters. In addition, boilers, fireplaces, air conditioners, heat pumps or canopies, and underfloor heating are in use.

The main energy source for Kyrgyzstanis and Uzbekistanis is coal, for Tajikistanis electricity. In addition, the following fuels are used: natural gas, propane, firewood, kerosene, fuel oil/diesel, biofuels, waste and garbage.

The use of solar energy by households is extremely low yet in the surveyed region: in Tajikistan it is used by only 23 households, in the Kyrgyz Republic by 4 households, in Uzbekistan the sample did not include any households with solar panels. Solar panels are used for other purposes but not in any of the households surveyed for heating.

Respondents noted that they use several types of energy sources during one heating season mainly due to the high cost of the main source (58.6% Kyrgyz Republic), due to interruptions in the supply of the main source and due to the high cost of the main source (40% each, Tajikistan), due to interruptions in the supply of the main source (77.8%, Uzbekistan). The main problem for all three countries in the heating period is interruptions in the supply of the main fuel.

Many respondents indicated that they have problems in summer and in winter with energy supply. 60% of Kyrgyzstanis, 80% of Tajikistanis, 100% of Uzbekistanis have problems in winter, 30% of Kyrgyzstanis, 40% of Tajikistanis, 98.9% of Uzbekistanis have problems in summer. The problems are mainly related to electricity, gas and water supply. Problems with lack of firewood among rural residents were also noted.

Rolling blackouts (cyclical disconnection of consumers from the power grid in order to limit the amount of energy consumed) are practiced in all three countries, according to the heads of households: 66.1% Kyrgyz Republic, 48.6% Tajikistan, 77.2% Uzbekistan, equally in urban and rural areas.

When choosing the main fuel in the Kyrgyz Republic, household heads are guided by considerations of uninterruptedness/reliability of energy supply, in Tajikistan - by the least harm to the environment and lower financial expenditures, in Uzbekistan - by the least financial expenditures.

In winter, households mainly regulate the temperature manually by turning equipment on or off or by setting a single temperature. In summer, the majority of respondents in the Kyrgyz Republic (67.8%) have no possibility to regulate the temperature, as is the case for 20.8% of Tajikistanis and 36.4% of Uzbekistanis. The temperature is regulated manually or by turning off appliances.

To cool the dwelling in summer, respondents mainly use fans, air conditioners, and to a lesser extent sunscreen film for windows. The source of energy is for the majority electricity. 40.2% of Kyrgyzstanis, 35.2% of Tajikistanis, and 14.4% of Uzbekistanis do not have a cooling system in their households. Those who do

not have a cooling system in their houses in most cases also do not plan to acquire and deploy cooling devices.

Most household heads have not experienced the change of the heating system in the past five years and most of them also do not plan to change their off-grid heating system in the next five years.

Kyrgyzstanis intending to change the system of off-grid heating, plan to use "smart boilers"⁷, electricity, district heating, steam heating, gas. Tajikistanis want to switch only to electricity, Uzbekistanis to gas, electricity, coal, district heating, solar panels.

The main reason why household heads want to change the form of heating is problems with the existing system. Respondents also said that the emergence of new technical solutions, including for heating regulation, was an incentive to change the heating system.

Respondents who have a cooling system in their houses plan to apply air conditioners because the existing system does not cool the houses sufficiently, as well as because of technical innovations that have appeared recently. An important reason, according to the respondents, is that in recent years summers have become hotter than in previous years. Houses are cooled mainly in June, July, and August.

For cooking households in the Kyrgyz Republic use mainly firewood, electricity, natural gas from underground pipes; in Tajikistan - electricity, firewood, propane (bottled gas); in Uzbekistan - propane, natural gas. Firewood is more often used in rural areas. Natural gas from underground pipes in cities, propane in bottles is more used in villages. More than one energy sources for cooking are used in the Kyrgyz Republic and Tajikistan for convenience. In Uzbekistan, the main reason is interruptions in the supply of the main source.

Almost all households have meters for electricity consumption (only 8% of households in Tajikistan do not have such meters). For most respondents, energy costs for energy used for purposes other than household purposes, such as farm buildings or equipment, small businesses are not included in household bills.

Most survey participants and family members try to save energy, with both men and women responding equally. The most energy-consuming household appliances according to respondents: electric stoves, televisions, refrigerators, washing machines, and lighting.

62.6% of Kyrgyzstanis, 87.4% of Tajikistanis, 80.6% of Uzbekistanis pay attention to the energy efficiency class of household appliances. 29.5% of Kyrgyzstanis, 16.8% of Tajikistanis, and 25.9% of Uzbekistanis use energy-saving appliances in their households to save energy. In addition to using these appliances, respondents turn off unused appliances, turn off lights, in rooms where there are no people, use less electrical appliances.

Energy-saving light bulbs are not used only by 17% of households in the Kyrgyz Republic, 8.8% of households in Tajikistan, 9.6% in Uzbekistan, for the following reasons - do not like the lighting, expensive, flickering, voltage drops, hazardous substances. Also, a number of respondents did not think about using energy-saving light bulbs.

Most respondents report that they insulate against heat loss windows and doors, and to a lesser extent walls and roofs, and most households plan to do it. Respondents who do not do insulation think that insulation is too expensive and because of insufficient information on how to insulate certain elements of the house to keep the heat in winter or the coolness in summer.

A large percentage of household heads believe that the use of fossil energy (coal, oil, gas) is harmful to the environment and to family health: 80.5% of Kyrgyzstanis, 80% of Tajikistanis, 65% of Uzbekistanis. In the Kyrgyz Republic and Tajikistan, slightly more female than male heads of households believe that there is harm from the use of fossil fuels, in Uzbekistan - more men believe so.

Only a relatively low percentage of 38.7% of Kyrgyzstanis, 42.6% of Tajikistanis, and 68.6% of Uzbekistanis declared that they are not ready to spend on environment-friendly energy sources. Some heads of households in Tajikistan noted that they have already switched to environment-friendly energy sources - 21.6% or 108 households.

However, as many as 17.2% of respondents from Kyrgyz Republic, 21.4% from Tajikistan, 75.2% from

⁷ "Smart boiler" is an automatic coal-fired boiler that is heated with culm (fine coal), which does not require constant attention and labor-intensive maintenance. Once a week coal is put in, the boiler distributes and heats the house evenly. Coal consumption in automatic boilers is less than in traditional boilers (an average of 1.5-2 times). Automatic continuous burning coal-fired boilers use fractional coal up to 50 mm, and during its combustion there is a more complete combustion of fuel, due to which the ash is much less and removed once every 4-7 days (putting fuel in).

Uzbekistan had already financial problems with the payment of electricity bills in the 2022-2023 period at different levels. These problems occurred mainly during the winter period in the Kyrgyz Republic and Uzbekistan, while in Tajikistan the difficulties continued throughout the year, most of all in winter.

Kyrgyzstani respondents on average paid 5,349.84 Kyrgyz Republic Soms (approximately 60 USD) per month for heating in the last 3 heating seasons. Respondents from Tajikistan paid on average 1,590 Tajikistan Somonis (approximately 145 USD) per month for heating in the last 3 heating seasons. On average, respondents from Uzbekistan paid 853,068.89 Uzbekistan Sums (approximately 70 USD) per month for heating in the last 3 heating seasons.

To solve financial problems, Kyrgyzstanis save electricity, borrow money from relatives and reduce expenditures on necessities (food, clothing). Tajikistanis borrow money from their relatives to solve issues related to payment of electricity costs. Uzbekistani heads of households save more money and borrow money from relatives.

Respondents learn about renewable energy mainly from TV channels and the internet (social media, internet forums, specialized websites). In Tajikistan in addition newspapers, magazines, and radio serve as sources of information. Relatives and friends are an important source of information for 9.4% of Kyrgyzstanis, 18.4% of Tajikistanis, 26.2% of Uzbekistanis.

1. THE SURVEY METHODOLOGY

1.1 Work plan and fieldwork control

Survey method

Surveys were in all three countries conducted face-to-face. CAPI and PAPI methods were used as the format of the survey. In the CAPI method, the interview is conducted using a questionnaire embedded in a specialized program on a tablet. The PAPI method involves the use of a paper version of the questionnaire. The surveys were conducted in the following format:

- ✓ Kyrgyz Republic - face-to-face personal interview on a tablet (CAPI)
- ✓ Tajikistan - face-to-face personal interview on a tablet (CAPI)
- ✓ Uzbekistan - face-to-face personal interview with paper questionnaire (PAPI)

The surveys were conducted by field interviewers. The fieldwork process was monitored by regional managers and country coordinators. In turn, the coordinators reported the progress of fieldwork every three days to the main project consultant.

1.2 Supervisors and Interviewers

The study involved 5 supervisors and 51 interviewers (in the Kyrgyz Republic - 1 supervisor and 19 interviewers, in Tajikistan - 1 supervisor and 7 interviewers, in Uzbekistan - 3 supervisors and 25 interviewers) with extensive experience in conducting sociological surveys. Prior to the start of the fieldwork, a training session was held to discuss the main parameters of the survey, the survey instrument, the survey sample and the process of respondent selection and interviewing. Interviewers in each country speak the state language (Kyrgyz, Tajik or Uzbek, depending on the country) as well as Russian.

1.3 Quality control

To verify the findings, 40% of each interviewer's questionnaires, selected randomly, were checked in each country. The field verification was conducted by means of a telephone call or by repeating the visit to the household by independent controllers. During the verification process, certain questions were asked to confirm or deny the respondent's participation in the survey. No serious violations of the survey process were found by the quality control.

1.4 The sample

Object of the study: citizens of the countries of the Fergana Valley over 18 years of age - heads of households.

Geography of the study: settlements located in/near the Fergana Valley:

- ✓ Kyrgyz Republic - Jalal-Abad, Osh and Batken regions and Osh city;
- ✓ Tajikistan - Sughd Region;
- ✓ Uzbekistan - Fergana, Namangan, Andijan regions.

In each country 500 respondents were interviewed (in the Kyrgyz Republic - 522). The total number was 1522 respondents. The sample was calculated based on data on the general population of the surveyed countries - official statistics of the participating countries. The sample is representative by such parameters as *gender, age, ethnicity, type of settlement, taking into account country peculiarities*. The total sample of the study is presented below (Table 1.1).

Table 1.1: Total sample of the study

Countries	Number of respondents	Urban residents	Rural residents
Kyrgyz Republic	522	130	392
Tajikistan	500	137	363
Uzbekistan	500	290	210
TOTAL	1,522	557	965

Constructing a sample population

The survey was conducted in seven regions and one city of republican subordination of three countries in the area in/near the Fergana Valley. Below is a map showing the regions where the survey was conducted.

Figure 9: Map of the Fergana Valley, showing surveyed localities in Kyrgyz Republic, Tajikistan and Uzbekistan⁸



Sequence of selection of sample items

Respondents in each country were selected using a multi-stage sampling technique.

- ✓ Step 1: Determine the size of the population over 18 years of age for the study countries as a whole.
- ✓ Step 2: In each country, localities (cities and villages) within the Ferghana Valley were randomly selected.
- ✓ Step 3: Within each locality, the starting points of the route and the number of plots were determined randomly.

Starting from the selected starting point of the route, interviewers entered every fifth household in the block of flats and every third household in the country part of the town during survey. Tables 1.2, 1.3, 1.4 present the study samples for each country and by localities.

⁸ This map is for illustrative purposes only. The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the CAREC Institute and ADB

Table 1.2: Sample in the Kyrgyz Republic

Region	General population					Sample population		
	Total number 18 years of age and older	Urban population	Rural population	Urban population, %	Rural population, %	Total number of respondents	Urban population	Rural population
Batken	428,636	103,810	324,826	3.71	11.60	80	20	60
Osh	1,104,248	87,824	1,016,424	3.14	36.29	202	20	182
Gorkenesh Osh	258,111	232,816	25,295	8.31	0.90	55	45	10
Jalal-Abad	1,009,889	228,301	781,588	8.15	27.91	185	45	140
Total	2,800,884	652,751	2,148,133,0	23.31	76.69	522	130	392

Source: National Statistical Committee of the Kyrgyz Republic, 2021,

Table 1.3: Sample in Tajikistan

Region	General population					Sample population		
	Total number 18 years of age and older	Urban population	Rural population	Urban population, %	Rural population, %	Total number of respondents	Urban population	Rural population
Sughd	1,620,300	443,962	1,176,338	27.4	72.6	500	137	363

Source: Agency on Statistics under the President of the Republic of Tajikistan, 2022.

Table 1.4: Sample in Uzbekistan

Region	General population					Sample population		
	Total number 18 years of age and older	Urban population	Rural population	Urban population, %	Rural population, %	Total number of respondents	Urban population	Rural population
Andijan	3,322,722	1,734,479	1,588,243	52.2	47.8	160	80	80
Namangan	2,997,543	1,943,913	1,053,630	64.9	35.1	150	100	50
Fergana	3,976,265	2,264,136	1,712,129	56.9	43.1	190	110	80
Total	10,296,530	5,942,528	4,354,002	57.7	42.3	500	290	210

Source: Agency of Statistics under the President of the Republic of Uzbekistan, 2022.

Method of respondent selection

For the respondent selection quotas based on socio-demographic parameters was used. In each household, a respondent was selected according to the following criteria:

- ✓ household member who makes decisions in financial and domestic affairs of the household,
- ✓ over 18 years old,
- ✓ compliance with quota parameters for gender and age.

A total of 1,522 respondents took part in the survey, including 763 male heads of households and 759 female heads of households. In each country, approximately equal proportions of male and female heads of households participated.

Table 1.5: Heads of households - by gender

	Kyrgyz Republic	Tajikistan	Uzbekistan	Total for three countries
Male heads of households	262	245	256	763
Female heads of households	260	255	244	759
Total	522	500	500	1,522

1.5 Questionnaire and fieldwork

The survey was conducted in the period from July 27 to August 16, 2023. **A single questionnaire** was used for data collection. The questionnaire consisted of a main part and a socio-demographic block. The **main block** included questions aligned with the research topics of the study. The questions of the **socio-demographic block** collected demographic information about the respondent (age, gender, education level, social status and so on).

Before the start of field work, a pilot survey was conducted to test the research tools (pre-test).

In the process of the questionnaire development, the peculiarities of each research country were taken into account in order to correctly adapt the questions, while maintaining a unified structure and content for subsequent data comparison. The toolkit was prepared in Russian. Subsequently, the questionnaire was translated into Kyrgyz, Tajik and Uzbek. The questionnaire was translated by professional translators under the supervision of the national coordinators in each country and the main consultant.

Table 1.6 displays the baseline parameters of the sociological study for the three countries.

Table 1.6: Basic parameters of the survey

COUNTRY	KYRGYZ REPUBLIC	TAJIKISTAN	UZBEKISTAN
Geography of the survey	3 regions and 1 city - Jalal-Abad, Osh Batken regions City of Osh	1 region - Sughd	3 regions - Fergana Namangan Andijan
Ratio of urban and rural population	Urban - 23.4% Rural - 76.6%	Urban - 27.4% Rural - 72.6%	Urban - 57.7% Rural - 42.3%
Time of field work	27.07.2023- 11.08.2023	2-16.08.2023	29.07.2023- 13.08.2023
Number of questions in the questionnaire	62	62	62
Number of parameters in the socio-demographic block	12	12	12
Number of respondents	522	500	500
Number of urban and rural respondents	Urban - 130 Rural - 392	Urban - 137 Rural -363	Urban – 290 Rural -210
Age of respondents	18 and over	18 and over	18 and over
Survey method	face-to-face, CAPI	face-to-face, CAPI	face-to-face, PAPI
Method of respondent selection in the household	Step+quota	Quota	Step+quota
Survey language	Kyrgyz, Russian	Tajik, Russian	Uzbek, Russian
Sampling error	+/-4,38 at 95% confidence interval	+/-4,38 at 95% confidence interval	+/-4,38 at 95% confidence interval
Number of failures	561	44	607

2. PROFILE OF THE RESPONDENTS

2.1 Gender and age of respondents

All groups of respondents had approximately equal percentages of female and male respondents.

Table 2.1: Gender of respondent

Answer options	Kyrgyz Republic		Tajikistan		Uzbekistan	
	Qty	%	Qty	%	Qty	%
Male	262	50.2	245	49.0	256	51.2
Female	260	49.8	255	51.0	244	48.8
Total	522	100.0	500	100.0	500	100.0

In the questionnaire the question about age was open-ended i.e. respondents orally mentioned their age. The answers were then coded into four age cohorts.

In the group of respondents from the **Kyrgyz Republic**, the age groups “30-45” (39.1%) and “18-29” (29.9%) predominate.

Respondents from the age groups “18-29” (36.4%) and “30-45” (35.8%) are also more numerous among respondents from **Tajikistan**.

Among respondents from **Uzbekistan**, there are more respondents in the age categories “30-45” (33.6%) and “46-60” (30.4%).

Table 2.2: Age of respondent

Answer options	Kyrgyz Republic		Tajikistan		Uzbekistan	
	Qty	%	Qty	%	Qty	%
18-29	156	29.9	182	36.4	87	17.4
30-45	204	39.1	179	35.8	168	33.6
46-60	97	18.5	94	18.8	152	30.4
61+	65	12.5	45	9.0	93	18.6
Total	522	100.0	500	100.0	500	100.0

2.2 Nationality of respondents

71.4% of respondents from the **Kyrgyz Republic** are Kyrgyz, more than a quarter (26.4%) are Uzbeks, and the rest are Turks, Russians, Uighurs, Azerbaijanis, and Dungans.

92.2% of respondents from **Tajikistan** identified themselves as Tajiks, while 7.8% identified themselves as Uzbeks.

The overwhelming majority of respondents from **Uzbekistan** identify themselves as Uzbeks (97.2%), the rest are Tajiks, Tatars, Kyrgyz, Russians and Germans.

Table 2.3: Nationality of the respondent

Answer options	Kyrgyz Republic		Tajikistan		Uzbekistan	
	Qty	%	Qty	%	Qty	%
Kyrgyz	373	71.4	-	-	2	0.4
Uzbek	138	26.4	39	7.8	486	97.2
Tajik	-	-	461	92.2	7	1.4
Turk	4	0.8	-	-	-	-
Russian	2	0.4	-	-	1	0.2
Uighur	2	0.4	-	-	-	-
Azerbaijani	2	0.4	-	-	-	-
Dungan	1	0.2	-	-	-	-
German	-	-	-	-	1	0.2
Tatar	-	-	-	-	3	0.6
Total	522	100.0	500	100.0	500	100.0

2.3 Education of the respondent

More than one-half of respondents from the **Kyrgyz Republic** have secondary education (51.9%), 20.7% - higher education, 19.7% - specialized secondary and vocational education.

Among respondents from **Tajikistan**, respondents with higher education prevail (37.4%). 27.4% of respondents have secondary and 25% have specialized secondary education.

38.6% of respondents from **Uzbekistan** have secondary education, 37.8% have specialized secondary education, one fifth of respondents have higher education. (In Uzbekistan, the continuous 11-year education was introduced in 2018. The survey involved respondents of different ages, generally 18 years and older, those who could study under the old system.)

Table 2.4: What is the highest level of education you have attained? Meaning only completed level of education

Answer options	Kyrgyz Republic		Tajikistan		Uzbekistan	
	Qty	%	Qty	%	Qty	%
Incomplete secondary (9 grades)	40	7.7	51	10.2	14	2.8
Secondary (11 grades)	271	51.9	137	27.4	193	38.6
Secondary specialized and vocational education (college, technical school)	103	19.7	125	25.0	189	37.8
Higher education (specialist, bachelor, Master, candidate, doctor, PhD)	108	20.7	187	37.4	104	20.8
Total	522	100.0	500	100.0	500	100.0

2.4 Family status

Married respondents predominate in all groups: 81% of respondents from **Uzbekistan**, 78.7% of respondents from the **Kyrgyz Republic** and 72% of respondents from **Tajikistan** are married. The majority of survey respondents have or had marital status.

Table 2.5: Please indicate your marital status?

Answer options	Kyrgyz Republic		Tajikistan		Uzbekistan	
	Qty	%	Qty	%	Qty	%
Married	411	78.7	360	72.0	405	81.0
Divorced	7	1.4	47	9.4	23	4.6
Widower/widow	32	6.1	33	6.6	47	9.4
Single and have never been married	70	13.4	58	11.6	25	5.0
No answer	2	0.4	2	0.4	-	-
Total	522	100.0	500	100.0	500	100.0

Number of family members

The majority of respondents from the Kyrgyz Republic and Uzbekistan live in families of 4 to 7 persons, including themselves. The majority of respondents from Tajikistan live in families of 3 to 7 persons, including themselves.

On average, families in the **Kyrgyz Republic** have 6 people, **Tajikistan** - 5 people, **Uzbekistan** - 5 people.

Table 2.6: How many total people (adults and children) currently live in your household, including yourself?

Answer options	Kyrgyz Republic		Tajikistan		Uzbekistan	
	Qty	%	Qty	%	Qty	%
1 person	1	0.2	42	8.4	6	1.2
2 persons	19	3.6	16	3.2	39	7.8
3 persons	33	6.3	55	11.0	48	9.6
4 persons	75	14.4	82	16.4	75	15.0
5 persons	124	23.8	129	25.8	104	20.8
6 persons	108	20.7	75	15.0	93	18.6
7 persons	89	17.0	52	10.4	63	12.6
8 persons	36	6.9	21	4.2	30	6.0
9 persons	15	2.9	16	3.2	11	2.2
10 persons	6	1.1	6	1.2	13	2.6
11 persons	2	0.4	4	0.8	6	1.2
12 persons	8	1.5	1	0.2	8	1.6
13 persons	2	0.4	-	-	2	0.4
14 persons	1	0.2	-	-	1	0.2
15 persons	2	0.4	-	-	-	-
16 persons	-	-	-	-	1	0.2
19 persons	1	0.2	1	0.2	-	-
Total	522	100.0	500	100.0	500	100.0

A fifth of respondents in Uzbekistan and a quarter of respondents in Tajikistan (24.2%) have no children under 16 in their families. In the Kyrgyz Republic, the share of such families among respondents amounted to 12.6%.

In the Kyrgyz Republic, half of respondents' families had two (28%) and three (23%) children. In Tajikistan, 27.2% of respondents had two children under 16 and 26.8% had one child. In Uzbekistan, 28% of respondents had two children and 23.8% had one child.

Families with six to ten children participated in the survey: 18 families in the Kyrgyz Republic, one family in Tajikistan and seven families in Uzbekistan.

On average, families in the **Kyrgyz Republic** have 3 children under 16 years of age, in **Tajikistan** - 2 children, in **Uzbekistan** - 2 children.

Table 2.7: How many children under 16 years of age currently live in your household in total?

Answer options	Kyrgyz Republic		Tajikistan		Uzbekistan	
	Qty	%	Qty	%	Qty	%
No children under 16 years of age	66	12.6	121	24.2	105	21.0
One child	82	15.7	134	26.8	119	23.8
Two children	146	28.0	136	27.2	140	28.0
Three children	120	23.0	71	14.2	92	18.4
Four children	60	11.5	32	6.4	27	5.4
Five children	30	5.7	5	1.0	10	2.0
Six children	9	1.7	-	-	4	0.8
Seven children	4	0.8	-	-	1	0.2
Eight children	2	0.4	-	-	2	0.4
Nine children	2	0.4	-	-	-	-
Ten children	1	0.2	1	0.2	-	-
Total	522	100.0	500	100.0	500	100.0

In the Kyrgyz Republic, the most common households are those with two adults aged 17 to 57 (44.4%), less than a quarter of respondents answered that there are three adult members in their family (23.8%). Households of 18% of respondents have four adult family members.

Families of respondents from Tajikistan are mostly populated by two (35.6%) and three (25%) adults between the ages of 17 and 57. Families with one (17%) and five (14.8%) adult members are also not uncommon.

In Uzbekistan also, families usually have from 2 to 4 family members, families with two adult members

are more common (40.8%). One fifth of respondents answered that four adults live in their families.

On average there are 3 people of working age (17-57) living in families in the **Kyrgyz Republic**, 3 people in **Uzbekistan**, and 2 people in **Tajikistan**.

Table 2.8: How many adults 17-57 years of age currently live in your household in total, including yourself?

Answer options	Kyrgyz Republic		Tajikistan		Uzbekistan	
	Qty	%	Qty	%	Qty	%
There are no adults in the household from 17 to 57 years of age	12	2.3	18	3.6	15	3.0
1 person	17	3.3	85	17.0	31	6.2
2 persons	232	44.4	178	35.6	204	40.8
3 persons	124	23.8	125	25.0	83	16.6
4 persons	94	18.0	74	14.8	95	19.0
5 persons	32	6.1	13	2.6	43	8.6
6 persons	6	1.1	4	0.8	20	4.0
7 persons	4	0.8	2	0.4	6	1.2
8 persons	-	-	-	-	3	0.6
9 persons	1	0.2	1	0.2	-	-
Total	522	100.0	500	100.0	500	100.0

The families of respondents from Kyrgyz Republic (62.4%) and a significant part of respondents from **Tajikistan** (48.2%) and **Uzbekistan** (45.8%) do not have elderly family members (58 years and older) living in their households. The number of elderly people in families in all three countries is mostly 1 or 2 persons.

Table 2.9: How many elderly people aged 58 and over currently live in your household, including yourself?

Answer options	Kyrgyz Republic		Tajikistan		Uzbekistan	
	Qty	%	Qty	%	Qty	%
No elderly people over 58 years of age	326	62.4	241	48.2	229	45.8
1 person	86	16.5	114	22.8	157	31.4
2 persons	109	20.9	98	19.6	114	22.8
3 persons	1	0.2	33	6.6	-	-
4 persons	-	-	13	2.6	-	-
5 persons	-	-	1	0.2	-	-
Total	522	100.0	500	100.0	500	100.0

2.5 Income level⁹

The average monthly income of 58% of households in the **Kyrgyz Republic**, according to the survey results, was more than 20,000 Kyrgyz Republic Soms (approximately 226 USD), while a third of respondents (34.9%) reported incomes between 12,001 and 20,000 Kyrgyz Republic Soms (approximately 136 to 226 USD).

Table 2.10: What, approximately, is the average monthly income of your household if you add up all salaries, educational allowances, pensions and other income (in local currency)?

Answer options	Kyrgyz Republic	
	Quantity	Percentages
Less than 6,000 soms	-	-
6,001 - 12,000 soms	22	4.2
12,001 - 20,000 soms	182	34.9
More than 20,000 soms	303	58.0
Difficult to answer	15	2.9
Total	522	100.0

Note: The KGS/USD exchange rate was 88.4 at the time of the survey.

⁹ Exchange rates are current for the time of fieldwork (end of July - first half of August 2023)

The largest proportion of respondents in **Tajikistan** (44.4%) answered that their average household income is more than 2,400 Tajikistan Somonis (approximately 219 USD), while one-fifth believe that their average monthly household income is between 1,401 and 2,400 Tajikistan Somonis (approximately 128 to 219 USD).

Table 2.11: What, approximately, is the average monthly income of your household if you add up all salaries, educational allowances, pensions and other income (in local currency)?

Answer options	Tajikistan	
	Quantity	Percentages
Less than 800 somonis	18	3.6
801 - 1,400 somonis	40	8.0
1,401 - 2,400 somonis	97	19.4
More than 2,400 somonis	222	44.4
Difficult to answer	123	24.6
Total	500	100.0

Note: TJS/USD exchange rate - 10.96.

The average monthly income of half (50.8%) of the respondents' households from **Uzbekistan** was more than 3,200,000 Uzbek sums (approximately more than 260 USD). 16.8% of respondents mentioned that their average monthly household income ranged from 2,000,001 to 3,200,000 sums (approximately 165 USD to 264 USD). The income of 14.8% of households ranged from 1,200,001 to 2,000,000 sums (approximately 100 USD to 165 USD).

Table 2.12: What, approximately, is the average monthly income of your household if you add up all salaries, educational allowances, pensions and other income (in local currency)?

Answer options	Uzbekistan	
	Quantity	Percentages
Less - 1,200,000 sums	47	9,4
1,200,001 - 2,000,000 sums	74	14,8
2,000,001 - 3,200,000 sums	84	16,8
More than 3,200,000 sums	254	50,8
Difficult to answer	41	8,2
Total	500	100,0

Note: UZS/USD exchange rate-12,075.

2.6 Employment

29.7% of respondents from the **Kyrgyz Republic** are housewives/housemen. The next largest groups are pensioners (14.2%), farmers (12.9%), civil servants in the public administration (10.7%), employees in the private sector and non-administrative employees in the public sector (10.7%). Individual entrepreneurs accounted for 7.8% of respondents, 6.3% were self-employed.

20.2% of respondents from **Tajikistan** work for themselves, 18.4% of respondents are salaried workers in the private and public sector, 16.8% are housewives/ housemen, 9.6% are self-employed, and 10.6% are civil servants.

Among respondents from **Uzbekistan**, pensioners (25.2%) and housewives (21.8%) make up the largest share of respondents. 12.8% are civil servants, 13.4% are salaried employees of the public and private sector, 8.8% work for themselves, and 8% are self-employed.

Table 2.13: What is your current employment?

Answer options	Kyrgyz Republic		Tajikistan		Uzbekistan	
	Qty	%	Qty	%	Qty	%
Individual entrepreneurs (IE without salaried employees)	32	6.1	61	12.2	23	4.6
Individual entrepreneurs (with salaried employees)	9	1.7	40	8.0	21	4.2
Self-employed / do not have an official/permanent place of work	33	6.3	48	9.6	40	8.0
Private sector employee	47	9.0	53	10.6	18	3.6
Public sector employee (non-administrative)	9	1.7	39	7.8	49	9.8
Civil servant	56	10.7	53	10.6	64	12.8
Student	22	4.2	28	5.6	6	1.2
Pensioner	74	14.2	46	9.2	126	25.2
Housewife/houseman	155	29.7	84	16.8	109	21.8
Unemployed	18	3.5	29	5.8	42	8.4
Farmer	67	12.9	10	2.0	2	0.4
No answer	-	-	9	1.8	-	-
Total	522	100.0	500	100.0	500	100.0

2.7 Type of settlement

Based on the peculiarities of the sample design, more rural residents participated in the survey in the **Kyrgyz Republic** and **Tajikistan** (75.1% and 72.6% respectively). In Uzbekistan, urban respondents prevailed - 58%.

Table 2.14: Type of settlement

Answer options	Kyrgyz Republic		Tajikistan		Uzbekistan	
	Qty	%	Qty	%	Qty	%
Urban residents	130	24.9	137	27.4	290	58
Rural residents	392	75.1	363	72.6	210	42
Total	522	100	500	100	500	100

Summary of findings

In the survey participated heads of households - decision makers involved in decisions related to energy supply, heating or cooling of the dwelling. Approximately equal proportions of male and female heads of households participated. In the Kyrgyz Republic, 262 male heads of households and 260 female heads of households participated in the survey. In Tajikistan, 254 men and 255 women. In Uzbekistan, 256 male and 244 female heads of households. In total, 763 male heads of households and 759 female heads of households participated in the survey.

Respondents were selected by quotas, which allowed to obtain the opinion of men and women in equal proportion and respondents of different ages, nationalities, with different education, forms of employment, and income.

The majority of survey participants have family experience, only 5% of Uzbekistanis, 11.6% of Tajikistanis, and 13.4% of Kyrgyzstanis have never been married.

Most households have more than five people living in them, including children.

Urban and rural residents of the localities that are part of the Fergana Valley sub-region participated in the survey: 130 urban and 392 rural residents from the Kyrgyz Republic, 137 urban and 363 rural residents from Tajikistan, 290 urban and 210 rural residents from Uzbekistan.

3. SEASONAL CHARACTERISTICS OF ELECTRICITY SUPPLY ISSUES

3.1 Problems with electricity supply in summer

The majority of respondents in the Kyrgyz Republic (69.3%) and a significant part of respondents (57.2%) in Tajikistan indicated the absence of problems in the **summer period**. In Uzbekistan, such respondents amounted to only 1.1%.

Respondents from the **Kyrgyz Republic** were relatively more likely to report problems with electricity (17%), less likely to report problems with hot water supply (9.8%) and gas (7.3%).

In **Tajikistan**, a quarter of respondents answered that they have problems with electricity in summer (24.4%). 11.6% of Tajikistanis experience problems with hot water supply in summer. A low proportion of respondents noted problems with gas (3.8%) and firewood (3%).

The most frequent problem cited by **Uzbekistani** respondents is interruptions and lack of electricity (84.8%), cited by the majority of respondents. One third of respondents from Uzbekistan experience problems with gas in summer (32.2%). Also, 13.4% of respondents noted problems with hot water supply.

Electricity supply is the main problem of the summer period, and it is most acute in Uzbekistan.

Table 3.1: What type of energy supply does your household have problems with in summer?

Answer options	Kyrgyz Republic		Tajikistan		Uzbekistan	
	Qty	%	Qty	%	Qty	%
With hot water supply/water heating	51	9.8	58	11.6	67	13.4
With electricity	89	17.0	122	24.4	424	84.8
With gas	38	7.3	19	3.8	161	32.2
No problems	362	69.3	286	57.2	6	1.1
Difficult to answer	2	0.4	29	5.8	9	1.8
Answers are recorded from the words of the respondents						
With firewood	-	-	15	3.0	-	-

Note: The sum does not equal 100%, as respondents could mark more than one answer option

In summer, 71.2% of rural residents and 63.8% of urban residents in the **Kyrgyz Republic** have no problems with energy supply to households.

59.1% of urban residents and 56.5% of rural residents of **Tajikistan** also noted that they have no problems with energy supply in summer.

Among urban and rural **Uzbekistanis** only six people out of 500 respondents noted that they have no problems in summer.

Kyrgyzstanis - heads of households living in the city noted that in summer they experience problems with electricity and water supply (hot water supply), while rural residents added gas shortage to these problems.

Tajikistanis, regardless of their place of residence, noted that in summer there are problems with electricity and water heating.

Uzbekistanis, urban and rural residents noted that they have problems with electricity and gas in the summer.

Table 3.2: What type of energy supply does your household experience problems with in summer? (by type of settlement)

Answer options	Kyrgyz Republic				Tajikistan				Uzbekistan			
	Urban		Rural		Urban		Rural		Urban		Rural	
	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%
With hot water supply/water heating	15	11.5	36	9.2	15	10.9	43	11.8	50	17.2	17	8.1
With electricity	27	20.8	62	15.8	35	25.5	87	24.0	232	80.0	192	91.4
With gas	4	3.1	34	8.7	3	2.2	16	4.4	98	33.8	63	30.0
No problems	83	63.8	279	71.2	81	59.1	205	56.5	4	1.4	2	1.0
Difficult to answer	1	0.8	1	0.3	6	4.4	23	6.3	8	2.8	1	0.5
Answers are recorded from the words of the respondents												
With firewood	-	-	-	-	3	2,2	12	3,3	-	-	-	-

Note: The sum does not equal 100%, as respondents could mark more than one answer option

3.2 Problems with electricity supply in winter

In the **winter period**, problems with energy supply increase in all countries under study. In the Kyrgyz Republic, 39.1% of respondents indicated no problems (69.3% have no problems with energy supply in summer, see Table 3.1), in Tajikistan - 22.6% (57.2% in summer, see Table 3.1), in Uzbekistan the answer "no problems" was not recorded.

In the **Kyrgyz Republic**, 45.6% of respondents have problems with electricity supply, 16.9% of respondents noted problems with hot water supply, and 7.3% with gas.

In **Tajikistan**, 67.4% of respondents noted problems with electricity, 44.8% with hot water supply, and 8.4% with gas.

In **Uzbekistan**, 89.6% reported problems with electricity, 50.6% with gas and 10.6% with hot water supply.

Table 3.3: Which type of energy supply does your household have problems with in winter?

Answer options	Kyrgyz Republic		Tajikistan		Uzbekistan	
	Qty	%	Qty	%	Qty	%
With hot water supply/water heating	88	16.9	224	44.8	53	10.6
With electricity	238	45.6	337	67.4	448	89.6
With gas	38	7.3	42	8.4	253	50.6
With district heating	5	1.0	-	-	9	1.8
Coal is expensive	25	4.8	-	-	-	-
The heating system is not working well	5	1.0	-	-	-	-
Shortage of biofuels	1	0.2	-	-	-	-
No problems	204	39.1	113	22.6	-	-
Difficult to answer	-	-	2	0.4	-	-

Note: The sum does not equal 100%, as respondents could mark more than one answer option

In winter, 38.3% of rural residents and 41.5% of urban residents do not experience problems with energy supply in the Kyrgyz Republic.

27.7% of urban residents and 20.7% of rural residents of Tajikistan also noted that they have no problems with energy supply in winter.

Among urban and rural Uzbekistanis, all 500 respondents did not mark the option "no problems".

In winter, urban and rural residents of the **Kyrgyz Republic** still have the same problems as in summer: power supply, water heating, gas. Problems with high prices for coal are also added. Urban residents note problems with district heating.

Tajikistani heads of households note among winter problems - lack of electricity (urban - 65.7%, rural - 68%), more rural than urban residents noted problems with hot water supply (urban - 36.5%, rural - 47.9%). In rural areas there are also problems with gas (9.6%).

Uzbekistanis - both urban and rural residents noted that they have problems with electricity and gas in winter. At that, rural residents have more problems with electricity (96.2% in rural areas, 84.8% in urban

areas), urban residents have more problems with gas (53.8% in urban areas, 46.2% in rural areas). 11.4% of urban and 9.5% of rural residents have problems with hot water supply.

Table 3.4: What type of energy supply does your household experience problems with in winter? (by type of settlement)

Answer options	Kyrgyz Republic				Tajikistan				Uzbekistan			
	Urban		Rural		Urban		Rural		Urban		Rural	
	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%
With hot water supply/water heating	11	8.5	77	19.6	50	36.5	174	47.9	33	11.4	20	9.5
With electricity	56	43.1	182	46.4	90	65.7	247	68.0	246	84.8	202	96.2
With gas	4	3.1	34	8.7	7	5.1	35	9.6	156	53.8	97	46.2
With district heating	5	3.8	-	-	-	-	-	-	6	2.1	3	1.4
Coal is expensive	8	6.2	17	4.3	-	-	-	-	-	-	-	-
The heating system is not working well	4	3.1	1	0.3	-	-	-	-	-	-	-	-
Shortage of biofuels	-	-	1	0.3	-	-	-	-	-	-	-	-
No problems	54	41.5	150	38.3	38	27.7	75	20.7	-	-	-	-
Difficult to answer	-	-	-	-	-	-	2	0,6	-	-	-	-

Note: The sum does not equal 100%, as respondents could mark more than one answer option.

Summary of findings

The character of energy supply problems in the studied areas, geographically located in or near the Fergana Valley, depends on the season and administrative-territorial affiliation of localities (urban/rural).

69.3% of Kyrgyzstanis in summer and 39.1% in winter noted that they have no problems with energy supply.

57.2% of Tajikistanis in summer and 22.6% in winter noted that they have no problems with energy supply.

1.1% of Uzbekistanis have no problems with energy supply in summer and winter.

Accordingly, 30% in summer and 60% in winter of respondents from the Kyrgyz Republic, 40% in summer and 80% in winter of respondents from Tajikistan and almost 100% of respondents from Uzbekistan (in summer and winter) have problems with energy supply.

In summer, problems mainly for urban residents of the Kyrgyz Republic are related to electricity and hot water supply, while rural residents have problems with gas.

In Tajikistan, urban and rural residents have problems with electricity and hot water supply, while rural residents have additional problems with gas and firewood shortages.

In Uzbekistan, main problems with electricity and gas are for both urban and rural residents.

In winter, these problems are repeated, and issues related to central heating and expensive coal in the Kyrgyz Republic are also added to them.

4. HEATING

4.1 Type of housing

The majority of respondents interviewed in the survey live in separate detached houses: in the Kyrgyz Republic - 87%, in Uzbekistan - 86.2%, in Tajikistan - 64%. More than a quarter of respondents from Tajikistan (27.4%) live in apartments in blocks of flats. The share of respondents living in multi-storey houses in the Kyrgyz Republic (12.6%) and Uzbekistan (13.6%) is smaller.

Table 4.1: What is the type of your housing?

Answer options	Kyrgyz Republic		Tajikistan		Uzbekistan	
	Qty	%	Qty	%	Qty	%
Separate apartment in a block of flats	66	12.6	137	27.4	68	13.6
Separate detached house	454	87.0	320	64.0	431	86.2
Part of the house (house for two owners)/ half of the house	1	0.2	26	5.2	1	0.2
Dormitory	-	-	2	0.4	-	-
Temporary building	1	0.2	15	3.0	-	-
Total	522	100.0	500	100.0	500	100.0

A quarter of respondents from **Tajikistan** (24.2%), live in houses older than 51 years.

One fifth of respondents from the **Kyrgyz Republic** (21.8%) and **Uzbekistan** (21.6%) live in houses built between “31-40 years”.

On average, residential houses were built 31 years ago in the Kyrgyz Republic, 35 years ago in Uzbekistan, and 36 years ago in Tajikistan.

Table 4.2: How many years ago was the house you live in built?

Answers are recorded from the words of the respondents	Kyrgyz Republic		Tajikistan		Uzbekistan	
	Qty	%	Qty	%	Qty	%
1-10 years ago	77	14.8	111	22.2	43	8.6
11-20 years ago	71	13.6	84	16.8	55	11.0
21-30 years ago	87	16.6	54	10.8	82	16.4
31-40 years ago	114	21.8	46	9.2	108	21.6
41-50 years ago	77	14.8	84	16.8	82	16.4
51 or more years ago	52	10.0	121	24.2	64	12.8
I don't know, not sure	44	8.4	-	-	66	13.2
Total	522	100.0	500	100.0	500	100.0

On average, respondents-heads of households in the **Kyrgyz Republic** indicated that they have lived in their house for more than 20 years, in **Tajikistan** - 20 years and in **Uzbekistan** - 24 years.

Table 4.3: How many years have you lived in it?

Answers are recorded from the words of the respondents	Kyrgyz Republic		Tajikistan		Uzbekistan	
	Qty	%	Qty	%	Qty	%
1 - 10	169	32.4	229	45.8	113	22.6
11 - 20	120	23.0	137	27.4	118	23.6
21-30	121	23.2	91	18.2	124	24.8
31-40	70	13.4	27	5.4	79	15.8
41-50	28	5.3	14	2.8	47	9.4
51 and more	14	2.7	2	0.4	19	3.8
Total	522	100.0	500	100.0	500	100.0

The majority of respondents in the three surveyed countries predominantly live in houses with heating area of “up to 50 square meters” and “from 51 to 100 square meters”. More than half of respondents from the **Kyrgyz Republic** (52.7%) and **Tajikistan** (54.2%) live in houses with heating area “up to 50 square meters”,

in **Uzbekistan** 67.2% of respondents live in housing with such heating area.

37.6% of the surveyed Kyrgyzstanis, 31% of Tajikistanis live in houses with heating area "from 51 to 100 square meters", 18.6% of respondents live in such houses in Uzbekistan.

8.6% of respondents from Tajikistan (3.4%), Uzbekistan (3.4%) and the Kyrgyz Republic (4.4%) live in houses with heating area "from 101 to 150 square meters". 8.6% of respondents from Tajikistan live in houses with heating area of "101 to 150 square meters", while respondents from Uzbekistan (3.4%) and the Kyrgyz Republic (4.4%) live in houses with such heating area less.

Table 4.4: State the approximate area in square meters of all living/heated spaces/rooms in your housing?

<i>Answers are recorded from the words of the respondents</i>	Kyrgyz Republic		Tajikistan		Uzbekistan	
	Qty	%	Qty	%	Qty	%
Up to 50 square meters	275	52.7	271	54.2	336	67.2
51 to 100 square meters	116	37.6	155	31.0	93	18.6
101 to 150 square meters	23	4.4	43	8.6	17	3.4
150 square meters and more	8	1.5	22	4.4	-	-
I don't know, not sure	100	3.8	9	1.8	54	10.8
Total	522	100.0	500	100.0	500	100.0

The main material of houses in **Uzbekistan** (83.2%) and **Tajikistan** (75%) is brick. Concrete, wood, and saman are also common in Tajikistan and Uzbekistan.

Half of respondents from the Kyrgyz Republic (50.8%) live in houses made of bricks, one third (32.8%) - in adobe houses. About one fifth (19.2%) use wood in construction. A relatively small part of respondents answered that they live in houses made of concrete (11.3%). Such materials as frame block "Paks" (8.2%), reed-fiber board (4%), ceramic bricks (1.9%) and others were also mentioned.

Table 4.5: The house in which you and your family currently live is mainly built of what materials?

<i>Answer options</i>	Kyrgyz Republic		Tajikistan		Uzbekistan	
	Qty	%	Qty	%	Qty	%
Brick	265	50.8	375	75.0	416	83.2
Saman	171	32.8	189	37.8	49	9.8
Reed-fiber board	21	4.0	6	1.2	9	1.8
Wood	100	19.2	136	27.2	228	45.6
Concrete	59	11.3	239	47.8	128	25.6
Monolith	3	0.6	8	1.6	12	2.4
Difficult to answer	1	0.2	-	-	-	-
<i>Answers are recorded from the words of the respondents</i>						
Ceramic brick "Kam brick"	10	1.9	-	-	-	-
Building block "Synch"	4	0.8	-	-	-	-
Sand	3	0.6	-	-	-	-
Stone	1	0.2	7	1.4	-	-
Paks	43	8.2	-	-	-	-

Note: The sum does not equal 100%, as respondents could mark more than one answer option

4.2 Heating system

The vast majority of respondents in the **Kyrgyz Republic** (89.3%) use an off-grid type of heating. Also, 7.8% of respondents answered that they are connected to boiler houses, 2.9% of respondents receive heat through the district heating system.

In **Tajikistan**, the majority of respondents also heat their houses autonomously (64.8%), the share of those who use a mixed type of heating (off-grid heating + private stoves in households) is also significant - 35.2%.

All respondents from **Uzbekistan** live in houses with off-grid heating.

Table 4.6: Is your housing connected to a district heating system or do you have off-grid heating?

Answer options	Kyrgyz Republic		Tajikistan		Uzbekistan	
	Qty	%	Qty	%	Qty	%
District	15	2.9	-	-	-	-
Off-grid	466	89.3	324	64.8	500	100.0
Mixed - both district and off-grid heating	-	-	-	-	-	-
Heating from boiler house	41	7.8	-	-	-	-
Answers are recorded from the words of the respondents						
Mixed - use off-grid heating and private stoves in households	-	-	176	35.2	-	-
Total	522	100.0	500	100.0	500	100.0

In the **Kyrgyz Republic**, the vast majority (94.8%) receive hot water through off-grid system, only 5.2% of respondents use both off-grid and district water heating system.

In **Tajikistan**, the share of respondents using a mixed method is significant and amounts to 40.4%. 59.6% of Tajikistanis receive hot water from off-grid water heating systems.

All respondents from **Uzbekistan** receive hot water from off-grid water heating.

Table 4.7: Where do you get your hot water from?

Answer options	Kyrgyz Republic		Tajikistan		Uzbekistan	
	Qty	%	Qty	%	Qty	%
District water heating	-	-	-	-	-	-
Off-grid water heating	495	94.8	298	59.6	500	100.0
Mixed - both district and off-grid water heating	27	5.2	202	40.4	-	-
Total	522	100.0	500	100.0	500	100.0

The most common method of water heating in the **Kyrgyz Republic** is electricity (74.5%) and coal (38.7%). Firewood (13.2%), gas (8.4%), biofuel (kizyak-cow muck) (1.7%) are also used for water heating.

In **Tajikistan**, the majority use electricity to heat water (92.4%), one fifth of respondents (20.2%) heat water using coal. Gas is used for this purpose by 17% of respondents.

In **Uzbekistan**, the vast majority of respondents use both electricity (92.4%) and gas (97.8%) to heat water. Coal (10.2%) and firewood (7.4%) are used less for water heating.

It should be noted that the use of **solar energy** for water heating is very low in the surveyed region: in Tajikistan it is used by 23 respondents - heads of households, in the Kyrgyz Republic - 4. In Uzbekistan, respondents did not mention the use of solar energy for water heating.

Table 4.8: If you have off-grid water heating, how exactly do you heat the water?^a

Answer options	Kyrgyz Republic N=522		Tajikistan N=500		Uzbekistan N=500	
	Qty	% ^b	Qty	% ^b	Qty	% ^b
With electricity	389	74.5	462	92.4	462	92.4
Gas	44	8.4	85	17.0	489	97.8
With solar energy	4	0.8	23	4.6	-	-
Coal	202	38.7	101	20.2	51	10.2
Answers are recorded from the words of the respondents						
Firewood	69	13.2	-	-	37	7.4
Biofuel (kizyak-cow muck)	9	1.7	-	-	-	-

Note:

a Only those respondents with off-grid or mixed water heating answer this question

b The sum does not equal 100% because respondents could mark more than one answer option.

Summary of findings

There are two types of housing in which residents of the surveyed areas of the Fergana Valley live: 80% of respondents noted that they live in separate detached houses and 18% in apartments of block of flats (multi-storey buildings).

The majority of respondents in all three countries under study predominantly live in houses with a heating area of “up to 50 square meters” and “51 to 100 square meters”.

The main material of which houses are built in the Kyrgyz Republic: brick, adobe, wood, concrete. In Tajikistan: brick, concrete, adobe, wood. In Uzbekistan, houses are built of brick, wood, concrete, adobe. Due to sample characteristics, the majority of households have off-grid heating (in Uzbekistan - 500 households (100%), in the Kyrgyz Republic - 466 households (89.3%), in Tajikistan - 324 households (64.8%). In Tajikistan, 176 households (35.2%) are mixed heated, with off-grid heating and additional boilers. In Kyrgyz Republic, 15 households have district heating and 41 households are connected to boiler houses.

The type of hot water supply most widespread in the region is off-grid: in Uzbekistan - 100%, Kyrgyz Republic - 94.8%, Tajikistan - 59.6%. In Tajikistan, 40.4% of respondents-heads of households noted that they have a mixed type of hot water supply (each house has a stove and boilers common for several households). The most common methods of water heating are electricity and coal.

The use of solar energy for water heating is very little spread in the surveyed region: in Tajikistan it is used in 23 households, in the Kyrgyz Republic 4 interviewed households, in Uzbekistan the sample did not include households with solar panels.

5. DISTRICT HEATING

5.1 Satisfaction with the quality of heat supply

Due to the prevalence of rural settlements in the survey sample, only 56 households, of which 15 in the **Kyrgyz Republic** have district heating, and 41 households are heated from the boiler house. The remaining 466 households have off-grid heating. In Uzbekistan and Tajikistan, all households have off-grid heating (Table 4.6).

Most of the respondents (43 out of 56 respondents), who are connected to the district heating system, are satisfied with the quality of heat supply, they consider the temperature of the dwelling in winter to be optimal. 13 respondents out of this number are not satisfied with the quality of the heat supply.

Table 5.1: If your dwelling is connected to the district heating system, are you satisfied with the quality of heat supply of district heating batteries in winter?

Answer options	Kyrgyz Republic N=56	
	Qty	%
Yes, it's quite satisfactory, the temperature is optimal	43	76.8
No, it's not, it's too cold.	9	16.1
No, it's not, it's too hot.	-	-
No, it does not suit me, the heat supply is unstable: it is there and then not there	4	7.1
No, it doesn't, for other reasons.	-	-
Total	56	100.0

Note: Only those respondents who have district heating answer this question.

In case there is no heating or not enough heat, 26 district heating consumers resort to portable heaters, 8 survey participants turn on the warm air mode in air conditioners. 20 respondents out of 56 noted that they have no problems with heating.

Table 5.2: What do you do if there is no heat or not enough heat in your district heated dwelling? How do you heat your dwelling?^a

Answer options	Kyrgyz Republic N=56	
	Qty	% ^b
Heat the boiler	2	3.6
Light the fireplace	-	-
Stoke the stove	-	-
Turn on the portable heater	26	46.4
Switch on the floor heating	-	-
Turn on the heat pump/canopy	-	-
Turn on the warm air supply in air conditioners	8	14.3
Use solar panels	-	-
There's no such problem	20	35.7

Note:

^a This question is answered only by those respondents who have district heating.

^b The sum does not equal 100% because respondents could mark more than one answer option.

5.2 Heating expenditures in winter

More than half of the respondents (53.6%) who use district heating paid between 1,001 and 1,500 Kyrgyz Republic Soms (approximately 11-17 USD at the time of the survey) monthly for the last three heating seasons. One third of respondents (33.9%) answered that they paid from 1,501 to 2,000 Kyrgyz Republic Soms (approximately 17-23 USD at the time of the survey) monthly. 10.7% of respondents answered that their payment was more than 2,001 Kyrgyz Republic Soms monthly (approximately more than 23 USD at the time of the survey).

Table 5.3: How much approximately per month does your household pay for heating in winter, by size of living area, for the last three heating seasons? (in local currency)

<i>Answers are recorded from the words of the respondents</i>	Kyrgyz Republic (currency - som)	
	<i>N=56</i>	
	<i>Qty</i>	<i>%</i>
Up to 1,000 soms	1	1.8
1,001 to 1,500 soms	30	53.6
1,501 to 2,000 soms	19	33.9
2,001 and more	6	10.7
Total	56	100.0

Note: this question is answered only by those respondents who have district heating.

Summary of findings

Based on the peculiarities of the geography of the study and, accordingly, the survey in rural settlements, the majority of households have autonomous (off-grid) heating systems. Only in the Kyrgyz Republic there were 56 households with district heating included in the survey sample.

In general, the heads of households in the Kyrgyz Republic with district heating, who participated in the survey, are satisfied with the quality of heat supply.

In the Kyrgyz Republic, if there is no heating or insufficient heat, district heating consumers resort to portable heaters, less often - turn on the warm air mode in air conditioners. One third of respondents noted that they have no problems with heat in their houses.

More than half of the respondents using district heating have paid between 1,001 and 1,500 Kyrgyz Republic soms (approximately 11-17 USD at the time of the survey) monthly for the last 3 heating seasons. One third of respondents answered that they paid from 1,501 to 2,000 Kyrgyz Republic soms (approximately 17-23 USD at the time of the survey) monthly.

6. OFF-GRID HEATING

6.1 Off-grid heating systems in the households

Except for the 56 households with district heating, all other 466 households that participated in the survey in the Kyrgyz Republic have off-grid heating. In Uzbekistan and Tajikistan, all households have off-grid heating.

In the **Kyrgyz Republic** (87.2%) and in Uzbekistan (89.6%), the most common off-grid heating system is **a stove**. In **Tajikistan**, 39.2% of respondents use a heating stove.

In Tajikistan, 64.2% of households use **an electric heater**. 19.3% of respondents from the Kyrgyz Republic and 16.2% of respondents from Uzbekistan use an electric heater.

Air conditioner as an additional source of heat is used in Uzbekistan (28.4%) and Tajikistan (17.4%).

Table 6.1: Which off-grid heating system is in your house?^a

Answer options	Kyrgyz Republic N=466		Tajikistan N=500		Uzbekistan N=500	
	Qty	% ^b	Qty	% ^b	Qty	% ^b
Stove	442	87.2	196	39.2	448	89.6
Boiler	43	8.5	13	2.6	36	7.2
Fireplace	-	-	27	5.4	9	1.8
Air conditioner	4	0.8	87	17.4	142	28.4
Electric heater	98	19.3	321	64.2	81	16.2
Floor heating	5	1.0	92	18.4	8	1.6
Heat pump/canopy	7	1.4	4	0.8	-	-
Solar panels	-	-	-	-	-	-
Answers are recorded from the words of the respondents						
Turning on the gas stove	-	-	-	-	1	0.2

Note:

^a This question is answered only by those respondents who have off-grid or mixed heating.

^b The sum does not equal 100% because respondents could mark more than one answer option.

6.2 Heating sources in winter

In the **Kyrgyz Republic**, the most common main source of energy used for heating is hard coal (88.6%). A small percentage of respondents mentioned such sources as electricity (6.7%), firewood (3.2%).

In **Tajikistan**, 70.2% of respondents identified electricity as the main source of energy used for dwelling heating. Hard coal (13.6%) and firewood (12.8%) are also used, but to a much lesser extent.

More than a half of respondents (54.6%) from **Uzbekistan** use coal for heating their houses.

Natural gas from underground pipes (15.2%) and electricity (13%) are also used.

Table 6.2: If you have an off-grid heating system, what energy source do you use to heat your house during the winter season?

Answer options	Kyrgyz Republic N=466		Tajikistan N=500		Uzbekistan N=500	
	Qty	%	Qty	%	Qty	%
Hard coal	413	88.6	68	13.6	273	54.6
Fuel oil/diesel	-	-	2	0.4	3	0.6
Natural gas from underground pipes	2	0.4	-	-	76	15.2
Propane (bottled gas)	-	-	03	0.6	43	8.6
Electricity	31	6.7	351	70.2	65	13.0
Biofuel (kizyak-cow muck)	5	1.1	10	2.0	1	0.2
Kerosene	-	-	-	-	-	-
Firewood	15	3.2	64	12.8	39	7.8
Solar panels	-	-	-	-	-	-
Waste and garbage (rubber, plastic, paper, etc.)	-	-	2	0.4	-	-
Total	466	100.0	500	100.0	500	100.0

Note: This question is only answered by those respondents who have off-grid or mixed heating.

In the **Kyrgyz Republic**, respondents often mentioned firewood (65.5%) and electricity (50%) as an additional source of energy for dwelling heating.

Additional sources of heating in **Tajikistan** are firewood (25.6%), hard coal (21.4%), electricity (20.4%), kizyak-cow muck (20.4%), propane in bottles (15.2%). Half of respondents (49.6%) from Tajikistan do not use additional sources of heating during the heating season.

In **Uzbekistan**, firewood (60.4%), electricity (36.8%), hard coal (16.8%), and propane in bottles (9.6%) are more frequently used.

Table 6.3: If you have an off-grid heating system, what other energy sources do you use to heat your house during the winter season?^a

Answer options	Kyrgyz Republic N=466		Tajikistan N=500		Uzbekistan N=500	
	Qty	% ^b	Qty	% ^b	Qty	% ^b
Hard coal	23	4.9	107	21.4	84	16.8
Fuel oil/diesel	1	0.2	1	0.2	2	0.4
Natural gas from underground pipes	5	1.1	-	-	37	7.4
Propane (bottled gas)	3	0.6	76	15.2	48	9.6
Electricity	233	50.0	102	20.4	184	36.8
Biofuel (kizyak-cow muck)	89	19.1	102	20.4	52	10.4
Kerosene	-	-	6	1.2	3	0.6
Firewood	305	65.5	128	25.6	302	60.4
Solar panels	2	0.4	13	2.6	1	0.2
Waste and garbage (rubber, plastic, paper, etc.)	-	-	48	9.6	4	0.8
Difficult to answer	-	-	4	0.8	-	-
Answers are recorded from the words of the respondents						
Nothing	22	4.7	248	49.6	11	2.2
Cotton stalk	-	-	1	0.2	-	-

Note:

a This question is answered only by those respondents who have off-grid or mixed heating.

b The sum does not equal 100% because respondents could mark more than one answer option.

6.3 Heating expenditures in winter

Heating expenditures for more than half of the **Kyrgyzstani** respondents (53.3%) using an off-grid heating system for the last three heating seasons were between 1,001 and 5,000 Kyrgyz Republic soms (approximately 11 to 57 USD at the time of the survey), 39.9% of respondents - between 5,001 and 15,000 soms (approximately 57 to 170 USD at the time of the survey). Kyrgyzstanis on average paid 5,349.84 Kyrgyz Republic soms (approximately 60 USD) per month for heating during the last three heating seasons.

Table 6.4: What is the size of your household's winter heating expenditure per month on average (include all types of heating used in winter for the last three heating seasons? (in local currency)

Answers are recorded from the words of the respondents	Kyrgyz Republic N=466	
	Qty	%
Less than 1,000 soms	17	3.6
1,001 – 5,000 soms	248	53.3
5,001 – 10,000 soms	186	39.9
10,001 - 15,000 soms	13	2.8
More than 15,001 soms	2	0.4
Total	466	100.0

Note: This question is only answered by those respondents who have off-grid or mixed heating.

57.8% of **Tajikistani** respondents paid less than 1,200 somonis per month for heating during the last 3 heating seasons. On average, respondents from Tajikistan paid 1,590 Tajikistan somonis (approximately 145 USD) per month for heating during the last 3 heating seasons.

Table 6.5: What is the size of your household's winter heating expenditure per month on average (include all types of heating used in winter for the last three heating seasons? (in local currency)

<i>Answers are recorded from the words of the respondents</i>	Tajikistan N=500	
	Qty	%
Less than 1,200 somonis	289	57.8
1,201 - 2,400 somonis	67	13.4
2,401 - 3,600 somonis	72	14.4
3,601 - 4,800 somonis	29	5.8
More than 4,801 somonis	43	8.6
Total	500	100.0

Note: This question is only answered by those respondents who have off-grid or mixed heating.

The majority of respondents in **Uzbekistan** paid less than 1,000,000 sums per month (71.8%) for the last 3 heating seasons. On average, respondents from Uzbekistan paid 853,068.89 Uzbekistan sums (approximately 70 USD) per month for heating during the last 3 heating seasons.

Table 6.6: What is the size of your household's winter heating expenditure per month on average (include all types of heating used in winter for the last three heating seasons? (in local currency)

<i>Answers are recorded from the words of the respondents</i>	Uzbekistan N=500	
	N	%
Less than 1,000,000 sums	359	71.8
1,000,001 - 2,000,000 sums	79	15.8
2,000,001 - 3,000,000 sums	24	4.8
3,000,001 - 4,000,000 sums	15	3.0
More than 4,000,0001 sums	2	0.4
Difficult to answer	21	4.2
Total	500	100.0

Note: This question is only answered by those respondents who have off-grid or mixed heating.

6.4 Reasons for using more than one type of energy source

During the heating season, some respondents use more than one type of energy source.

In the **Kyrgyz Republic**, the most frequent reason for using different energy sources is the high cost of the main source (58.6%). 18.5% of respondents use several types of sources due to interruptions in the supply of the main energy source.

In **Tajikistan**, interruptions in the supply of the main energy source (43.6%) and the high cost of energy (40%) are about equally important causes.

In **Uzbekistan**, the main reason for using multiple energy sources is interruptions in the supply of the main source (77.8%). 27.9% of respondents are based on cost saving considerations due to high cost.

Table 6.7: If you use more than one type of energy source in one heating season, for what reason?^a

Answer options	Kyrgyz Republic		Tajikistan		Uzbekistan	
	N=466		N=500		N=500	
	Qty	% ^b	Qty	% ^b	Qty	% ^b
Due to interruptions in the supply of the main source	86	18.5	218	43.6	388	77.8
Due to the high cost of the main source, to save	273	58.6	200	40.0	139	27.9
Use one type of energy source	79	17.0	131	26.2	11	2.2
Answers are recorded from the words of the respondents						
Habit	4	0.9	-	-	-	-
Convenient	25	5.4	-	-	-	-
Depends on the opportunity	9	1.9	-	-	-	-
Because of the weak electricity	6	1.3	-	-	-	-
It's warmer this way	4	0.9	-	-	-	-

^a This question is answered only by those respondents who have off-grid or mixed heating.

^b The sum does not equal 100% because respondents could mark more than one answer option.

In the **Kyrgyz Republic**, the high cost of main energy sources is a bigger problem in rural areas (60.5%) than in urban areas (48.6%).

In **Tajikistan**, there is no serious divergence of opinion between the two groups of residents, using several types of energy sources due to interruptions in the supply of the main source.

In **Uzbekistan**, there is a slight difference between rural and urban residents in terms of sensitivity to interruptions in the supply of the main source: rural residents are more likely than urban residents to report this reason.

Table 6.8: If you use several types of energy sources in one heating season, for what reason? (by type of settlement)

Answer options	Kyrgyz Republic				Tajikistan				Uzbekistan			
	Urban		Rural		Urban		Rural		Urban		Rural	
	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%
Due to interruptions in the supply of the main source	15	20.3	71	18.1	59	43.1	159	43.8	220	76.1	168	80.0
Due to the high cost of the main source, to save	36	48.6	237	60.5	51	37.2	149	41.0	78	27.0	61	29.0
Use one type of energy source	22	29.7	57	14.5	38	27.7	93	25.6	9	3.1	2	1.0
Answers are recorded from the words of the respondents												
Habit	1	1.4	3	0.8	-	-	-	-	-	-	-	-
Convenient	2	2.7	23	5.9	-	-	-	-	-	-	-	-
Depends on the opportunity	-	-	9	2.3	-	-	-	-	-	-	-	-
Because of the weak electricity	1	1.4	5	1.3	-	-	-	-	-	-	-	-
It's warmer this way	-	-	4	1.0	-	-	-	-	-	-	-	-

Comparison by income level shows that households in the **Kyrgyz Republic** that use more than one type of energy source, 21.2% (56 households) with higher income (more than 20,000 soms) do so more often than households with lower income (from 6,000 to 20,000 soms) due to interruptions in the supply of the main source.

In **Tajikistan**, 52.3% of respondents with lower incomes (800-2400 somonis) are more likely to use more than one type of energy source due to interruptions in the supply of the main source than those with higher incomes (more than 2400 somonis). 45.5% of households with higher income more often use several types of energy sources due to the high cost of the main source in order to save costs than households with lower income (36.8%).

Household heads from **Uzbekistan**, regardless of income, use several types of energy sources during one heating season due to interruptions in the supply of the main source.

Table 6.9: If you use several types of energy sources in one heating season, for what reason? (by income)^b

Answer options	Kyrgyz Republic				Tajikistan				Uzbekistan			
	6,001 – 20,000 soms (39,1%) ^a		More than 20,000 soms (58%) ^a		800 – 2,400 somonis (31%) ^a		More than 2,400 somonis (44,4%) ^a		Less than 1,200,000 – 3,200,000 soms (41%) ^a		More than 3,200,000 soms (50,8%) ^a	
	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%
Due to interruptions in the supply of the main source	26	13.8	56	21.2	81	52.3	89	40.1	157	77.0	19	77.2
Due to the high cost of the main source, to save	114	60.6	155	58.7	57	36.8	101	45.5	55	27.0	73	28.7
Use one type of energy source	31	16.5	45	17.0	31	20.0	61	27.5	4	2.0	7	2.8
Answers are recorded from the words of the respondents												
Habit	-	-	2	0.8	-	-	-	-	-	-	-	-
Convenient	12	6.4	11	4.2	-	-	-	-	-	-	-	-
Depends on the opportunity	5	2.7	4	1.5	-	-	-	-	-	-	-	-
Because of the weak electricity	5	2.7	1	0.4	-	-	-	-	-	-	-	-

Note:

^a Number of respondents from the total sample with a given income

^b The sum does not equal 100% because respondents could mark more than one answer option.

In general, when choosing the main source of energy for heating, respondents from the **Kyrgyz Republic** are guided by:

- uninterruptedness/reliability of energy supply (41.2%),
- lowest financial burden (30.9%),
- availability of the existing heating system (16.6%),
- least harm to the health of the family (10.9%).

The following answers were recorded among respondents from **Tajikistan**:

- the least harm to the environment (31.6%),
- lowest financial burden (28.6%),
- least harm to the health of the family (26%),
- uninterruptedness/reliability of energy supply (6.6%).

Respondents from **Uzbekistan** choose in the following order:

- lowest financial burden (35%),
- uninterruptedness/reliability of energy supply (28%),
- availability of the existing heating system (20%),
- least harm to the environment (16%).

Table 6.10: What guides you in choosing your main heating source?

Answer options	Kyrgyz Republic N=466		Tajikistan N=500		Uzbekistan N=500	
	Qty	%	Qty	%	Qty	%
I choose based on the least harm to the environment	2	0.4	158	31.6	80	16.0
I choose based on the least harm to the health of my family	51	10.9	130	26.0	5	1.0
I choose based on the least financial burden	144	30.9	143	28.6	175	35.0
I choose based on the considerations of uninterruptedness/reliability of energy supply, deficiency	192	41.2	33	6.6	140	28.0
Due to the presence of an existing heating system	77	16.6	-	-	100	20.0
Difficult to answer	-	-	34	6.8	2	0.4
Answers are recorded from the words of the respondents						
I'm trying to prepare for winter	-	-	1	0.2	-	-
Every year there are electricity problems	-	-	1	0.2	-	-
Total	466	100.0	500	100.0	500	100.0

Note: Only respondents with off-grid or mixed heating will answer this question.

Differences in preferences between men and women are noticeable regarding the following answers:

In the **Kyrgyz Republic**, women (32.0%) are slightly more likely than men (29.8%) to pay attention to the **financial burden** when choosing the main heating source. On the other hand, the uninterruptedness/reliability of energy supply is slightly more important for men: in the Kyrgyz Republic, men (42.9%) are more concerned about the uninterruptedness/reliability of supply compared to women (39.5%)

In **Tajikistan**, women (30.6%) are also more likely than men (26.5%) to indicate the **financial burden**. It is equally important for men and women to choose the main source of heating based on the least harm to family health (men - 26.5%, women - 25.5%). It is also important for the respondents to choose based on the least harm to the environment: 33.1% - men, 30.2% - women.

In **Uzbekistan**, this trend is also confirmed: women (38.4%) are more concerned about the **financial burden** than men (31.2%), and men (29.7%) are more concerned about the uninterruptedness/reliability of energy supply than women (26.2%).

Table 6.11: What guides you in choosing your main heating source? (by gender)

Answer options	Kyrgyz Republic				Tajikistan				Uzbekistan			
	Male		Female		Male		Female		Male		Female	
	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%
I choose based on the least harm to the environment	1	0.4	1	0.4	81	33.1	77	30.2	45	17.6	35	14.1
I choose based on the least harm to the health of my family	21	8.8	30	13.2	65	26.5	65	25.5	2	0.8	3	1.2
I choose based on the least financial burden	71	29.8	73	32.0	65	26.5	78	30.6	80	31.2	95	38.4
I choose based on the considerations of the uninterruptedness/reliability of energy supply, deficiency	102	42.9	90	39.5	18	7.3	15	5.9	76	29.7	64	26.2
Due to the presence of an existing heating system	43	18.1	34	14.9	-	-	-	-	53	20.7	47	19.3
Difficult to answer	-	-	-	-	15	6.2	19	7.4	-	-	2	0.8
Answers are recorded from the words of the respondents												
I'm trying to prepare for winter	-	-	-	-	-	-	1	0.4	-	-	-	-
Every year there are electricity problems	-	-	-	-	1	0.4	-	-	-	-	-	-

Preferences for choosing a primary heating source vary depending on the type of community.

In the **Kyrgyz Republic**, in rural areas, the main emphasis is placed on the uninterruptedness/reliability of energy supply: in villages (42.6%), in cities (33.8%). It is equally important for urban and rural residents to reduce financial expenditures, as indicated by 30.6% of rural and 32.4% of urban respondents. Urban residents, more often than rural residents choose the main source of heating because of the existing heating system (urban residents - 21.6%, rural residents - 15.6%).

In **Tajikistan**, urban residents are more likely than rural residents to choose the main source of heating based on the least harm to the environment (35% and 30.3% respectively) and the least harm to family health (29.9% and 24.5% respectively). For rural residents, lower financial expenditures are more important: 30.9% (for urban residents - 22.6%).

In **Uzbekistan**, the majority in cities are focused on the least financial burden (37.2%), in villages - 31%. The uninterruptedness/reliability of energy supply is more important for rural residents than for urban residents (29.5% and 26.9% respectively).

Table 6.12: What guides you in choosing your main heating source? (by type of settlement)

Answer options	Kyrgyz Republic				Tajikistan				Uzbekistan			
	Urban		Rural		Urban		Rural		Urban		Rural	
	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%
I choose based on the least harm to the environment	2	2.7	-	-	48	35.0	110	30.3	44	15.2	36	17.1
I choose based on the least harm to the health of my family	7	9.5	44	11.2	41	29.9	89	24.5	4	1.4	1	0.5
I choose based on the least financial burden	24	32.4	120	30.6	31	22.6	112	30.9	110	37.2	65	31.0
I choose based on the considerations of uninterruptedness/reliability of energy supply	25	33.8	167	42.6	10	7.3	23	6.3	78	26.9	62	29.5
Due to the presence of an existing heating system	16	21.6	61	15.6	-	-	-	-	55	19.0	45	21.4
Difficult to answer	-	-	-	-	6	4.5	28	7.7	1	0.3	1	0.5
Answers are recorded from the words of the respondents												
I'm trying to prepare for winter	-	-	-	-	1	0.7	-	-	-	-	-	-
Every year there are electricity problems	-	-	-	-	-	-	1	0.3	-	-	-	-

Preferences for the main source of heating vary by income level in each of the three countries. In the **Kyrgyz Republic**, the uninterruptedness/reliability of energy supply is given the highest priority across all income categories, with a range from 38.8% (less than 6,001-20,000 soms) to 42.4% (more than 20,000 soms). Meanwhile, the lowest financial burden also plays a significant role, especially among the more affluent population, ranging from 31.4% to 32.4%.

In **Tajikistan**, for the group with income of more than 2,400 somonis, the main source of heating is chosen based on the least harm to the environment (30.6%), in the group with income less (less than 800-2,400 somonis) this parameter amounted to 25.2%. Financial burden is important for all consumers with different incomes. For the group with lower income, possible harm to family health is more important than for the group with higher income (33.6% and 23.9% respectively).

In **Uzbekistan**, reducing the financial burden plays a key role in choosing a heating source, especially among less affluent groups of the population (38% of respondents with an income of less than 1,200,000-3,200,000 soms) compared to 32.7% with an income of more than 3,200,000 soms. Uninterruptedness/reliability of supply is more important for consumers with incomes less than 1,200,000 – 3,200,000 soms (31.7%).

Table 6.13: What guides you in choosing your main heating source? (by income)^b

Answer options	Kyrgyz Republic				Tajikistan				Uzbekistan ^b			
	Less than 6,001 - 20,000 soms (39,1%) ^a		More than 20,000 soms (58%) ^a		Less than 800-2,400 somonis (31%) ^a		More than 2,400 somonis (44,4%) ^a		Less than 1,200,000 - 3,200,000 soms (41%) ^a		More than 3,200,000 soms (50,8%) ^a	
	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%
I choose based on the least harm to the environment	1	0.5	1	0.4	39	25.2	68	30.6	27	13,2	48	18.9
I choose based on the least harm to the health of my family	28	14.9	19	7.2	52	33.6	53	23.9	1	0,5	3	1.2
I choose based on the least financial burden	61	32.4	83	31.4	44	28.4	67	30.2	78	38	83	32.7
I choose based on the considerations of uninterruptedness/reliability of energy supply, deficiency	73	38.8	112	42.4	11	7.1	16	7.2	65	31,7	62	24.4
Due to the presence of an existing heating system	25	13.4	49	18.6	-	-	-	-	33	16,1	59	23.2
Difficult to answer	-	-	-	-	7	4.5	18	8.1	2	1,0	-	-
Answers are recorded from the words of the respondents												
I'm trying to prepare for winter	-	-	-	-	1	0.6	-	-	-	-	-	-
Every year there are electricity problems	-	-	-	-	1	0.6	-	-	-	-	-	-

Note:

^a Number of respondents from the total sample with a given income

^b The sum does not equal 100% because respondents could mark more than one answer option.

6.5 Heating period

Respondents-heads of households from **Kyrgyz Republic** noted that they heat their houses for 4 to 6 months, in **Tajikistan** - for 3 to 8 months, in **Uzbekistan** - for 3 to 6 months.

Table 6.14: How many months of the year is your house heated?

Answer options	Kyrgyz Republic N=466		Tajikistan N=500		Uzbekistan N=500	
	Qty	%	Qty	%	Qty	%
We don't heat ourselves	-	-	3	0.6	-	-
1 month	-	-	3	0.6	-	-
2 months	-	-	1	0.2	2	0.4
3 months	-	-	237	47.4	101	20.2
4 months	198	42.5	84	16.8	130	26.0
5 months	241	51.7	74	14.8	213	42.6
6 months	27	5.8	65	13.0	51	10.2
7 months	-	-	21	4.2	3	0.6
8 months	-	-	11	2.2	-	-
9 months	-	-	1	0.2	-	-
Total	466	100.0	500	100.0	500	100.0

Note: This question is answered only by those respondents who have off-grid or mixed heating.

In the **Kyrgyz Republic**, the months when the dwelling is heated all days are December, January, February, partially - October, November, March. In October, 10.3% of respondents heat their dwellings for an average of 12 days. In early spring, in March, 58.8% of respondents heat their dwelling for about 19 days.

In **Tajikistan** in winter months - December, January, February - respondents heat their houses almost all days. In the fall, in October, less often than in November, they start to warm living quarters. In spring, in March and to a lesser extent in April, respondents keep households warm.

In **Uzbekistan**, all households in December, January and February are heated every day. In November and in March, respondents heat their houses for more than a month. In October, 10.6% of respondents or 53 households heat for about 18 days.

Table 6.15: Mark the months in which the house is heated and how many days per month do you heat?

Months	Kyrgyz Republic			Tajikistan			Uzbekistan		
	Qty	%	How many days you heated on average	Qty	%	How many days you heated on average	Qty	%	How many days you heated on average
January	466	100.0	31	459	92.4	31	500	100.0	30
February	466	100.0	28	454	91.3	28	500	100.0	28
March	274	58.8	19	155	31.2	26	322	64.4	18
April	-	-	-	54	10.9	25	10	2.0	12
May	-	-	-	9	1.8	16	-	-	-
June	-	-	-	-	-	-	-	-	-
July	-	-	-	-	-	-	-	-	-
August	-	-	-	-	-	-	-	-	-
September	-	-	-	9	1.8	23	-	-	-
October	48	10.3	12	80	16.1	26	53	10.6	18
November	439	94.2	25	219	44.1	28	337	67.4	23
December	466	100.0	31	447	89.9	30	497	99.4	31

6.6 Main non-financial difficulties with heating in winter

Respondents were asked about heating difficulties of a **non-financial nature** that they experienced in the last winter (2022-2023). The question was open-ended, i.e. respondents themselves came up with answers.

The majority of respondents from the **Kyrgyz Republic** answered that they did not experience problems related to heating (72.1%). The others pointed to difficulties such as power outages (7.1%), shortage of coal (4.9%) and poor quality of heating (4.1%).

“Power outages” were also noted by 35.2% of respondents from **Tajikistan**. 40.8% of respondents noted that there were no non-financial difficulties with heating in winter 2022-2023.

Almost all respondents in **Uzbekistan** mentioned such difficulties as “power outages” (99.4%) and “low gas pressure” (99%).

Table 6.16: What were the main non-financial heating difficulties you experienced last winter?^a

Answers are recorded from the words of the respondents	Kyrgyz Republic N=466		Tajikistan N=500		Uzbekistan N=500	
	Qty	% ^b	Qty	% ^b	Qty	% ^b
There were no problems	336	72.1	204	40.8	1	0.2
Windows are frozen/Doors are frozen	6	1.3	-	-	-	-
Poor quality asphalt in the yard	2	0.4	-	-	-	-
Problems with pipes/old pipes	3	0.6	-	-	-	-
There was no coal on sale/lack of coal/no coal on sale	23	4.9	18	3.6	-	-
Severe cold	37	7.9	12	2.4	-	-
Water shortage	3	0.6	-	-	-	-
No gas/gas shortage	2	0.4	-	-	-	-
The heating system was not working well/badly warming the house	19	4.1	-	-	-	-
Shortage of firewood/wood	7	1.5	12	2.4	-	-
Sewer	4	0.9	-	-	-	-
Fire up the stove	1	0.2	-	-	-	-
The high cost of coal	6	1.3	-	-	-	-
Power outage/ Weak power/no power supply	33	7.1	176	35.2	-	-
The radiator exploded	6	1.3	-	-	-	-
The water's frozen	8	1.7	1	0.2	-	-
Power outage	-	-	-	-	497	99.4
Low gas pressure	-	-	-	-	495	99.0
Lack of drinking water	-	-	3	0.6	-	-
Cracks in water pipes due to cold weather	-	-	3	0.6	-	-
No hot water	-	-	19	3.8	-	-
Low mains voltage	-	-	11	2.2	-	-
Clearing the roof of snow	-	-	5	1.0	-	-
Fireplace cleaning	-	-	2	0.4	-	-
Lack of heating	-	-	2	0.4	-	-
Difficult to answer	-	-	43	8.6	-	-

Note:

^aThis question is only answered by those respondents who have off-grid or mixed heating.

^bThe sum does not equal 100% because respondents could mark more than one answer option.

6.7 Supply interruptions, heating difficulties in the winter of 2022-2023

The majority of Kyrgyzstani respondents (66.7%) and less than a third of respondents from Tajikistan (30.8%) pointed to the absence of interruptions in the supply of energy sources and difficulties with heating last winter. This answer was given by only 2.2% of respondents from Uzbekistan.

14% of **Kyrgyzstani** respondents said that they experienced outages several days per quarter during the last heating season, 6% - several days per year. Only a minor part of respondents had frequent outages: 3% of respondents - several days a month, 2.6% - several times a week.

More than a quarter of respondents from **Tajikistan** (26.4%) said they had experienced supply interruptions several times a week, 17.6% several times a month, 14.2% several times a quarter, and 7.8% several times a year.

A significant proportion of **Uzbekistanis** (58.8%) experienced heating interruptions several times a week, 29.4% several times a month, and 9.4% several times a quarter.

Table 6.17: Did you have supply interruptions, heating difficulties last winter?

Answer options	Kyrgyz Republic		Tajikistan		Uzbekistan	
	N=466		N=500		N=500	
	Qty	%	Qty	%	Qty	%
Yes, a few times a week.	12	2.6	132	26.4	294	58.8
Yes, a few days a month	14	3.0	88	17.6	147	29.4
Yes, a few days a quarter	65	14.0	71	14.2	47	9.4
Yes, a few days a year	28	6.0	39	7.8	-	-
No, there wasn't.	311	66.7	154	30.8	11	2.2
Difficult to answer	36	7.7	16	3.2	1	0.2
Total	466	100.0	500	100.0	500	100.0

Note: Only those respondents who have independent or mixed heating will answer this question.

6.8 Experiences with changes in household heating systems and future plans

The majority of respondents in all three countries had no experience of changing the heating system in the last five years. In Tajikistan, 55 households had changed their heating system, 39 in Uzbekistan and 19 in the Kyrgyz Republic.

Table 6.18: Do you have experience of changing the heating system in your house in the last 5 years (excluding relocation)?

Answer options	Kyrgyz Republic		Tajikistan		Uzbekistan	
	N=119		N=330		N=488	
	Qty	%	Qty	%	Qty	%
Yes	19	16.0	55	16.7	39	8.0
No	97	81.5	275	83.3	449	92.0
Difficult to answer	3	2.5	-	-	-	-
Total	199	100.0	330	100.0	488	100.0

Note: This question is answered only by those respondents who have independent or mixed heating and have had difficulties with heating.

19 surveyed households in the Kyrgyz Republic have changed their house heating system in the last five years by switching:

- from electricity to coal (7 HHs),
- from coal to electricity (8 HHs),
- from coal to steam heating (4 HHs),

55 surveyed households in Tajikistan have changed their house heating system in the last five years by switching:

- from gas to electricity (15 HHs),
- from electricity to coal (2 HHs),
- from coal to gas (3 HHs),
- from coal to electricity (35 HHs),

39 households in Uzbekistan have changed their house heating system in the last five years by switching

- from gas to electricity (7 HHs),
- from gas to coal (6 HHs),
- from electricity to gas (6 HHs),
- from electricity to coal (4 HHs),
- from coal to electricity (13 HHs),
- from coal to gas (2 HHs),
- from coal to solar panels (1 HHs).

The majority of respondents do not intend to change the system of off-grid heating in the next five years. Most of those who intend to change the heating system are among respondents from the **Kyrgyz Republic** - 28.8%. The fact that they plan to change the heating system in the next 5 years was reported by

16.6% of **Uzbekistanis** and 11.2% of **Tajikistanis**.

Table 6.19: Do you plan to change your off-grid heating system in the next five years, including by relocation?

Answer options	Kyrgyz Republic N=466		Tajikistan N=500		Uzbekistan N=500	
	Qty	%	Qty	%	Qty	%
Yeah, I plan to.	134	28.8	56	11.2	83	16.6
No, I don't plan to.	332	71.2	444	88.8	417	83.4
Total	466	100.0	500	100.0	500	100.0

Note: This question is only answered by those respondents who have off-grid or mixed heating.

Comparing the data from the table on plans to change the heating system in the next five years by gender, it can be noted that in **the Kyrgyz Republic** 32.4% of men expressed their intention to change the heating system, while for women the percentage was 25.0%.

In **Tajikistan**, the trend is similar, with 12.7% of men intending to change their heating, compared to 9.8% of women.

In **Uzbekistan**, these differences are also noticeable - 19.1% of men versus 13.9% of women intend to change the heating system.

Table 6.20: Do you plan to change your off-grid heating system in the next five years, including by relocation? (by gender)

Answer options	Kyrgyz Republic				Tajikistan				Uzbekistan			
	Male		Female		Male		Female		Male		Female	
	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%
Yeah, I plan to.	77	32.4	57	25.0	31	12.7	25	9.8	49	19.1	34	13.9
No, I don't plan to.	161	67.6	171	75.0	214	87.3	230	90.2	207	80.9	210	86.1
Total	238	100.0	228	100.0	245	100.0	255	100.0	256	100.0	244	100.0

Plans to change off-grid heating system in the next five years, including relocation, vary by age group.

In the **Kyrgyz Republic**, young people aged 18 to 29 years (29.6%) and 30 to 45 years (32.2%) are more likely to express an intention to change the heating system compared to older age groups.

In **Tajikistan**, the trend is similar: young people and middle generation plan to change heating more often (9.9% to 12.8%) compared to older groups.

In **Uzbekistan**, young people and middle generation also express more interest in changing the heating system (17.2% to 18.5%) compared to older age groups, where plans to change the heating system are less pronounced (12.8% to 15.1%).

Table 6.21: Do you plan to change your off-grid heating system in the next five years, including by relocation? (by age groups)

	Kyrgyz Republic				Tajikistan				Uzbekistan			
	18-29 %	30-45 %	46-60 %	61+ %	18-29 %	30-45 %	46-60 %	61+ %	18-29 %	30-45 %	46-60 %	61+ %
Yeah, I plan to	29.6	32.2	25	22	9.9	12.8	12.8	6.7	17.2	18.5	15.1	15.1
No, I don't plan to	70.4	67.8	75	78	90.1	87.2	87.2	93.3	82.8	81.5	84.9	84.9
Total	100	100	100	100	100	100	100	100	100	100	100	100

In the **Kyrgyz Republic**, 25.7% of urban residents and 29.3% of rural residents plan to change their off-grid heating system in the next five years.

In **Tajikistan**, this indicator is 11.7% for cities and 11.0% for villages.

In **Uzbekistan**, 16.9% of urban residents and 16.2% of rural residents also expressed their intention to change their heating system during this period.

The majority of respondents in each country (between 70.7% and 88.3%) do not plan to change their heating system in the next five years.

Table 6.22: Do you plan to change your off-grid heating system in the next five years, including by relocation? (by type of settlement)

Answer options	Kyrgyz Republic				Tajikistan				Uzbekistan			
	Urban		Rural		Urban		Rural		Urban		Rural	
	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%
Yeah, I plan to.	19	25.7	115	29.3	16	11.7	40	11.0	49	16.9	34	16.2
No, I don't plan to.	55	74.3	277	70.7	121	88.3	323	89.0	241	83.1	176	83.8
Total	74	100.0	392	100.0	137	100.00	363	100.0	290	100.0	210	100.0

In the **Kyrgyz Republic**, 30.9% of respondents with incomes between 6,001 and 20,000 soms plan to change their heating system, while among those earning more than 20,000 soms the figure is 27.7%.

In **Tajikistan**, 13.5% of respondents with income from 800 to 2,400 somonis and 9.5% of respondents with higher income plan to change the system of off-grid heating.

In **Uzbekistan**, approximately 17% of both groups plan to change their autonomous heating system in the next five years, including by relocation.

Table 6.23: Do you plan to change your off-grid heating system in the next five years, including by relocation? (by income)

Answer options	Kyrgyz Republic				Tajikistan				Uzbekistan			
	6,001 - 20,000 soms (39,1%)		More than 20,000 soms (58%)		800-2,400 somonis (31%)		More than 2,400 somonis (44,4%)		Less than 1,200,000 - 3,200,000 soms (41%)		More than 3,200,000 sums (50,8%)	
	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%
Yeah, I plan to	58	30.9	73	27.7	21	13.5	21	9.5	34	16,6	41	16,1
No, I don't plan to	130	69.1	191	72.3	134	86.5	201	90.5	171	83,4	213	83,9
Total	188	100.0	264	100.0	155	100.0	222	100.0	205	100,0	254	100,0

Note: Number of respondents from the total sample with a given income

Respondents from the **Kyrgyz Republic**, planning to change the heating system, most often think to switch to “smart boilers” (36.6%), electricity (31.3%). 10.5% plan to switch to district heating, 10.4% - to steam heating, 8.2% - to gas heating. 3% of respondents intend to switch to solar panels.

Respondents from **Uzbekistan** plan to switch to gas (30.1%) and electricity (28.9%) heating systems. 18.1% plan to switch to district heating system, 13.3% - to coal. 9.6% of respondents want to switch to solar panels.

All respondents from **Tajikistan** who answered that they want to change their heating system plan to switch to an electric heating system.

Table 6.24: Type of heating respondents plan to switch to

Answer options	Kyrgyz Republic		Tajikistan		Uzbekistan	
	N=134		N=56		N=83	
	Qty	%	Qty	%	Qty	%
District heating	14	10.5	-	-	15	18.1
Gas	11	8.2	-	-	25	30.1
Electricity	42	31.3	56	100.0	24	28.9
Coal	-	-	-	-	11	13.3
Solar panels	4	3.0	-	-	8	9.6
Answers are recorded from the words of the respondents						
Steam heating	14	10.4	-	-	-	-
“Smart Boiler” ¹⁰	49	36.6	-	-	-	-
Total	134	100.0	56	100.0	83	100.0

Note: This question is only answered by those respondents who have off-grid or mixed heating and want to change the heating system

¹⁰ “Smart Boiler” is an automatic coal-fired boiler that is heated with culm (fine coal), which does not require constant attention and labor-intensive

134 heads of households in the Kyrgyz Republic plan to change the type of heating and mainly plan to put automatic boilers in the houses of 47 respondents ("smart boiler") because of new technical solutions (regulation of heating level, etc.), convenience, time saving. Also, some respondents plan to switch completely to electricity (42 respondents), as it is more convenient for them, saves time. 14 respondents plan to switch to district heating system or steam heating, 11 respondents - to gas, 4 respondents - to solar panels.

The main reason for all respondents who plan to change their heating system is problems with the existing system.

Table 6.25: What is the reason you are planning to change your heating system?

Answer options	Kyrgyz Republic N=134											
	"Smart Boiler" N=49 (36.6%)		Electricity N=42 (31.3%)		District heating N=14 (10.5%)		Steam heating N=14 (10.4%)		Gas N=11 (8.2%)		Solar panels N=4 (3.0%)	
Problems with the existing system	13	27.7	13	31.0	4	28.6	4	28.6	4	36.4	1	25.0
Access to infrastructure (gas pipeline/district heating) is/will be available	1	2.1	5	11.9	3	21.4	1	7.1	1	9.1	-	-
For financial expenditure reasons	10	34.5	8	19.0	1	7.1	3	21.4	2	18.2	1	25.0
It is possible to take a loan/credit for this purpose	-	-	1	2.4	1	7.1	-	-	-	-	-	-
New technical solutions (heating level control, etc.) have been introduced.	19	40.4	19	45.2	1	7.1	3	21.4	1	9.1	2	50.0
For environmental reasons (environmental protection, health protection)	4	8.5	5	11.9	1	7.1	1	7.1	3	27.3	1	25.0
Convenience, time saving	19	40.4	17	40.5	1	7.1	5	35.7	4	36.4	2	50.0
Climate / winter warming	-	-	2	4.8	1	7.1	1	7.1	1	9.1	-	-
Climate / winter cooling	4	8.5	1	2.4	4	28.6	-	-	-	-	-	-
Answers are recorded from the words of the respondents												
To keep all the rooms heated	1	50.0	-	-	-	-	1	7.1	-	-	-	-
To prevent a fire	-	-	-	-	-	-	1	7.1	-	-	-	-

Note: The sum does not equal 100%, as respondents could mark more than one answer option

56 Tajikistani heads of HHs planning to change the heating system and switch to electricity will do so because of problems with the existing system, colder winters and for convenience and time saving.

maintenance. Once a week coal is put in, the boiler distributes and heats the house evenly. Coal consumption in automatic boilers is less than in traditional boilers (an average of 1.5-2 times). Automatic continuous burning coal-fired boilers use fractional coal up to 50 mm, and during its combustion there is a more complete combustion of fuel, due to which the ash is much less and removed once every 4-7 days (putting fuel in).

Table 6.26: What is the reason you are planning to change your heating system?

Answer options	Tajikistan Electricity N=56 (100.0%)	
Problems with the existing system	14	25.0
Climate / winter cooling	14	25.0
Convenience, time saving	11	19.6
Access to infrastructure (gas pipeline/district heating) is/will be available	8	14.3
For financial expenditure reasons	8	14.3
For environmental reasons (environmental protection, health protection)	8	14.3
New technical solutions (heating level control, etc.).	6	10.7
Climate / winter warming	3	5.4
It is possible to take a loan/credit for this purpose	-	-
Difficult to answer	1	1.8

Note: The sum does not equal 100%, as respondents could mark more than one answer option

83 heads of HHs in Uzbekistan plan to change the heating system to gas (25 respondents), electricity (24 respondents), district heating (15 respondents), coal (11 respondents), solar panels (8 respondents).

Respondents will connect to gas as there is/are access to infrastructure (gas pipeline/district heating), there are new technical solutions (regulation of heating level, etc.).

Electricity is attractive because it is cheaper according to respondents than the existing heating system.

Respondents will connect to the district system because of new technical solutions (regulation of heating level, etc.), access to infrastructure (gas pipeline/district heating) is/will be available, due to financial expenditures.

One thing they all have in common is problems with the existing heating system.

Table 6.27: What is the reason you are planning to change your heating system?

Answer options	Uzbekistan N=83									
	Gas N=25 (30.1%)		Electricity N=24 (28.9%)		District heating N=15 (18.1%)		Coal N=11 (13.3%)		Solar panels N=8 (9.6%)	
Problems with the existing system	12	38.7	8	25.8	3	9.7	6	19.4	2	6.5
Access to infrastructure (gas pipeline/district heating) is/will be available	3	27.3	3	27.3	3	27.3	2	18.2	-	-
For financial expenditure reasons	2	14.3	4	28.6	4	28.6	2	14.3	2	14.3
It is possible to take a loan/credit for this purpose	1	25.0	-	-	-	-	-	-	3	75.0
New technical solutions (heating level control, etc.).	3	27.3	2	18.2	4	36.4	-	-	2	18.2
For environmental reasons (environmental protection, health protection)	-	-	2	100.0	-	-	-	-	-	-
Convenience, time saving	7	46.7	4	26.7	3	20.0	-	-	1	6.7
Climate / winter cooling	1	14.3	4	57.1	-	-	2	28.6	-	-

Note: The sum does not equal 100%, as respondents could mark more than one answer option

6.9 Controlling the temperature in the household during the winter period

In the **Kyrgyz Republic**, half of respondents (51.5%) control the household temperature in winter by turning equipment on and off as needed. 31.3% have the ability to regulate the temperature manually. 12.4% of respondents set one temperature and leave it on most of the time.

In **Tajikistan**, households mainly regulate household temperature manually (32%) and by turning equipment on and off (27.8%). 30.4% of respondents from Tajikistan set one temperature and leave it on for a long time.

Respondents from **Uzbekistan** more often adjust the temperature manually (35%). More than a third

(26%) of respondents set one temperature and leave it on most of the time.

In the Kyrgyz Republic 21% of respondents noted that there is **no possibility to control the temperature in winter**, in Tajikistan this indicator is 14.8%, in Uzbekistan 30.8%.

Table 6.28: Which of the following best describes how your household controls the temperature of the house in winter?^a

Answer options	Kyrgyz Republic		Tajikistan		Uzbekistan	
	N=466		N=500		N=500	
	Qty	% ^b	Qty	% ^b	Qty	% ^b
Set one temperature and leave it at that temperature most of the time	58	12.4	152	30.4	130	26.0
Adjusting the temperature manually	146	31.3	160	32.0	175	35.0
Turn equipment on or off as needed	240	51.5	139	27.8	75	15.0
There is no temperature control option in our household	98	21.0	74	14.8	154	30.8
Answers are recorded from the words of the respondents						
Using a thermometer	2	0.4	-	-	-	-

Note:

^a This question is answered only by those respondents who have off-grid or mixed heating.

^b The sum does not equal 100% because respondents could mark more than one answer option.

6.10 Controlling the temperature in the household during the summer period

67.8% of respondents from the Kyrgyz Republic, 20.8% of respondents from Tajikistan and 36.4% of respondents from Uzbekistan **do not have the ability to control household temperature in summer**.

Respondents who *turn on equipment at one temperature* and leave it on for long periods of time are more likely to do so in Uzbekistan (15.2%) and Tajikistan (16.6%) than in the Kyrgyz Republic (0.6%).

All three countries primarily control temperature by manually adjusting the temperature and by turning equipment on or off as needed about equally.

Table 6.29: Which of the following best describes how your household controls the temperature of your house in the summer?

Answer options	Kyrgyz Republic		Tajikistan		Uzbekistan	
	N=522		N=500		N=500	
	Qty	%	Qty	%	Qty	%
Set one temperature and leave it at that temperature most of the time	3	0.6	83	16.6	76	15.2
Adjusting the temperature manually	55	10.5	172	34.4	138	27.6
Turn equipment on or off as needed	78	14.9	158	31.6	113	22.6
There is no temperature control option in our household	354	67.8	104	20.8	182	36.4
Answers are recorded from the words of the respondents						
Opening windows and doors	40	7.7	-	-	-	-
Closing windows and curtains	-	-	1	0.2	-	-

Note: The sum does not equal 100% because respondents could have marked more than one answer option.

Summary of findings

This chapter discusses various aspects of off-grid heating in households in the Kyrgyz Republic, Tajikistan and Uzbekistan, included in the Fergana Valley.

Off-grid heating is an off-grid heating system for an apartment or house, which is not in contact with external district systems.

The survey involved 466 households in the Kyrgyz Republic, 500 HHs in Tajikistan and 500 HHs in Uzbekistan with off-grid or mixed heating.

In all countries, the main heating is through stoves and electric heaters. In the Kyrgyz Republic also

boilers are used for heating, in Tajikistan and Uzbekistan - air conditioners, fireplaces, boilers, floor heating.

In winter the main source of energy for the Kyrgyz Republic is coal, for Tajikistan - electricity, coal, firewood, for Uzbekistan - coal, gas, electricity.

Kyrgyzstani respondents on average paid 5,349.84 Kyrgyz Republic soms (approximately 60 USD) per month for heating in the last three heating seasons. Respondents from Tajikistan paid on average 1,590 Tajikistan somonis (approximately 145 USD) per month for heating in the last 3 heating seasons. On average, respondents from Uzbekistan paid 853,068.89 Uzbekistan sums (approximately 70 USD) per month for heating in the last 3 heating seasons.

Only one type of energy source is used by 26.2% (131 HHs) of Tajikistanis, 17% (79 HHs) of Kyrgyzstanis, 2.2% (11 HHs) of Uzbekistanis. Most households use more than one type of heating during the heating season.

The main reasons for using several types of heating are the high cost of the main source (Kyrgyz Republic), supply interruptions and high cost of the main source (Tajikistan), supply interruptions (Uzbekistan).

Rural residents (60.5%) of the Kyrgyz Republic use several types of energy sources more than urban residents (48.6%) because of the high cost of the main source. There is not much difference in the responses of urban and rural Tajikistanis: mainly due to interruptions in supply and high cost. Uzbekistanis are also united in their answers, and both urban and rural residents use several types of energy sources due to supply interruptions.

In the Kyrgyz Republic, more affluent groups use several types of energy sources because of interruptions in the supply of the main source. In Tajikistan, more affluent HHs use several types of energy sources due to the high cost of the main source. The lowest income group in Uzbekistan cited interruptions in supply as the reason for using several types of energy sources. In Uzbekistan, there is no difference in the answers of respondents of the two income groups; both groups indicated supply interruptions as reasons for using several types of energy sources.

Heads of households in the Kyrgyz Republic are mainly guided by two factors when choosing the main source of heating: uninterruptedness/reliability of supply (41.2%) and financial resources (30.9%). Heads of households in Tajikistan mentioned the following reasons: least harm to the environment (31.6%), financial resources (28.6%). Heads of HHs of Uzbekistan: financial resources (35%), uninterruptedness/reliability of supply (28%).

77 households or 16.6% of respondents in the Kyrgyz Republic and 100 households or 20% of respondents in Uzbekistan base their choice simply on the heating system already in place. In Tajikistan, this factor (presence of an existing system) is absent.

When selecting the main source of heating, female heads of households in all three countries are guided by considerations of the least financial burden. Men in the Kyrgyz Republic and Uzbekistan are guided by considerations of the uninterruptedness/reliability of energy supply, in Tajikistan - by the least impact and harm to the environmental system.

For rural residents of the Kyrgyz Republic, the uninterruptedness/reliability of energy supply is important when choosing the main source of heating, for urban residents - financial expenditures. For rural residents of Tajikistan - financial expenditures, for urban residents - the least harm to the environment are the factors in choosing the main heating source. For urban residents of Uzbekistan - financial expenditures, for rural residents - continuity of supply are the main reasons for choosing the main heating source.

High-income households in the Kyrgyz Republic are guided by the uninterruptedness/reliability of supply when choosing the main source of heating, regardless of income, most households are guided by considerations of financial expenditures. Respondents in Tajikistan, who noted that they have a higher income do not want to harm the environment when choosing a heating source, those with lower incomes do not want to harm the health of loved ones and proceed from considerations of the least financial burden. The lower income group in Uzbekistan, when choosing the main source of heating, is guided by the availability of financial resources.

Heads of households from the Kyrgyz Republic heat their houses for 4 to 6 months, with all winter months (December, January, February) and partially October, November, March. Heads of households from Tajikistan heat their houses for 3 to 8 months, starting in September and ending in May. Heads of households from Uzbekistan heat their houses for 3 to 6 months, from October to April.

The majority of Kyrgyzstanis (72.1%), 40.8% of Tajikistanis, and 0.2% of Uzbekistanis noted that they had no problems of non-financial nature with heating last winter.

The main non-financial difficulties related to heating in winter in the Kyrgyz Republic are associated with power outages (7.1%), lack of coal (4.9%), house heating problems (4.1%). In Tajikistan with power outage (35.2%), in Uzbekistan - with power outage (99.4%), low gas pressure (99%). This question was open-ended, i.e. respondents gave their own answer.

Last winter, 66.7% of Kyrgyzstanis (33.3% had problems), 30.8% of Tajikistanis (69.2% had problems), and 2.2% of Uzbekistanis (97.8% had problems) did not have supply interruptions or difficulties with heating.

Supply interruptions occurred several times a quarter for Kyrgyzstanis (14%), several times a week for Tajikistanis (26.4%), and several times a week for Uzbekistanis (58.8%).

19 HHs in the Kyrgyz Republic that have off-grid or mixed heating and had difficulties with heating in the last winter (2022-2023) changed their heating system in the last five years, switching from electricity to coal (7 HHs), from coal to electricity (8 HHs), from coal to steam heating (4 HHs). 55 HHs in Tajikistan, which also experienced difficulties with heating in the last winter, changed their heating system mainly from coal to electricity (35 HHs). 39 HHs in Uzbekistan also switched to a different heating system, mainly from coal to electricity.

28.8% (134 HHs) of Kyrgyzstanis, 11.2% (56 HHs) of Tajikistanis and 16.6% (83 HHs) of Uzbekistanis are planning to change the system of off-grid heating in the next five years, including by relocation.

In the Kyrgyz Republic more rural people (29.3%) than urban people (25.7%), in Tajikistan equally 11% of urban and rural people, in Uzbekistan also equally 16% of urban and rural people plan to change the heating system.

HHs with lower incomes plan to change the off-grid heating system: in the Kyrgyz Republic 30.9% (high income group - 27.7%), in Tajikistan 13.5% (high income group 9.5%), in Uzbekistan 17.0% (high income groups: 1,200,000 – 3,200,000 sums 16.5%, more than 3,200,000 sums 16.1%).

More male than female heads of households plan to change the off-grid heating system in the next five years, including by relocation: Kyrgyz Republic men 32.4%, women - 25%, Tajikistan men - 12.7%, women - 9.8%, Tajikistan men - 19.1%, women 13.9%.

Mostly respondents aged 18-45 years plan to change the heating system in the Kyrgyz Republic, 30-60 years old in Tajikistan, and 18-45 years old in Uzbekistan.

In the Kyrgyz Republic, more rural residents (29.3%) than urban residents (25.7%), in Tajikistan, 11% of urban and rural residents are equally likely, and in Uzbekistan, 16% of urban and rural residents are also planning to change the heating system.

Differences in income among respondents planning a relocation are not clearly visible.

Kyrgyz people are planning to switch to “smart boilers” systems, to electricity, district and steam heating. A “smart boiler” is an automatic coal-fired boiler that is heated with culm (fine coal), which does not require constant attention and labor-intensive maintenance. Once a week coal is put in, the boiler distributes and heats the house evenly. Coal consumption in automatic boilers is less than in traditional boilers (an average of 1.5-2 times). Automatic continuous burning coal-fired boilers use fractional coal up to 50 mm, and during its combustion there is a more complete combustion of fuel, due to which the ash is much less and removed once every 4-7 days (putting fuel in).

Tajikistanis are planning to switch to electric heating, Uzbekistanis to gas, electricity and district heating.

134 respondents from the Kyrgyz Republic, 56 from Tajikistan and 83 from Uzbekistan plan to change their heating system. Kyrgyzstanis plan to switch mainly to smart boilers and electricity, Tajikistanis to electricity, and Uzbekistanis to gas and electricity.

The main reason for the majority of respondents from three countries is problems with the existing heating system. The emergence of new technical solutions attracts the heads of households and promotes the change of heating systems. Expected lower financial expenditures are another motive.

21% of Kyrgyzstanis, 14.8% of Tajikistanis, and 30.8% of Uzbekistanis do not control the temperature in the house due to lack of regulation. One of the main ways of control is manual regulation of temperature or use of household appliances when necessary.

In summer, 67.8% of Kyrgyzstanis, 20.8% of Tajikistanis, and 36.4% of Uzbekistanis do not control the temperature. Manual temperature control of air conditioners, fans, etc. is the main way to control the temperature, as well as the use of household appliances when necessary.

7. DWELLING COOLING

7.1 Cooling systems in the household

40.2% of respondents from the Kyrgyz Republic and 35.2% of respondents from Tajikistan **do not have any equipment for dwelling cooling**. The answer "there is no cooling system in our house" was given by 14.4% of Uzbekistanis.

In Uzbekistan and the Kyrgyz Republic, the most common technique for cooling the air is **a fan**, with 70.8% of Uzbekistan respondents and 51.3% of the Kyrgyz Republic respondents having one. In Tajikistan, the number of respondents using a fan (36%) and **an air conditioner** (35.4%) is approximately equal.

Accordingly, 20.6% of the interviewed Uzbekistanis and 9.2% of the Kyrgyzstanis have air conditioner.

Table 7.1: Which cooling system is in your house?

Answer options	Kyrgyz Republic		Tajikistan		Uzbekistan	
	Qty	%	Qty	%	Qty	%
Air conditioner	48	9.2	177	35.4	103	20.6
Fan	268	51.3	180	36.0	354	70.8
Sun protection films for windows	2	0.4	36	7.2	4	0.8
No cooling system in our house	210	40.2	176	35.2	72	14.4

Note: The sum does not equal 100%, as respondents may have marked more than one answer option.

At the same time, more than half of respondents from the **Kyrgyz Republic** (53.8%) who do not have a cooling system in the house also do not plan to have one. 62.5% of **Uzbekistani** respondents and 38.1% of **Tajikistani** respondents who do not have house cooling equipment have no intention to connect cooling systems.

More than a third of respondents from the **Kyrgyz Republic** (38.1%) and **Uzbekistan** (36.1%), 11.9% of respondents from **Tajikistan** plan to purchase appliances for house cooling. Half of respondents from Tajikistan found it difficult to answer the question.

Table 7.2: Do you plan to connect a cooling system?

Answer options	Kyrgyz Republic N=210		Tajikistan N=176		Uzbekistan N=72	
	Qty	%	Qty	%	Qty	%
Yes	80	38.1	21	11.9	26	36.1
No	113	53.8	67	38.1	45	62.5
Difficult to answer	17	8.1	88	50.0	1	1.4
Total	210	100.0	176	100.0	72	100.0

Note: Only those respondents who do not have a cooling system in their house answer this question

7.2 Energy sources of the cooling system in summer

The main source of energy for house cooling in all surveyed areas is electricity. 0.6% of respondents from Tajikistan use solar panels.

Table 7.3: What energy sources do you use to cool your house during the summer season?^a

Answer options	Kyrgyz Republic N=312		Tajikistan N=324		Uzbekistan N=428	
	Qty	% ^b	Qty	% ^b	Qty	% ^b
Electricity	304	97.4	226	69.8	392	91.6
Solar panels	-	-	2	0.6	-	-
I never cool the house down	8	2.6	84	25.9	36	8.4
Difficult to answer	-	-	13	4.0	-	-

Note:

^a Only respondents who have a cooling system in their house answer this question.

^b The sum does not equal 100% because respondents could mark more than one answer option.

7.3 Cooling period: months, number of days

Respondents-heads of households from the **Kyrgyz Republic** noted that they cool their houses for 2-3 months, in **Tajikistan** for 2-4 months, and in **Uzbekistan** for 2-3 months.

Table 7.4: How many months of the year is your house cooled?

Months	Kyrgyz Republic		Tajikistan		Uzbekistan	
	N=304		N=240		N=392	
	Qty	%	Qty	%	Qty	%
1	30	9.9	18	7.5	30	7.7
2	142	46.7	65	27.1	178	45.4
3	116	38.2	109	45.4	184	46.9
4	12	3.9	29	12.1	-	-
5	3	1.0	18	7.5	-	-
6	1	0.3	1	0.4	-	-
Total	304	100.0	240	100.0	392	100.0

Note: Only respondents who have a cooling system in their house and use sources to cool their house answer this question.

According to the survey results, cooling of dwelling in the **Kyrgyz Republic** starts in May and ends in August-September, however, the largest proportion of respondents turn on the systems in June (81.3%), July (99%).

In **Tajikistan**, cooling appliances are started in April and completed in September, but most respondents use them in June (67.9%), July (100%), and August (90%).

In **Uzbekistan**, respondents who use cooling appliances turn them on in June (86.7%), July (99.7%), and August (52.8%).

Table 7.5: Mark the months in which the house is cooled and how many days per month do you cool the house?

Months	Kyrgyz Republic			Tajikistan			Uzbekistan		
	Cooling		How many days do you cool your house on average	Cooling		How many days do you cool your house on average	Cooling		How many days do you cool your house on average
	Qty	%		Qty	%		Qty	%	
January	-	-	-	-	-	-	-	-	-
February	-	-	-	-	-	-	-	-	-
March	-	-	-	-	-	-	-	-	-
April	-	-	-	4	1.7	14	-	-	-
May	14	4.6	18	48	20.0	27	-	-	-
June	247	81.3	23	163	67.9	29	340	86.7	24
July	301	99.0	27	240	100.0	30	391	99.7	31
August	160	52.6	23	216	90.0	29	207	52.8	25
September	8	2.6	17	16	6.7	21	-	-	-
October	1	0.3	15	-	-	-	-	-	-
November	-	-	-	-	-	-	-	-	-
December	-	-	-	-	-	-	-	-	-

Note: Only respondents who have a cooling system in their house answer this question.

7.4 Plans related to changes in the cooling system

The majority of respondents in the surveyed areas do not plan to change their house cooling system. In the **Kyrgyz Republic**, one third of respondents who have a cooling system plan to change the cooling system. In **Uzbekistan** - 28.8%, in **Tajikistan** - 15.8%.

Table 7.6: Do you plan to change the cooling system?

Answer options	Kyrgyz Republic		Tajikistan		Uzbekistan	
	N=304		N=240		N=392	
	Qty	%	Qty	%	Qty	%
Yes	102	33.6	38	15.8	113	28.8
No, I don't plan to.	202	66.4	202	84.2	279	71.2
Total	304	100.0	240	100.0	392	100.0

Note: Only respondents who have a cooling system in their house answer this question.

In the **Kyrgyz Republic**, all respondents planning to change their cooling system intend to switch to **air conditioners**. 65.8% of respondents from **Tajikistan** intend to switch to air conditioners, 34.2% - to fans. In **Uzbekistan**, 89.4% plan to switch to air conditioners and 7.1% to fans.

Table 7.7: Cooling systems that respondents plan to switch to

Answer options	Kyrgyz Republic		Tajikistan		Uzbekistan	
	N=102		N=38		N=113	
	Qty	%	Qty	%	Qty	%
Yes, I want to switch to using air conditioner	102	100.0	25	65.8	101	89.4
Yes, I want to switch to using fan	-	-	13	34.2	8	7.1
I want to stop using the air conditioner/fan	-	-	-	-	4	3.5

Note: This question is only answered by respondents who have a cooling system in their house and plan to change their cooling system.

In the **Kyrgyz Republic**, the main arguments in favor of changing the system more often are:

- insufficient cooling generated by the appliance in use (73.5%),
- emergence of new technical solutions (48%),
- climate warming (22.5%).

The most common reasons for changing an existing cooling system in **Tajikistan** are:

- insufficient cooling generated by the appliance in use (60.5%),
- climate warming (42.1%).
- emergence of new technical solutions (21.1%).

In **Uzbekistan**, respondents in Uzbekistan were more likely to change their cooling system for the following reasons:

- insufficient cooling generated by the appliance in use (41.6%),
- emergence of new technical solutions (29.2%),
- environmental protection, health protection, etc. (25.7%),
- financial considerations (16.8%).

Table 7.8: For what reason do you plan to change the cooling system?^a

Answer options	Kyrgyz Republic		Tajikistan		Uzbekistan	
	N=102		N=38		N=113	
	Qty	% ^b	Qty	% ^b	Qty	% ^b
The existing system doesn't cool enough	75	73.5	23	60.5	47	41.6
For financial expenditure reasons	1	1.0	3	7.9	19	16.8
There are new technical solutions, improvements	49	48.0	8	21.1	33	29.2
For environmental reasons (environmental protection, health protection, etc.)	10	9.8	3	7.9	29	25.7
Climate warming (summers are getting hotter)	23	22.5	16	42.1	-	-
Difficult to answer	-	-	-	-	3	2.7

Note:

^a Only respondents who have a cooling system in their house and plan to change their cooling system answer this question.

^b The sum does not equal 100% because respondents could mark more than one answer option.

Summary of findings

Many households surveyed do not have cooling systems in the dwelling (40.2% in the Kyrgyz Republic, 35.2% in Tajikistan, 14.4% in Uzbekistan). Fans are the most common equipment for cooling air in Uzbekistan and the Kyrgyz Republic, while in Tajikistan the number of users of fans and air conditioners is approximately equal (35% each). Significantly fewer households have air conditioners in the Kyrgyz Republic (9.2%) and Uzbekistan (20.6%)

The intention to purchase a cooling system was expressed by 38.1% of respondents from the Kyrgyz Republic and 36.1% of respondents from Uzbekistan, 11.9% of respondents from Tajikistan.

The main source of energy for cooling dwellings in all regions is electricity (more than 90% of respondents from the Kyrgyz Republic and Uzbekistan). Solar panels are used in a small percentage of cases only in Tajikistan (0.6%).

Houses are cooled for 2-4 months, with most turning on cooling systems in June, July and August. The time frame for this process varies in each of these countries: in the Kyrgyz Republic from May to September, in Tajikistan from April to September, and in Uzbekistan from June to August.

The majority of households in the Kyrgyz Republic (66.4%), in Tajikistan (84.2%), in Uzbekistan (71.2%) do not plan to change the cooling system of their dwelling.

When changing the cooling system, the preference is for air conditioners in all three countries, and in Tajikistan there is also a noticeable interest in fans.

The reasons for changing cooling systems vary from insufficient cooling to changing climatic conditions, depending on the region. The emergence of new technical solutions is one of the reasons for changing the cooling system.

8. COOKING

8.1 Main source of energy in the household for cooking

In the **Kyrgyz Republic**, firewood (37.9%), electricity (29.7%) and natural gas from underground pipes (17.5%) are more often used for cooking. Respondents also mentioned such sources as propane in bottles (6.3%), hard coal (5.9%), and kizyak-cow muck (2.7%).

More than half of respondents from **Tajikistan** (53.6%) use electricity for cooking, a quarter of respondents cook with firewood. 12.2% of respondents cook with propane in bottles, 2.4% use kizyak-cow muck.

The main source of energy used by respondents from **Uzbekistan** is gas - propane in bottles (54.2%) and natural gas from underground pipes. Such sources as firewood (2.8%), hard coal (1.6%), electricity (1.6%) are used very little.

Table 8.1: What is the main source of energy used in your household for cooking?

Answer options	Kyrgyz Republic		Tajikistan		Uzbekistan	
	Qty	%	Qty	%	Qty	%
Hard coal	31	5.9	10	2.0	8	1.6
Natural gas from underground pipes	91	17.5	15	3.0	198	39.6
Propane (bottled gas)	33	6.3	61	12.2	271	54.2
Electricity	155	29.7	268	53.6	8	1.6
Firewood	198	37.9	126	25.2	14	2.8
Waste and garbage (rubber, plastic, paper, etc.)	-	-	2	0.4	-	-
Biofuel (kizyak-cow muck)	14	2.7	12	2.4	1	0.2
Difficult to answer	-	-	6	1.2	-	-
Total	522	100.0	500	100.0	500	100.0

Urban residents from the **Kyrgyz Republic** named natural gas from underground pipes (61.5%) and electricity (22.3%) as the main source of energy for cooking. Rural residents use firewood (48%) and electricity (32%).

Tajikistani urban residents mainly use electricity 62.9%, firewood 19.7%, and bottled gas 10.2%, as do rural residents (50.1% electricity, 27.3% firewood, 12.9% gas).

In **Uzbekistan**, both urban and rural residents use propane (urban 43.2%, rural 69.5%) and natural gas (urban -natural gas 50.3%, propane 43.2%) as their primary source for cooking.

Biofuels (cow muck) are mainly used in rural areas.

Table 8.2: What is the main source of energy used in your household for cooking? (by type of settlement)

Answer options	Kyrgyz Republic				Tajikistan				Uzbekistan			
	Urban		Rural		Urban		Rural		Urban		Rural	
	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%
Hard coal	1	0.8	30	7.7	1	0.7	9	2.5	3	1.0	5	2.4
Natural gas from underground pipes	80	61.5	11	2.8	8	5.8	7	1.9	146	50.3	52	24.8
Propane (bottled gas)	10	7.7	23	5.9	14	10.2	47	12.9	125	43.2	146	69.5
Electricity	29	22.3	126	32.0	86	62.9	182	50.1	5	1.7	3	1.4
Firewood	10	7.7	188	48.0	27	19.7	99	27.3	10	3.5	4	1.9
Waste and garbage (rubber, plastic, paper, etc.)	-	-	-	-	-	-	2	0.6	-	-	-	-
Biofuel (kizyak-cow muck)	-	-	14	3.6	1	0.7	11	3.0	1	0.3	-	-
Difficult to answer	-	-	-	-	-	-	6	1.7	-	-	-	-
Total	130	100.0	392	100.0	137	100.0	363	100.0	290	100.0	210	100.0

Electricity (50%), firewood (32%), coal (22.8%) and kizyak-cow muck (20.3%) are used by **Kyrgyzstani** respondents as additional sources of energy for cooking.

As an additional energy source, respondents from **Tajikistan** use electricity (29.4%), firewood (20%)

and propane in bottles (18.8%) and kizyak-cow muck (16.8%). 38.4% of respondents do not use additional energy sources for cooking.

The majority of respondents (70.8%) from **Uzbekistan** use firewood as an additional source of energy for cooking. Electricity (19.8%) and propane in bottles (13.6%) are also used.

Table 8.3: What additional source of energy do you use in your household for cooking?

Answer options	Kyrgyz Republic		Tajikistan		Uzbekistan	
	Qty	%	Qty	%	Qty	%
Hard coal	119	22.8	69	13.8	12	2.4
Natural gas from underground pipes	6	1.1	14	2.8	1	0.2
Propane (bottled gas)	33	6.3	94	18.8	68	13.6
Electricity	261	50.0	147	29.4	99	19.8
Firewood	167	32.0	100	20.0	354	70.8
Waste and garbage (rubber, plastic, paper, etc.)	-	-	49	9.8	1	0.2
Biofuel (kizyak-cow muck)	106	20.3	84	16.8	16	3.2
We don't use it	30	5.7	192	38.4	11	2.2
Difficult to answer	-	-	3	0.6	7	1.4

Note: The sum does not equal 100%, as respondents may have marked more than one answer option.

In the **Kyrgyz Republic**, 51.1% of respondents among the reasons for using multiple sources of energy for cooking noted that it is very convenient. They are also guided by considerations of saving money (37.2%). Another reason is interruptions in the supply of the main source of energy (13.6%).

Survey participants in **Tajikistan** use several types of energy sources for cooking because of interruptions in the supply of the main source (37.4%) and because of high cost, for the sake of saving money (24.9%). But the main reason is convenience (58.0%)

In **Uzbekistan** (69.8%), the reason for using multiple energy sources is interruptions in the supply of the main energy source. For one third of households, it is convenient to use alternative options.

Table 8.4: If you use multiple energy sources for cooking, for what reason?

Answer options	Kyrgyz Republic		Tajikistan		Uzbekistan	
	Qty	%	Qty	%	Qty	%
Due to interruptions in the supply of the main source	71	13.6	114	37.4	349	69.8
Because it's expensive, to save money	194	37.2	76	24.9	40	8.0
Convenience	267	51.1	177	58.0	149	29.8
Difficult to answer	3	0.6	21	6.9	2	0.4
Answers are recorded from the words of the respondents						
We use only one type of energy source	30	5.7	-	-	-	-
To taste good	2	0.4	-	-	-	-

Note: The sum does not equal 100%, as respondents may have marked more than one answer option.

8.2 Costs for the main source of energy for cooking in the summer period

67% of respondents from the **Kyrgyz Republic** pay less than 500 Kyrgyz Republic soms (less than about 6 USD) for the main source of energy used for cooking in summer. On average - 503.60 soms (6-7 USD)¹¹.

¹¹ Exchange rates are current for the time of fieldwork (end of July - first half of August 2023)

Table 8.5: How much do you pay for the main source of energy you use for cooking per month on average in summer? (in local currency)

Answer options	Kyrgyz Republic	
	Qty	%
Less than 500 soms	350	67.0
501 - 1,000 soms	81	15.6
1,001 - 1,500 soms	19	3.6
1,501 - 2,000 soms	10	1.9
More than 2,001 soms	5	1.0
We don't pay for coal/wood/kizyak-cow muck etc.	57	10.9
Total	522	100.0

Half of respondents from **Tajikistan** (52.6%) answered that they do not pay for coal, firewood and kizyak-cow muck used for cooking in summer. More than a third of respondents found it difficult to name the amount they pay for the energy source used for cooking. On average - 139.31 somonis (12-13 dollars)¹².

Table 8.6: How much do you pay for the main source of energy you use for cooking per month on average in summer? (in local currency)

Answer options	Tajikistan	
	Qty	%
Less than 100 somonis	35	7.0
101 - 200 somonis	5	1.0
201 - 300 somonis	6	1.2
301 - 400 somonis	3	0.6
Over 401 somonis	2	0.4
We don't pay for coal/wood/kizyak-cow muck etc.	263	52.6
Difficult to answer	186	37.2
Total	500	100.0

60% of respondents from **Uzbekistan** said that in summer they pay on average less than 150,000 sums (about 12 USD) per month for the main source of energy they use for cooking. The average is 168,071.12 sums (13-14 USD)¹³.

Table 8.7: How much do you pay for the main source of energy you use for cooking per month in average summer? (in local currency)

Answer options	Uzbekistan	
	Qty	%
Less than 150,000 sums	300	60.0
150,001 - 300,000 sums	144	28.8
301 001 - 450,000 sums	12	2.4
450,001 - 600,000 sums	6	1.2
More than 601,000 sums	2	0.4
We don't pay for coal/wood/kizyak-cow muck etc.	9	1.8
Difficult to answer	27	5.4
Total	500	100.0

Summary of findings

For cooking, households in the Kyrgyz Republic usually use firewood, electricity and natural gas, in Tajikistan - electricity, firewood, propane (bottled gas), in Uzbekistan - propane and natural gas.

Urban respondents in the Kyrgyz Republic noted that the main source of energy for cooking in HHs is natural gas, while rural respondents use firewood. In Tajikistan, urban and rural respondents use electricity.

¹² Exchange rates are current for the time of fieldwork (end of July - first half of August 2023)

¹³ Exchange rates are current for the time of fieldwork (end of July - first half of August 2023)

Uzbekistani urban respondents use more natural gas, rural respondents use gas in cylinders (propane).

Additional sources for Kyrgyzstani respondents are coal, biofuel, propane. At the same time, 5.7% of respondents do not use additional energy sources for cooking. Tajikistani respondents noted coal, natural gas, biofuel, waste and garbage as additional sources of energy. At the same time, 38.4% of respondents do not use an additional source of energy. In Uzbekistan, firewood, electricity, coal and biofuel are additionally used for cooking. 2.2% of respondents do not use additional sources.

The use of various energy sources for cooking is due to the following reasons: In the Kyrgyz Republic, households are looking for convenient and economical ways of doing so when faced with interruptions in main energy supplies. In Tajikistan, convenience comes first, but economy and supply problems are also important. In Uzbekistan, interruptions in energy supply are the main incentive, but for some household's convenience is also important when choosing alternative energy sources.

9. ELECTRICITY SUPPLY

9.1 Electricity meters in households

All respondents from the Kyrgyz Republic and Uzbekistan have electricity meters in their houses. 91.6% of respondents from Tajikistan have electricity meters.

Table 9.1: Does your household have a device/ “meter” that records electricity consumption?

Answer options	Kyrgyz Republic		Tajikistan		Uzbekistan	
	Qty	%	Qty	%	Qty	%
Yes	522	100.0	458	91.6	500	100.0
No	-	-	42	8.4	-	-
Total	522	100.0	500	100.0	500	100.0

The majority of respondents' household energy bills do not include expenses for energy used for purposes other than household purposes, such as farm buildings or equipment, small businesses. Such costs are included in household bills for 23.2% of respondents from **Tajikistan**, 8.2% of respondents from the **Kyrgyz Republic** and 4.4% of respondents from **Uzbekistan**.

Table 9.2: Do any of your household energy bills include energy used for non-domestic purposes such as farm buildings or equipment, small business?

Answer options	Kyrgyz Republic		Tajikistan		Uzbekistan	
	Qty	%	Qty	%	Qty	%
Yes	43	8.2	116	23.2	22	4.4
No	479	91.8	384	76.8	478	95.6
Total	522	100.0	500	100.0	500	100.0

9.2 Rolling blackouts

The practice of rolling blackouts is practiced in all three countries of the region. 77.2% of respondents from **Uzbekistan** answered that their locality practiced rolling blackouts, the same answer was given by 66.1% of respondents from the **Kyrgyz Republic** and 48.6% of respondents from **Tajikistan**.

Table 9.3: Does your community have scheduled power outages/rolling blackouts?

Answer options	Kyrgyz Republic		Tajikistan		Uzbekistan	
	Qty	%	Qty	%	Qty	%
Yes	345	66.1	243	48.6	386	77.2
No	177	33.9	257	51.4	114	22.8
Total	522	100.0	500	100.0	500	100.0

Rolling blackouts are more common in rural areas of the Kyrgyz Republic (67.3%) and Tajikistan (49.3%), while in urban areas these figures are 62.3% and 46.7%, respectively. In Uzbekistan, rolling blackouts are more common in rural areas (81%) than in urban areas (74.5%).

Table 9.4: Does your community have scheduled power outages/rolling blackouts? (by type of settlement)

Answer options	Kyrgyz Republic				Tajikistan				Uzbekistan			
	Urban		Rural		Urban		Rural		Urban		Rural	
	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%
Yes	81	62.3	264	67.3	64	46.7	179	49.3	216	74.5	170	81.0
No	49	37.7	128	32.7	73	53.3	184	50.7	74	25.5	40	19.0
Total	130	100.0	392	100.0	137	100.0	363	100.0	290	100.0	210	100.0

41.1% of respondents from the **Kyrgyz Republic** answered that usually electricity is cut off for "11-50

hours" per month, one third of respondents have no electricity for "51-100 hours" per month. A fifth of respondents have no electricity for "up to 10 hours" per month.

In **Tajikistan**, on average, electricity was usually cut off for 16 hours per month.

38.1% of respondents from **Uzbekistan** recorded power outages for "11-50 hours". 28.5% - for "51-100 hours", 24.4% - for "101 hours and more" per month.

Kyrgyz Republic experiences an average outage time of about 46 hours per month, while in **Tajikistan** this time is significantly shorter, averaging 16 hours per month. **Uzbekistan** stands out with the longest average outage time, reaching an average of 76 hours monthly.

Table 9.5: Approximately how many hours, on average, do power outages usually last per month?^a

Answer options	Kyrgyz Republic		Tajikistan		Uzbekistan	
	N=345		N=243		N=386	
	Average time 46 hours		Average time 16 hours		Average time 76 hours	
	Qty	%	Qty	%	Qty	%
Up to 10 hours	68	19.7	-	-	9	2.3
11 – 50 hours	142	41.1	138	56.8	147	38.1
51 - 100 hours.	111	32.2	-	-	110	28.5
101 hours or more	24	7.0	-	-	94	24.4
Very rarely, a few times a year	-	-	-	-	5	1.3
Difficult to answer	-	-	105	43.2	21	5.4
Total	345	100.0	243	100	386	100.0

Note:

^a This question is only answered by those respondents with electricity outages.

9.3 Financial problems in paying electricity bills and their solutions

The majority of respondents from the **Kyrgyz Republic** (82.8%) and **Tajikistan** (78.6%) **have no problems** paying their electricity bills. 24.8% of household heads from **Uzbekistan** also had no financial problems in paying their electricity bills in 2022-2023.

The remaining respondents indicated that they had financial problems to varying degrees: 75.2% of Uzbekistanis (376 HHs), 21.4% of Tajikistanis (107 HHs) and 17.2% of Kyrgyzstanis (90 HHs).

Table 9.6: Did you have financial problems paying your electricity bills in 2022-2023?

Answer options	Kyrgyz Republic		Tajikistan		Uzbekistan	
	Qty	%	Qty	%	Qty	%
Yes, big problems.	4	0.8	15	3.0	77	15.4
Yes, there's been a little trouble	21	4.0	14	2.8	248	49.6
Yes, there were minor problems	65	12.4	78	15.6	51	10.2
No	432	82.8	393	78.6	124	24.8
Total	522	100.0	500	100.0	500	100.0

Respondents from the **Kyrgyz Republic** who answered that they experienced financial problems in paying their electricity bills were more likely to experience them during the winter months: in January (76.7%), February (62.2%) and December (45.6%).

Respondents from **Tajikistan** who have financial problems with paying their electricity bills experience them throughout the year, but the largest proportion face them in December (21.5%), February (22.4%), March (20.6%), and April (21.5%).

December (84.3%), January (76.1%), February (67%) are the months in which most respondents from

Uzbekistan faced difficulties related to paying electricity bills.

Table 9.7: Please mark the months in which you had financial problems paying your electricity bill?

Answer options	Kyrgyz Republic N=90		Tajikistan N=107		Uzbekistan N=376	
	Qty	%	Qty	%	Qty	%
January	69	76.7	19	17.8	286	76.1
February	56	62.2	24	22.4	252	67.0
March	21	23.3	22	20.6	20	5.3
April	4	4.4	23	21.5	3	0.8
May	4	4.4	16	15.0	1	0.3
June	3	3.3	15	14.0	-	-
July	3	3.3	10	9.3	1	0.3
August	-	-	9	8.4	21	5.6
September	-	-	17	15.9	1	0.3
October	-	-	20	15.9	37	9.8
November	11	12.2	20	18.7	30	8.0
December	41	45.6	23	21.5	317	84.3

Note: Only respondents who have had financial problems paying their electricity bills answer this question.

Financial difficulties related to paying electricity bills were solved by **Kyrgyzstani** people by saving money (37.8%), reducing expenditures on necessities (21.1%), and borrowing money from relatives (22.2%).

The majority of respondents (75.7%) from **Tajikistan** solved their problems with electricity bills by borrowing money from relatives.

In **Uzbekistan**, half of respondents (48.9%) began to save more money, 39.6% of respondents borrowed money from relatives.

Table 9.8: How did you solve problems related to paying electricity costs?^a

Answer options	Kyrgyz Republic N=90		Tajikistan N=107		Uzbekistan N=376	
	Qty	% ^b	Qty	% ^b	Qty	% ^b
Took out a loan, loans from the bank	-	-	1	0.9	2	0.5
Borrowed money from loved ones	20	22.2	81	75.7	149	39.6
Started saving more	34	37.8	13	12.1	184	48.9
Reduced expenses for celebrations, vacations, etc.	10	11.1	10	9.3	10	2.7
Reduced spending on necessities (food, clothing, etc.)	19	21.1	12	11.2	2	0.5
Answers are recorded from the words of the respondents						
Worked more to pay for the electric bill	5	5.6	-	-	-	-
Paid the next month with penalties	10	11.1	-	-	-	-
Sold rice / dried apricot	3	3.3	-	-	-	-
No solution, debts piled up	-	-	-	-	34	9.0
We paid in one lump sum for several months	-	-	1	0.9	-	-

Note:

^a Only respondents who have had financial problems paying their electricity bills answer this question.

^b The sum does not equal 100% because respondents could mark more than one answer option.

9.4 Additional equipment for power generation

The vast majority of respondents in all three countries do not have electricity generating equipment. 13 respondents from Tajikistan, four respondents from Uzbekistan and two respondents from the Kyrgyz Republic indicated that they have a diesel generator as their own electricity generating equipment. And one respondent each from the Kyrgyz Republic and Uzbekistan use solar panels.

Table 9.9: Do you use your own electricity generating equipment?

Answer options	Kyrgyz Republic		Tajikistan		Uzbekistan	
	Qty	%	Qty	%	Qty	%
Yes	3	0.6	13	2.6	5	1.0
No	519	99.4	487	97.4	495	99.0
Total	522	100.0	500	100.0	500	100.0

9.5 Payment for electricity per month

On average for the last year respondents paid per month: in the Kyrgyz Republic, most respondents paid up to 1,000 soms for electricity (94.8%), for gas (32.6%, did not use gas-63.2%). More than 2,000 soms 67.9% of respondents paid for coal (15.3% did not buy coal), for heat supply 7.8% of respondents paid from 1,000 to 1,500 soms (89.1% are not connected to the district heating system).

Table 9.10: How much do you pay or have you paid per month in the last year on average?

Answer options	Kyrgyz Republic							
	Electricity		Gas		Coal		For district heating	
	Qty	%	Qty	%	Qty	%	Qty	%
Up to 1,000 soms	495	94.8	170	32.6	25	4.8	2	0.4
1,001 to 1,500 soms	14	2.7	3	0.6	19	3.6	41	7.8
1,501 to 2,000 soms	4	0.8	1	0.2	37	7.1	12	2.3
2,001 and more	7	1.3	1	0.2	354	67.9	2	0.4
I don't use it	-	-	330	63.2	80	15.3	465	89.1
No answer	-	-	1	0.2	-	-	-	-
Difficult to answer	2	0.4	16	3.0	7	1.3	-	-

On average over the last year, 61.6% of respondents paid less than 200 somonis per month for electricity, 59% for gas (30% do not use gas), and 10.2% for coal (60.4% do not use coal).

Table 9.11: How much do you pay or have you paid per month in the last year on average?

Answer options	Tajikistan							
	Electricity		Gas		Coal		For district heating	
	Qty	%	Qty	%	Qty	%	Qty	%
Less than 200 somonis	308	61,6	295	59,0	51	10,2	-	-
201 - 400 somonis	39	7,8	-	-	21	4,2	-	-
401 - 600 somonis	29	5,8	2	0,4	9	1,8	-	-
601 - 800 somonis	3	0,6	1	0,2	-	-	-	-
More than 801 somonis	1	0,2	-	-	7	1,4	-	-
I don't use it	4	0,8	150	30,0	302	60,4	500	100.0
No answer	47	9,4	17	3,4	23	4,6	-	-
Difficult to answer	69	13,8	35	7,0	87	17,4	-	-

On average, 90.2% of respondents paid more than 70,000 soms per month for electricity, 33.4% for gas, and 64.6% for coal (33.4% do not use coal for house heating) over the past year.

Table 9.12: How much do you pay or have you paid per month in the last year on average?

Answer options	Uzbekistan							
	Electricity		Gas		Coal		For district heating	
	Qty	%	Qty	%	Qty	%	Qty	%
Less than 40,000 sums	-	-	153	30.6	-	-	-	-
40,001 - 50,000 sums	4	0.8	110	22.0	-	-	-	-
50,001 - 60,000 sums	14	2.8	27	5.4	-	-	-	-
60,001 - 70,000 sums	4	0.8	27	5.4	-	-	-	-
More than 70,001 sums	451	90.2	167	33.4	323	64.6	-	-
I don't use it	-	-	-	-	167	33.4	500	100.0
No answer	-	-	-	-	-	-	-	-
Difficult to answer	27	5.4	16	3.2	10	2.0	-	-

Summary of findings

Almost all interviewed households in the three countries have metering devices.

The majority of households do not have energy expenditures for non-domestic purposes recorded in their household bills (8.2% are recorded in the Kyrgyz Republic, 23.2% in Tajikistan, 4.4% in Uzbekistan).

The practice of rolling blackouts is widespread: 66.1% in the Kyrgyz Republic, 48.6% in Tajikistan and 77.2% in Uzbekistan of household heads indicated that temporary blackouts occur.

The practice of rolling blackouts is more common in rural areas than in urban areas.

Power outages in the Kyrgyz Republic and Uzbekistan last for 46 and 76 hours per month on average, in Tajikistan they are at 16 hours per month shorter.

Most residents of the Kyrgyz Republic (82.8%) and Tajikistan (78.6%) do not experience financial difficulties in paying their electricity bills. However, 75% of households in Uzbekistan experienced financial problems in paying their electricity bills in the period from 2022 to 2023.

During the winter months when heating is required, more respondents from all three countries experience financial difficulties in paying their energy bills.

To manage their financial situation, household members employ a variety of strategies, including saving, reducing spending on basic necessities, and seeking financial support, borrow from relatives.

As for the use of additional equipment for electricity generation, most respondents do not have it. However, a small number of households reported having diesel generators, and single responses from the Kyrgyz Republic and Uzbekistan mentioned the use of solar panels.

Kyrgyz Republic: payment on average for electricity for one month - 496.43 soms, for gas - 393.42 soms, for coal – 5,084.89 soms, for district heating – 1,502.81 soms. Dollar to Som exchange rate: 88.39¹⁴.

Tajikistan: on average for electricity for one month paid - 174.90 somonis, for gas - 83.33 somonis, for coal - 311.25 somonis. Dollar to Somonis exchange rate: 10.96¹⁵.

Uzbekistan: on average for electricity for one month paid – 111,078.22 sums, for gas – 69,512.81 sums, for coal – 765,866.87 sums. Dollar to Sum exchange rate: 12,075¹⁶.

¹⁴ Exchange rates are current for the time of fieldwork (end of July - first half of August 2023)

¹⁵ Exchange rates are current for the time of fieldwork (end of July - first half of August 2023)

¹⁶ Exchange rates are current for the time of fieldwork (end of July - first half of August 2023)

10. ENERGY SAVING, ENVIRONMENTAL PROTECTION AND HEALTH PROTECTION

10.1 Energy savings in households

The overwhelming majority of respondents from the **Kyrgyz Republic** (92.9%) and **Uzbekistan** (98.6%) answered that they and their family members try to save energy. 59.8% of respondents from Tajikistan gave this answer. 19.6% of respondents from **Tajikistan** answered that they and their family members do not save energy, 17.8% - sometimes save energy.

Table 10.1: Do you and members of your household try to save energy?

Answer options	Kyrgyz Republic		Tajikistan		Uzbekistan	
	Qty	%	Qty	%	Qty	%
Yes	485	92.9	299	59.8	493	98.6
No	27	5.2	98	19.6	7	1.4
Sometimes	10	1.9	89	17.8	-	-
Difficult to answer	-	-	14	2.8	-	-
Total	522	100.0	500	100.0	500	100.0

In the answers of respondents from the Kyrgyz Republic and Uzbekistan there is no difference in the opinion of male and female heads of households. The Differences in answers can be traced among respondents from Tajikistan, where female heads of households indicate more than men that they and their family members try to save energy (positive answers of men 55.5%, positive answers of women 63.9%).

Table 10.2: Do you and members of your household try to save energy? (by gender)

Answer options	Kyrgyz Republic				Tajikistan				Uzbekistan			
	Male		Female		Male		Female		Male		Female	
	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%
Yes	243	92.7	242	93.1	136	55.5	163	63.9	252	98.4	241	98.8
No	14	5.3	13	5.0	52	21.2	46	18.0	4	1.6	3	1.2
Sometimes	5	1.9	5	1.9	46	18.8	43	16.9	-	-	-	-
Difficult to answer	-	-	-	-	11	4.5	3	1.2	-	-	-	-
Total	262	100.0	260	100.0	245	100.0	255	100.0	256	100.0	244	100.0

10.2 Environmental Impact of Fossil Energy

The majority of respondents in all countries surveyed believe that the use of coal, oil and gas is harmful to the environment.

Those who deny the harm of fossil energy are the most numerous in **Uzbekistan** - one third (33.6%) answered "no". 18.4% of **Kyrgyzstanis** also believe that the use of these energy sources does not harm the environment and human health. The smallest percentage of respondents that denied the harm of using coal, oil and gas was from **Tajikistan** (11.6%).

Table 10.3: Do you think that the use of fossil energy (coal, oil, gas) is harmful to the environment and your family's health?

Answer options	Kyrgyz Republic		Tajikistan		Uzbekistan	
	Qty	%	Qty	%	Qty	%
Yes	420	80.5	400	80.0	325	65.0
No	96	18.4	58	11.6	168	33.6
Difficult to answer	6	1.1	42	8.4	7	1.4
Total	522	100.0	500	100.0	500	100.0

The remaining tables of chapter 10.2 provide a breakdown by age, type of settlement, gender and education level categories of the answers to the question about the environmental and health impact of fossil fuels.

Gender

In the **Kyrgyz Republic** and **Tajikistan**, female heads of households (82.3% and 81.2% respectively), slightly more men (78.6% and 78.8% respectively) are aware that the use of fossil energy is harmful to the environment and human health. In **Uzbekistan**, the situation is the opposite - more men (70.7%) than women (59.0%) are aware of the consequences of fossil energy.

Table 10.4: Do you think that the use of fossil energy (coal, oil, gas) is harmful to the environment and your family's health? (by gender)

Answer options	Kyrgyz Republic				Tajikistan				Uzbekistan			
	Male		Female		Male		Female		Male		Female	
	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%
Yes	206	78.6	214	82.3	193	78.8	207	81.2	181	70.7	144	59.0
No	50	19.1	46	17.7	32	13.1	26	10.2	73	28.5	95	38.9
Difficult to answer	6	2.3	-	-	20	8.1	22	8.6	2	0.8	5	2.1
Total	262	100.0	260	100.0	245	100.0	255	100.0	256	100.0	244	100.0

Age

Among **all age groups**, the predominant view is the negative impact of fossil fuels on the environment. The majority of respondents in each of the age categories expressed this view, indicating widespread awareness and concern about environmental issues, regardless of age.

In the **Kyrgyz Republic**, among young respondents (18-29 years old) 21.2% and among respondents from 46 to 60 years old 21.6% believe that the use of fossil energy is not harmful to the environment.

Table 10.5: Do you think that the use of fossil energy (coal, oil, gas) is harmful to the environment and your family's health? (by age groups)

Answer options	Kyrgyz Republic							
	18-29		30-45		46-60		61+	
	Qty	%	Qty	%	Qty	%	Qty	%
Yes	122	78.2	168	82.4	74	76.3	56	86.2
No	33	21.2	33	16.2	21	21.6	9	13.8
Difficult to answer	1	0.6	3	1.4	2	2.1	-	-
Total	156	100.0	204	100.0	97	100.0	65	100.0

In **Tajikistan**, the opinion on the harm of fossil energy remains stable across age groups at over 73%, with a higher percentage of respondents 18-29 years old who are not sure (12.6%).

Table 10.6: Do you think that the use of fossil energy (coal, oil, gas) is harmful to the environment and your family's health? (by age groups)

Answer options	Tajikistan							
	18-29		30-45		46-60		61+	
	Qty	%	Qty	%	Qty	%	Qty	%
Yes	141	77.5	144	80.4	82	87.2	33	73.3
No	18	9.9	20	11.2	11	11.7	9	20.0
Difficult to answer	23	12.6	15	8.4	1	1.1	3	6.7
Total	182	100.0	179	100.0	94	100.0	45	100.0

In **Uzbekistan**, the level of concern is lower, especially among young people, where 37.9% of respondents deny the harm caused by fossil energy and its impact on the environment.

Table 10.7: Do you think that the use of fossil energy (coal, oil, gas) is harmful to the environment and your family's health? (by age groups)

Answer options	Uzbekistan							
	18-29		30-45		46-60		61+	
	Qty	%	Qty	%	Qty	%	Qty	%
Yes	50	57.5	121	72.0	96	63.2	58	62.4
No	33	37.9	45	26.8	55	36.2	35	37.6
Difficult to answer	4	4.6	2	1.2	1	0.6	-	-
Total	87	100.0	168	100.0	152	100.0	93	100.0

Education

In the **Kyrgyz Republic**, there is high concern that the use of fossil energy (coal, oil, gas) is harmful to the environment and health. This was noted by 86.1% of respondents with secondary education, 75.7% with specialized secondary education, and 82.4% with higher education.

In **Tajikistan**, the same high awareness rates among respondents of all education levels are 81.9%, 72.0%, 83.4%, respectively. 6.9% of respondents with secondary education, 12.8% with secondary specialized and vocational education, and 7.0% with higher education could not give a clear answer to this question.

In **Uzbekistan**, there is a positive correlation between the level of education and awareness of the harms of fossil energy use.

Table 10.8: Do you think that the use of fossil energy (coal, oil, gas) harms the environment and your family's health? (by level of education)

	Kyrgyz Republic						Tajikistan						Uzbekistan					
	Secondary		Secondary specialized		Higher		Secondary		Secondary specialized		Higher		Secondary		Secondary specialized		Higher	
	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%
Yes	253	86.1	78	75.7	89	82.4	154	81.9	90	72.0	156	83.4	113	54.6	130	68.8	82	78.8
No	55	13.3	22	21.4	19	17.6	21	11.2	19	15.2	18	9.6	92	44.4	55	29.1	21	20.2
Difficult to answer	3	0.6	3	2.9	-	-	13	6.9	16	12.8	13	7.0	2	1.0	4	2.1	1	1.0
Total	311	100	103	100	108	100	188	100	125	100	187	100	207	100	189	100	104	100

Type of settlement

In three all countries, the majority share concerns about the issue., regardless of the type of settlement (urban or rural) in which respondents live.

Some difference in answers is seen among respondents from Tajikistan, where urban residents (89.1%) more than rural residents (76.6%) believe that the use of fossil energy (coal, oil, gas) is harmful to the environment.

Table 10.9: Do you think that the use of fossil energy (coal, oil, gas) harms the environment and your family's health? (by type of settlement)

Answer options	Kyrgyz Republic				Tajikistan				Uzbekistan			
	Urban		Rural		Urban		Rural		Urban		Rural	
	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%
Yes	104	80.0	316	80.6	122	89.1	278	76.6	190	65.5	135	64.3
No	26	20.0	70	17.9	9	6.6	49	13.5	96	33.1	72	34.3
Difficult to answer	-	-	6	1.5	6	4.3	36	9.9	4	1.4	3	1.4
Total	130	100.0	392	100.0	137	100.0	363	100.0	290	100.0	210	100.0

10.3 Use of energy-saving light bulbs in households

Most respondents in all surveyed regions have energy-saving light bulbs in their houses. Energy saving light bulbs are not used by 17% of respondents from **the Kyrgyz Republic**, 9.6% of respondents from **Uzbekistan** and 8.8% of respondents from **Tajikistan**.

Table 10.10: Do you have energy-saving light bulbs in your house?

Answer options	Kyrgyz Republic		Tajikistan		Uzbekistan	
	Qty	%	Qty	%	Qty	%
Yes	431	82.6	446	89.2	451	90.2
No	89	17.0	44	8.8	48	9.6
Difficult to answer	2	0.4	10	2.0	1	0.2
Total	522	100.0	500	100.0	500	100.0

Respondents - heads of households from the Kyrgyz Republic and Tajikistan mostly have energy saving light bulbs in the house and their presence does not depend on gender. In Uzbekistan, men are slightly more likely than women to introduce energy saving light bulbs in their households.

Table 10.11: Do you have energy-saving light bulbs in your house? (by gender)

Answer options	Kyrgyz Republic				Tajikistan				Uzbekistan			
	Male		Female		Male		Female		Male		Female	
	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%
Yes	219	83.6	212	81.5	213	86.9	233	91.4	239	93.4	212	86.9
No	41	15.6	48	18.5	26	10.6	18	7.1	17	6.6	31	12.7
Difficult to answer	2	0.8	-	-	6	2.4	4	1.6	-	-	1	0.4
Total	262	100.0	260	100.0	245	100.0	255	100.0	256	100.0	244	100.0

The higher the education of the head of household, the more energy-saving light bulbs are in the house.

Table 10.12: Do you have energy-saving light bulbs in your house? (by level of education)

	Kyrgyz Republic						Tajikistan						Uzbekistan					
	Secondary		Secondary specialized		Higher		Secondary		Secondary specialized		Higher		Secondary		Secondary specialized		Higher	
	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%
Yes	250	80,2	89	86,4	92	85,2	166	88,3	110	88,0	170	90,9	186	89,9	168	88,9	97	93,3
No	59	18,3	14	13,6	16	14,8	17	9,0	10	8,0	17	9,1	21	10,1	20	10,6	7	6,7
Difficult to answer	2	1,4	-	-	-	-	5	2,7	5	4,0	-	-	-	-	1	0,5	-	-
Total	311	100,0	103	100,0	108	100,0	188	100,0	125	100,0	187	100,0	207	100,0	189	100,0	104	100,0

In all three countries that make up the Fergana Valley the majority of respondents in both urban and rural areas are using energy saving light bulbs.

Table 10.13: Do you have energy-saving light bulbs in your house? (by type of settlement)

Answer options	Kyrgyz Republic				Tajikistan				Uzbekistan			
	Urban		Rural		Urban		Rural		Urban		Rural	
	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%
Yes	108	83.1	323	82.4	127	92.7	319	87.9	260	89.7	191	91.0
No	22	16.9	67	17.1	9	6.6	35	9.6	29	10.0	19	9.0
Difficult to answer	-	-	2	0.5	1	0.7	9	2.5	1	0.3	-	-
Total	130	100.0	392	100.0	137	100.0	363	100.0	290	100.0	210	100.0

About one-half of the respondents **who do not use energy saving light bulbs** in the Kyrgyz Republic (46.1%) and Uzbekistan (58.3) did not think about the reason why they do not use them. The same answer was given by a fifth of respondents in Tajikistan (20.5%).

Among the reasons, answers related to **the quality of the lighting** were also voiced: 22.7% of Tajikistanis, 22.5% of Kyrgyzstanis and 14.6% of Uzbekistanis “do not like the lighting”.

20.5% of respondents from Tajikistan noted that **“there is flickering, voltage drops”**. The same answer was given by 7.9% of respondents from the Kyrgyz Republic and 6.3% of respondents from Uzbekistan.

High-cost of energy-saving light bulbs are also one of the reasons why respondents do not use them: 16.8% of Kyrgyzstanis, 13.6% of Tajikistanis, and 8.3% of Uzbekistanis consider them expensive.

Some respondents among those who do not use energy-saving light bulbs believe that they contain hazardous substances (4.2%-4.5% in the three countries).

Table 10.14: If you do not use them, what is the reason?

Answer options	Kyrgyz Republic		Tajikistan		Uzbekistan	
	N=89		N=44		N=48	
	Qty	%	Qty	%	Qty	%
Expensive	15	16.8	6	13.6	4	8.3
Don't like the lighting	20	22.5	10	22.7	7	14.6
Presence of hazardous substances	4	4.5	2	4.5	2	4.2
There's flickering, voltage drops	7	7.9	9	20.5	3	6.3
Not available in stores	2	2.2	-	-	-	-
I hadn't thought about it	41	46.1	9	20.5	28	58.3
Difficult to answer	-	-	8	18.2	4	8.3
Total	89	100.0	44	100.0	48	100.0

Note: Only those respondents who do not have energy-saving light bulbs answer this question.

10.4 Most energy-consuming household appliances

According to respondents from the **Kyrgyz Republic**, in their everyday life the greatest amount of energy is spent on using an electric stove (68.4%), a refrigerator (56.1%), and a washing machine (42%).

Respondents **from Tajikistan** consume the most energy using TV (79.4%), electric stove (70.4%), refrigerator (67.2%).

According to respondents from **Uzbekistan**, the most energy-consuming household appliances are: TV (76.2%), refrigerator (66.8%), lighting (41%) and washing machine (40.6%).

As can be seen from the respondents' answers the most expensive household appliances are those that are constantly used in the household - electric stove, TV, refrigerator, washing machine.

Table 10.15: What do you think consumes electricity in your household the most?

Answer options	Kyrgyz Republic		Tajikistan		Uzbekistan	
	Qty	%	Qty	%	Qty	%
Electric stove	357	68.4	352	70.4	72	14.4
Electric kettle	182	34.9	324	64.8	117	23.4
Multicooker	6	1.1	19	3.8	11	2.2
Oven	79	15.1	28	5.6	101	20.2
Microwave	16	3.1	94	18.8	28	5.6
Lighting (light bulbs)	122	23.4	247	49.4	205	41.0
TV	142	27.2	397	79.4	381	76.2
Air conditioner	29	5.6	123	24.6	97	19.4
Fan	54	10.3	93	18.6	199	39.8
Washing machine (automatic, semi-automatic)	219	42.0	171	34.2	203	40.6
Dishwasher	4	0.8	23	4.6	-	-
Water heater/boiler/Ariston	114	21.8	132	26.4	88	17.6
Portable batteries	3	0.6	23	4.6	-	-
Fridge	293	56.1	336	67.2	334	66.8
Freezer	10	1.9	42	8.4	49	9.8
Computer/laptop	6	1.1	55	11.0	23	4.6
Record player	-	-	2	0.4	7	1.4
Coffee machine	-	-	8	1.6	-	-
Answers are recorded from the respondents' words						
Sewing machine	1	0.2	-	-	-	-
Iron	1	0.2	-	-	-	-
Phone charging	4	0.8	-	-	-	-
Motor for water	2	0.4	-	-	-	-
Construction work/welding	2	0.4	-	-	-	-
Difficult to answer	-	-	-	-	2	0.4

Note: The sum does not equal 100%, as respondents could mark more than one answer option

10.5 Awareness of energy efficiency classes of household appliances

In general, most respondents pay attention to the energy efficiency class of household appliances: in the **Kyrgyz Republic** (62.6%), **Uzbekistan** (80.6%) and **Tajikistan** (87.4%).

Table 10.16: Do you pay attention to the energy efficiency class of household appliances?

Answer options	Kyrgyz Republic		Tajikistan		Uzbekistan	
	Qty	%	Qty	%	Qty	%
Yes	327	62.6	437	87.4	403	80.6
No	158	30.3	47	9.4	44	8.8
I don't know what energy efficient household appliances are	37	7.1	4	0.8	49	9.8
Difficult to answer	-	-	12	2.4	4	0.8
Total	522	100.0	500	100.0	500	100.0

In the Kyrgyz Republic, women more often pay attention to the energy efficiency class of household appliances than men: 61.1% of men and 64.2% of women. In Tajikistan and Uzbekistan, on the contrary, more men pay attention to it (Tajikistan - men - 91.2%, women - 86%, Uzbekistan - men - 84%, women - 77%).

**Table 10.17: Do you pay attention to the energy efficiency class of household appliances?
(by gender)**

Answer options	Kyrgyz Republic				Tajikistan				Uzbekistan			
	Male		Female		Male		Female		Male		Female	
	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%
Yes	160	61.1	167	64.2	125	91.2	312	86.0	215	84.0	188	77.0
No	85	32.4	73	28.1	11	8.0	36	9.9	28	10.9	16	6.6
I don't know what energy efficient appliances are	17	6.5	20	7.7	1	0.7	3	.8	11	4.3	38	15.6
Difficult to answer	-	-	-	-	-	-	12	3.3	2	0.8	2	0.8
Total	262	100	260	100	137	100	363	100	256	100	244	100

The following tendency is observed in the answers of - heads of households: the older the respondent, the more he/she pays attention to the energy efficiency class.

**Table 10.18: Do you pay attention to the energy efficiency class of household appliances?
(by age groups)**

Answer options	Kyrgyz Republic				Tajikistan				Uzbekistan			
	18-29	30-45	46-60	61+	18-29	30-45	46-60	61+	18-29	30-45	46-60	61+
	%	%	%	%	%	%	%	%	%	%	%	%
Yes	57.7	63.2	64.9	69.2	83	91.1	87.2	91.1	80.5	82.1	80.3	78.5
No	34.6	32.8	25.8	18.5	11.5	7.3	10.6	6.7	11.5	8.3	6.6	10.8
I don't know what energy efficient appliances are	7.7	3.9	9.3	12.3	1.1	-	2.1	-	4.6	9.5	12.5	10.8
Difficult to answer	-	-	-	-	4.4	1.7	-	2.2	3.4	-	0.7	-
Total	100	100	100	100	100	100	100	100	100	100	100	100

The following tendency is expressed among answers of Kyrgyzstani and Uzbekistani respondents: the higher the level of education, the more attention is paid to the characteristic of household appliances.

Tajikistani respondents with incomplete secondary and secondary education pay more attention to the energy efficiency class of household appliances than respondents with higher education (91.5% and 82.4% respectively).

**Table 10.19: Do you pay attention to the energy efficiency class of household appliances?
(by level of education)**

Answer options	Kyrgyz Republic			Tajikistan			Uzbekistan		
	Secondary	Secondary specialized	Higher	Secondary	Secondary specialized	Higher	Secondary	Secondary specialized	Higher
	%	%	%	%	%	%	%	%	%
Yes	56.6	56.3	66.7	91.5	88.8	82.4	77.8	80.4	86.5
No	33.5	35.9	29.6	6.4	8	13.4	7.7	8.5	11.5
I don't know what energy efficient appliances are	9.9	7.8	3.7	1.1	-	1.1	14	9.5	1.9
Difficult to answer	-	-	-	1.1	3.2	3.2	0.5	1.6	-
Total	100	100	100	100	100	100	100	100	100

Rural residents pay more attention to the energy efficiency class of household appliances in the Kyrgyz Republic (urban -53.8%, rural - 65.6%) and in Tajikistan (urban -85.3%, rural -89.4%) than urban residents. In Uzbekistan, urban and rural residents pay equal attention to the energy efficiency class of household appliances (urban -81.4% and rural - 79.5%).

**Table 10.20: Do you pay attention to the energy efficiency class of household appliances?
(by type of settlement)**

Answer options	Kyrgyz Republic		Tajikistan		Uzbekistan	
	Urban	Rural	Urban	Rural	Urban	Rural
	%	%	%	%	%	%
Yes	53.8	65.6	85.3	89.4	81.4	79.5
No	40	27	10.6	8.2	9	8.6
I don't know what energy efficient appliances are	6.2	7.4	1.2	0.4	8.6	11.4
Difficult to answer	-	-	2.9	2	1	0.5
Total	100	100	100	100	100	100

10.6 Ways to save electricity

In all studied regions, the main common ways to save energy are turning off lights if there are no people (Kyrgyzstanis - 95.2%, Tajikistanis - 52.2%, Uzbekistanis - 91.8%), turning off unused electrical appliances or consuming less of them.

Also, respondents in all three countries pay attention to the fact that the use of energy-saving, energy-efficient appliances is a way to save energy: 29.5% of respondents from the Kyrgyz Republic, 25.9% from Uzbekistan, 16.8% from Tajikistan.

Table 10.21: What methods of energy conservation do you use?

Answer options	Kyrgyz Republic		Tajikistan		Uzbekistan	
	Qty	%	Qty	%	Qty	%
Turn off unused appliances	344	65.9	372	74.4	-	-
Turn off lights when there are no people in the room	497	95.2	261	52.2	390	91.8
Less use of electrical appliances	285	54.6	225	45.0	230	54.1
Watch less Television	54	10.3	92	18.4	92	21.6
Cook less	108	20.7	59	11.8	22	5.2
Insulate the apartment	106	20.3	18	3.6	31	7.3
Proper wiring and appliances	5	1.0	69	13.8	67	15.8
Use energy-saving, energy-efficient appliances	154	29.5	84	16.8	110	25.9
Difficult to answer	-	-	28	5.6	-	-

Note: The sum does not equal 100%, as respondents could mark more than one answer option

In the Kyrgyz Republic, the main ways of energy saving are used equally by men and women, only more women than men indicated that they watch less TV to save energy.

In Tajikistan, female heads of households try to turn off unused appliances, use less appliances, fix wiring and appliances, and use energy-saving, energy-efficient appliances, slightly more than male heads of households.

In Uzbekistan, men who make decisions about the costs of house maintenance are more likely than women to try to insulate apartments, keep wiring and appliances in good working order, and use energy-saving, energy-efficient appliances. Women use less electrical appliances and watch less Television to save energy.

Table 10.22: What/what methods of energy conservation do you use? (by gender)

Answer options	Kyrgyz Republic				Tajikistan				Uzbekistan			
	Male		Female		Male		Female		Male		Female	
	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%
Turn off unused appliances	167	63.7	177	68.1	175	71.4	197	77.3	-	-	-	-
Turn off lights when there are no people in the room	255	97.3	242	93.1	129	52.7	132	51.8	197	91.2	193	92.3
Less use of electrical appliances	141	53.8	144	55.4	106	43.3	119	46.7	113	52.3	117	56.0
Watch less Television	20	7.6	34	13.1	44	18.0	48	18.8	44	20.4	48	23.0
Cook less	51	19.5	57	21.9	30	12.2	29	11.4	10	4.6	12	5.7
Insulate the apartment	52	19.8	54	20.8	8	3.3	10	3.9	24	11.1	7	3.3
Proper wiring and appliances	1	0.4	4	1.5	27	11.0	42	16.5	46	21.3	21	10.0
Use energy-saving, energy-efficient appliances	78	29.8	76	29.2	35	14.3	49	19.2	65	30.1	45	21.5
Difficult to answer	-	-	-	-	13	5.3	15	5.9	-	-	-	-

Note: The sum does not equal 100%, as respondents could mark more than one answer option

The distribution of opinions of respondents from the **Kyrgyz Republic** and **Uzbekistan on insulation of dwellings to prevent heat/cold loss** is very similar. In both countries, respondents who think that they need to insulate **windows** (69% - Kyrgyz Republic, 66.8% - Uzbekistan) and **doors** (37.4% - Kyrgyz Republic, 22% - Uzbekistan) are much more numerous than those who think about the need **to insulate walls** (7.7% - Kyrgyz Republic, 1.8% - Uzbekistan) and **roofs** (6.1% - Kyrgyz Republic, 1.6% - Uzbekistan) in their households.

In the opinions of respondents from **Tajikistan** on the need to insulate elements of the dwelling to prevent heat/cold loss, there is no serious advantage in favor of any particular parts: 51.4% of respondents believe that they need to insulate **doors**, 46.4% - **windows**, 38.6% - **roof**, 38.2% - **walls**.

Table 10.23: In your opinion, is there a need to insulate (tape, patch, warm) any of the listed items in your household against heat/cold loss?

Answer options	Kyrgyz Republic				Tajikistan				Uzbekistan			
	Yes		No		Yes		No		Yes		No	
	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%
Windows	360	69.0	162	31.0	232	46.4	268	53.6	334	66.8	166	33.2
Doors	195	37.4	327	62.6	257	51.4	243	48.6	110	22.0	390	78.0
Walls	40	7.7	482	92.3	191	38.2	309	61.8	9	1.8	491	92.2
Roof	32	6.1	490	93.9	193	38.6	307	61.4	8	1.6	492	98.4
Total	522	100.0	522	100.0	500	100.0	500	100.0	500	100.0	500	100.0

The large majority of respondents in the Kyrgyz Republic (79.4%) and Uzbekistan (72.2%) and still 52.6% of respondents from Tajikistan plan to insulate their dwelling against heat/cold loss dwelling elements.

Table 10.24: Do you plan to insulate (tape, patch, warm) all the items you selected?

Answer options	Kyrgyz Republic		Tajikistan		Uzbekistan	
	N=379		N=344		N=356	
	Qty	%	Qty	%	Qty	%
Yeah, I plan to.	301	79.4	181	52.6	257	72.2
No, I don't plan to.	78	20.6	163	47.4	99	27.8
Total	379	100.0	344	100.0	356	100.0

Note: Only respondents who see a need for insulation against heat/cold loss answer this question.

Respondents from the **Kyrgyz Republic** (56.4%) and **Uzbekistan** (61.6%), who do not plan to insulate their dwellings against heat/cold loss, mainly explain it by **cost**, respondents from **Tajikistan** (60.1%) - **by lack of information** on how it can be done. Also, respondents from all three countries lack information on what financial support for thermal insulation of dwellings is available to them.

Table 10.25: If you are not planning such insulation/cooling improvements, for what reason?

Answer options	Kyrgyz Republic		Tajikistan		Uzbekistan	
	N=78		N=163		N=99	
	Qty	%	Qty	%	Qty	%
Insufficient information on how to do this	14	17.9	98	60.1	18	18.2
Insufficient information on what financial support is available	17	21.8	40	24.5	20	20.2
It's too expensive	44	56.4	25	15.4	61	61.6
Answers are recorded from the words of the respondents						
The house/apartment is not mine	1	1.3	-	-	-	-
I'm not planning on it yet	2	2.6	-	-	-	-
Total	78	100.0	163	100.0	99	100.0

Note: Only respondents who are not planning insulation/cooling improvements) answer this question.

About 40% of respondents from the Kyrgyz Republic and Tajikistan and 68.6% from Uzbekistan are not ready to spend on environmentally friendly energy sources. 21.1% of Kyrgyzstanis, 11.2% of Uzbekistanis, and 2.2% of Tajikistanis would be willing to pay 10% more than they pay today if they switched to more environmentally friendly energy sources.

Table 10.26: Imagine that you have the opportunity to switch to more environmentally friendly energy sources, e.g. solar panels, windmills, etc. Based on the price you currently pay, how much more would you be willing to pay for more environmentally friendly energy sources? In terms of maximum percentage

Answer options	Kyrgyz Republic		Tajikistan		Uzbekistan	
	Qty	%	Qty	%	Qty	%
0%	12	2.3	-	-	-	-
1%	2	0.4	-	-	3	0.6
2%	4	0.8	-	-	17	3.4
3%	-	-	-	-	5	1.0
5%	35	6.7	5	1.0	28	5.6
6%	1	0.2	-	-	-	-
7%	3	0.5	-	-	1	0.2
8%	1	0.2	-	-	-	-
9%	1	0.2	-	-	-	-
10%	110	21.1	11	2.2	56	11.2
15%	14	2.7	8	1.6	6	1.2
20%	42	8.0	12	2.4	20	4.0
22%	1	0.2	-	-	-	-
25%	-	-	5	1.0	3	0.6
30%	13	2.5	8	1.6	11	2.2
40%	4	0.8	1	0.2	2	0.4
45%	-	-	-	-	1	0.2
50%	25	4.8	-	-	-	-
60%	2	0.4	-	-	-	-
70%	2	0.4	-	-	-	-
100%	8	1.5	-	-	-	-
No, I'm not ready to spend money on environmentally friendly energy sources	202	38.7	213	42.6	343	68.6
I have already switched to an environmentally friendly energy source	-	-	108	21.6	-	-
Difficult to answer	40	7.6	129	25.8	4	0.8
Total	522	100.0	500	100.0	500	100.0

In the **Kyrgyz Republic**, approximately equal percentages of men (52.7%) and women (50.0%) are willing to pay for more environmentally friendly energy sources.

In **Tajikistan**, the proportions also don't differ very much, but on a much lower overall level: 9.4% of men and 10.6% of women are ready to pay.

However, in **Uzbekistan**, a higher percentage of men (36.7%) are willing to pay than women (24.2%).

Among those who have switched to environmentally friendly energy sources in Tajikistan, both men and women are equally heads of HH: 22.0% of men and 21.2% of women.

Table 10.27: Imagine that you have the opportunity to switch to more environmentally friendly energy sources, e.g. solar panels, windmills, etc. Based on the price you currently pay, how much more would you be willing to pay for more environmentally friendly energy sources? In terms of maximum percentage (by gender)

Answer options	Kyrgyz Republic				Tajikistan				Uzbekistan			
	Male		Female		Male		Female		Male		Female	
	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%
I'm willing to pay	138	52.7	130	50.0	23	9.4	27	10.6	94	36.7	59	24.2
No, I'm not willing to pay	111	42.4	103	39.6	113	46.1	100	39.2	161	62.9	182	74.6
I've already switched to environmentally friendly energy source	-	-	-	-	54	22.0	54	21.2	-	-	-	-
Difficult to answer	13	5.0	27	10.4	55	22.4	74	29.0	1	0.4	3	1.2
Total	262	100.0	260	100.0	245	100.0	255	100.0	256	100.0	244	100.0

A majority of Kyrgyzstanis, and especially youth (18-29 years old) and representatives of the generation from 30 to 60 years old are ready to pay for environmentally friendly energy sources, while most among the older generation is not ready to do so yet.

Tajikistanis heads of households are less willing to pay extra for environmentally friendly energy sources. But a number of households have already installed environmentally friendly energy sources - on average 20% in all age groups.

One-third of Uzbekistani heads of households noted that they are ready to pay extra when switching to environmentally friendly energy sources, with the youth in the lead, but the 61+ also exceeding one-third.

Table 10.28: Imagine that you have the opportunity to switch to more environmentally friendly energy sources, e.g. solar panels, windmills, etc. Based on the price you currently pay, how much more would you be willing to pay for more environmentally friendly energy sources? (by age groups)

	Kyrgyz Republic								Tajikistan								Uzbekistan							
	18-29		30-45		46-60		61+		18-29		30-45		46-60		61+		18-29		30-45		46-60		61+	
	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%
I'm willing to pay	80	51.3	113	55.4	50	51.5	25	38.5	16	8.8	18	10.1	13	13.8	3	6.7	31	35.6	53	31.5	37	24.3	32	34.4
No, I'm not willing to pay	67	42.9	71	34.8	42	43.3	34	52.3	87	47.8	74	41.3	30	31.9	22	48.9	56	64.4	114	67.9	112	73.7	61	65.6
I've already switched to an eco-friendly energy source	-	-	-	-	-	-	-	-	37	20.3	37	20.7	23	24.5	11	24.4	-	-	-	-	-	-	-	-
Difficult to answer	9	5.8	20	9.8	5	5.2	6	9.2	42	23.1	50	27.9	28	29.8	9	20.0	-	-	1	0.6	3	2.0	-	-
Total	156	100.0	204	100.0	97	100.0	65	100.0	182	100.0	179	100.0	94	100.0	45	100.0	87	100.0	168	100.0	152	100.0	93	100.0

Respondents with higher education are more willing to pay for environmentally friendly energy sources compared to those with secondary or specialized secondary education.

In Tajikistan, more than a quarter of respondents with higher education have already switched to environmentally friendly energy sources.

Table 10.29: Imagine that you have the opportunity to switch to more environmentally friendly energy sources, e.g. solar panels, windmills, etc. Based on the price you currently pay, how much more would you be willing to pay for more environmentally friendly energy sources? (by level of education)

	Kyrgyz Republic						Tajikistan						Uzbekistan					
	Secondary		Secondary specialized		Higher		Secondary		Secondary specialized		Higher		Secondary		Secondary specialized		Higher	
	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%
I'm willing to pay	144	46.8	58	56.3	66	61.1	14	6.3	12	9.6	24	12.8	58	34.9	46	24.3	49	47.1
No, I'm not willing to pay	139	44.8	36	35.0	39	36.1	87	51.4	53	42.4	73	39.0	147	64.5	141	74.6	55	52.9
I've already switched to environmentally friendly energy source	-	-	-	-	-	-	29	14.3	30	24.0	49	26.2	-	-	-	-	-	-
Difficult to answer	28	8.4	9	8.7	3	2.8	58	28.0	30	24.0	41	22.0	2	0.6	2	1.1	-	-
Total	311	100.0	103	100.0	108	100.0	188	100.0	125	100.0	187	100.0	207	100.0	189	100.0	104	100.0

In urban areas of the **Kyrgyz Republic and Tajikistan**, more respondents are willing to pay for environmentally friendly energy sources compared to rural residents. In **Uzbekistan**, the trend is similar: in urban areas, more people are willing to switch to environmentally friendly energy sources.

In Tajikistan, part of the households that have switched to alternative environmentally friendly energy sources are in villages (63 households) and slightly less in cities (45 households).

Table 10.30: Imagine that you have the opportunity to switch to more environmentally friendly energy sources, e.g. solar panels, windmills, etc. Based on the price you currently pay, how much more would you be willing to pay for more environmentally friendly energy sources? In terms of maximum percentage (by type of settlement)

	Kyrgyz Republic				Tajikistan				Uzbekistan			
	Urban		Rural		Urban		Rural		Urban		Rural	
	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%
I'm willing to pay	69	53.1	199	50.8	15	10.9	35	9.6	93	32.1	60	28.6
No, I'm not willing to pay	46	35.4	168	42.9	47	34.3	166	45.7	194	66.9	149	71.0
I've already switched to environmentally friendly energy source	-	-	-	-	45	32.8	63	17.4	-	-	-	-
Difficult to answer	15	11.5	25	6.4	30	21.9	99	27.3	3	1.0	1	0.5
Total	130	100.0	392	100.0	137	100.0	363	100.0	290	100.0	210	100.0

Summary of findings

The majority of respondents actively practice energy saving, in the Kyrgyz Republic 92.9%, and Uzbekistan 98.6%, in Tajikistan about 78%.

In the Kyrgyz Republic and Uzbekistan, the responses of male and female heads of households are similar with regard to energy saving. In Tajikistan, there is a difference between the responses of men and women as heads of households: women (63.9%) more often express a positive attitude towards energy saving than men (55.5%).

The majority of household heads agree that the use of fossil energy resources such as coal, oil and gas is harmful to the environment (80.5% Kyrgyz Republic, 80% Tajikistan, 65% Uzbekistan). However, in Uzbekistan (33.6%) and Kyrgyz Republic (18.4%) there is a notable percentage of respondents who do not believe that these energy sources are harmful to the environment, while Tajikistan has the lowest percentage of respondents (11.6%).

More female than male heads of households in the Kyrgyz Republic and Tajikistan believe that fossil energy is harmful to the environment and human health. In Uzbekistan, more male heads of households support this position.

Considering the answers of respondents of different age cohorts, there is no particular difference in the opinion of the four groups (18-29, 30-45, 46-60, 61+). Common to all is the predominance of opinion about the negative environmental impact of fossil energy. In the Kyrgyz Republic, 20% each of the 18-29 and 46-60 age groups deny a negative impact. In Tajikistan also about 20% of respondents deny or find it difficult to answer in the groups: 18-29, 30-45, 61+. Uzbekistan has the largest number of respondents denying the negative impact of coal, oil and gas use on nature: 37.9% (18-29), 26.8% (30-45), 36.2% (46-60), 37.6% (61+).

The more educated the respondents are, the more they realize that fossil energy - oil, coal, gas - is harmful to nature and human health.

89.1% of urban residents of Tajikistan, 80.6% of rural residents and 80% of urban residents of the Kyrgyz Republic, 76.6% of rural residents of Tajikistan, 65.5% of urban residents and 64.3% of rural residents believe that fossil fuels are harmful.

More than 80% of HHs have energy saving light bulbs. More male heads of households in the Kyrgyz Republic and Uzbekistan have energy-saving light bulbs in their houses, while in Tajikistan more female heads of households indicated their presence in their houses.

The education level of respondents affects the choice of energy saving light bulbs in a directly proportional way - the higher the education, the more often energy-saving light bulbs are used.

A majority both of urban and rural residents of the Fergana Valley have energy saving light bulbs in their HHs. The share of "no bulb" answers: 17% in urban and rural settlements of the Kyrgyz Republic, about 7% in urban and rural settlements of Tajikistan and 10% in urban and rural settlements of Uzbekistan.

Most respondents from the Kyrgyz Republic (46.1%) and Uzbekistan (58.3%) who don't use energy saving light bulbs did not think about the reasons for using them. Some complain about the quality of lighting, flickering, voltage drops. Cost and concerns about harmful substances were also voiced as reasons for not using such bulbs.

Residents of all three countries identified similar appliances that require the most electricity in their households. These are mainly electric cookers, refrigerators and Televisions, indicating everyday needs where energy is used most intensively.

Most households pay attention to energy efficiency of household appliances. Household heads from the Kyrgyz Republic pay the least attention to it - 30.3% (9.4% Tajikistan, 8.8% Uzbekistan).

Women in the Kyrgyz Republic are slightly more aware of energy efficiency classes than men. In Tajikistan and Uzbekistan, more men than women are aware of this energy consumption classifier.

The following tendency is observed in the answers of - heads of households: the older the respondent, the more he/she pays attention to the energy efficiency class.

Respondents with secondary or specialized secondary education do not pay as much attention to the energy efficiency class of household appliances than others.

The higher the education, the more he/she pays attention to the energy efficiency class.

Slightly more urban residents do not know about the classes than rural residents.

The most common ways to save electricity are turning off lights when people are not present, disconnecting unused appliances, and limiting the use of electrical appliances. Respondents also emphasize the importance of energy-saving appliances, with the Kyrgyz Republic and Uzbekistan focusing on turning off lights in the house when people are not present, and Tajikistan on turning off unused appliances.

In the Kyrgyz Republic, men and women tend to practice similar energy saving practices, except that women are more likely to indicate a reduction in Television watching time. In Tajikistan, female heads of households are more active in making savings by turning off unused appliances and paying attention to energy-saving technologies. In Uzbekistan, male household expenditure decision-makers are more active in insulating rooms and maintaining appliances, while women reduce the use of appliances and Television watching time to save energy.

In general, windows and doors need to be taped, patched, insulated against loss of heat or cold - this is the opinion of the heads of households in all three countries. And more than half of respondents - 79.4% in the Kyrgyz Republic, 52.6% in Tajikistan and 72.2% in Uzbekistan plan to insulate windows and doors.

Among those who don't intend to do so, the main reason is the high cost of materials and work (56.4% of Kyrgyzstanis, 15.4% of Tajikistanis, 61.6% of Uzbekistanis). Heads of HHs of Tajikistan 60.1%, Uzbekistan 18.2%, Kyrgyz Republic 17.9% do not have sufficient information on how to improve insulation.

68.6% of Tajikistanis, 42.6% of Uzbekistanis, 38.7% of Kyrgyzstanis are not ready to spend on environmentally friendly energy sources. And 21.6% of heads of households in Tajikistan have already switched to more environmentally friendly energy sources. Of those respondents who are ready to switch to more environmentally friendly energy sources, such as solar panels, windmills are ready to pay 10% more respondents from the Kyrgyz Republic (21.1%), Uzbekistan (11.2%), Tajikistan (2.2%).

Box. Does Environment and Health Awareness Matter for Household Fuel Choice?

(From an ADBI working paper by Dina Azhgaliyeva, Wataru Kodama and Hans Holzhacker based on the data of this survey)¹⁷

Household consumption of coal and other dirty fuels for heating greatly contributes to air pollution both outdoor and indoor. Promoting clean energy to households in regions where a large proportion of population is energy poor could be challenging. The survey results show that half of households (50%) use coal for heating (Figure 10a). In the recent study, Azhgaliyeva, Kodama, and Holzhacker (2023) find that energy poor (66%¹⁸) are more likely to use dirty heating. In dirty fuel for heating they include those fuels which cause not only outdoor but also indoor air pollution (e.g., particulate matter and carbon monoxide): coal, fuel oil, diesel, biofuel (dung), firewood, waste and garbage (Figure 10a). In clean (modern) fuel for heating we include district heating, electricity and gas. 22% of households with dirty heating have plans to switch to clean heating in the next five years (including moving to another house), nearly half of which are willing to switch to electricity heating (Figure 10b).

One third (32%) of households selected heating fuel based on least financial burden, a quarter (26%) of households selected heating fuel based on continuity (uninterrupted) of supply, 12% due to the existing heating system (it is costly to change heating system) and 30% based on least environmental and health impact (Figure 10c). More households (33%) choose solid fuel due to reliable energy supply than those which choose clean heating (14%). More households (48%) choose clean heating due to the least environmental and health impact than those which choose solid fuel (19%).

Households that prioritize environmental harm are less likely to choose dirty fuel for heating, but only among those who are energy non-poor. Thus, raising environmental awareness will have a limited impact on switch to clean heating. On the other hand, awareness about health impact has a significant impact on clean heating fuel choice across all groups (energy poor and non-poor). Policies raising awareness about the health impact from dirty fuel are more likely to lead to a greater impact on fuel switching than raising awareness about environmental harm. Interestingly, environmental and health prioritization is significantly lower among households using dirty heating (20%) comparing to households using clean heating (48%). Thus, there is a great scope to increase environmental and health awareness among households using dirty heating in order to promote clean heating.

Environmental awareness is the major households' reason which affects willingness to switch from dirty to clean heating however the actual use of clean heating is affected by environmental prioritization only for energy non-poor, indicating that energy poor although could be aware of environmental impacts have a limited ability to switch from dirty to clean heating, which could be due other factors such as a limited access to finance to change the heating system (or moving house), access or affordability of clean heating options. Thus, in addition to raising environmental/health awareness, other policies enabling households' not only willingness but also ability to switch to clean heating, such as subsidized loans, energy infrastructure (district heating, gas, etc.) access, and reliability of energy supply (1/3 of households choose dirty heating due to reliability of supply).

Overall, our results suggest that raising environmental awareness is not enough for energy poor households to adopt modern fuels. They will also need more policy support, besides raising awareness, such as improving access to finance, access to clean heating options or its affordability. While promoting clean fuel choice, governments will need to prepare for a greater demand for clean fuel (electricity, district heating, and gas).

¹⁷ ADBI Working Paper 1425. Tokyo: Asian Development Bank Institute. <https://doi.org/10.56506/VUWZ8321>

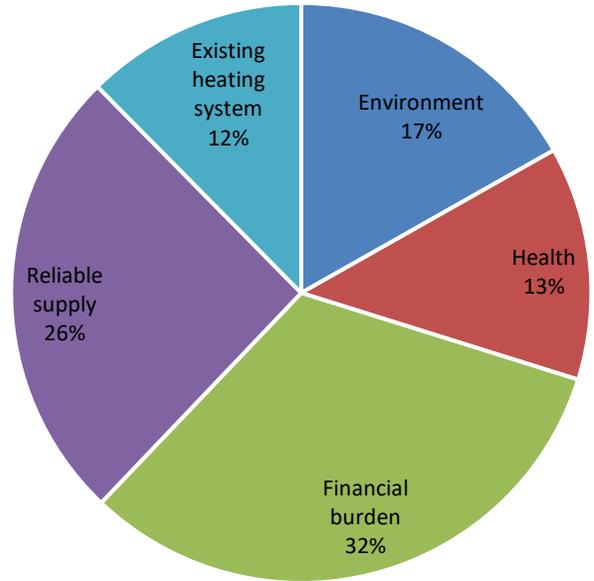
¹⁸ Following the most popular measure of energy poverty, households spending more than 10% of expenditure on energy are considered as energy poor.

Figure 10: Heating choice

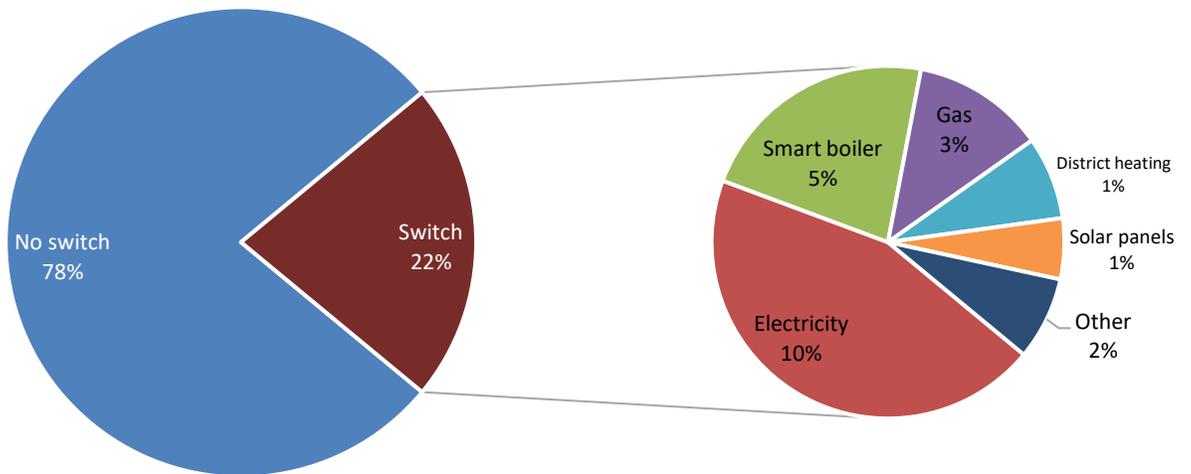
a) Household heating choice



b) Prioritization for heating choice



c) Willingness to switch from dirty to clean heating



11. SOURCES OF INFORMATION ON RENEWABLE ENERGY

In the media information space of Uzbekistan and Tajikistan, the most common source of information is **TV**, with social networks in second place. Tajik respondents noted newspapers and magazines as an information resource (30.8%). In the Kyrgyz Republic, the source of information about renewable energy is social networks, with television in second place. For respondents from three countries, their close circle - family, relatives, colleagues - is one of the main sources of information.

Table 11.1: Please tell us from which information sources do you get news/different information about renewable energy (e.g. solar and wind energy)?

Answer options	Kyrgyz Republic		Tajikistan		Uzbekistan	
	Qty	%	Qty	%	Qty	%
1. Television	271	51.9	453	90.6	354	70.8
2. Newspapers and magazines	3	0.6	154	30.8	31	6.2
3. Social media	289	55.4	287	57.4	257	51.4
4. Internet forums	84	16.1	84	16.8	90	18.0
5. Street billboards, posters, banners	3	0.6	21	4.2	8	1.6
6. Leaflets, booklets distributed on the street or in mailboxes	-	-	4	0.8	5	1.0
7. Public transportation	-	-	50	10.0	14	2.8
8. Specialized sites	11	2.1	35	7.0	11	2.2
9. Advertising by the entrances, in elevators, etc.	-	-	5	1.0	9	1.8
10. Radio	3	0.6	83	16.6	5	1.0
11. From school children who receive this information in schools	2	0.4	19	3.8	6	1.2
12. Relatives, friends	49	9.4	92	18.4	131	26.2
None of the above	14	2.7	7	1.4	7	1.4
I don't get that kind of information	26	5.0	-	-	-	-
Difficult to answer	10	1.9	1	0.2	5	1.0

Note: The sum does not equal 100%, as respondents could mark more than one answer option.

In the **Kyrgyz Republic**, more women (54.2%) than men get information about renewable energy from Television, men - from the Internet (social media, Internet forums, etc.) - 76.3% (women - 66.5%).

In **Tajikistan**, female and male heads of households get information more from TV channels (men - 91.4%, women - 89.8%) than from the Internet (men - 78%, women - 70.6%). Men and women equally draw information from newspapers and magazines (29.4% and 32.2% respectively) and radio (15.9% and 17.3%). Women (20.8%) get information from relatives and friends compared to men (15.9%). Men (11.8%) notice information in public transportation more often than women (8.2%).

In **Uzbekistan**, male respondents (73%) mainly receive information from TV channels (women - 68.4%). The Internet is in second place: 68% of men and 70.9% of women chose this source of information about renewable energy. Relatives, friends, close relatives are also a source of information for both men 28.9% and women 23.4%

Table 11.2: Please tell us from which information sources do you get news/different information about renewable energy (e.g. solar and wind energy)? (by gender)

Answer options	Kyrgyz Republic				Tajikistan				Uzbekistan			
	Male		Female		Male		Female		Male		Female	
	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%
Television	130	49.6	141	54.2	224	91.4	229	89.8	187	73.0	167	68.4
Newspapers and magazines	1	0.4	2	0.8	72	29.4	82	32.2	14	5.5	17	7.0
Social media	152	58.0	137	52.7	146	59.6	141	55.3	138	53.9	119	48.8
Internet forums	48	18.3	36	13.8	45	18.4	39	15.3	36	14.1	54	22.1
Street billboards, posters, banners	3	1.1	-	-	12	4.9	9	3.5	4	1.6	4	1.6
Leaflets, booklets distributed on the street or in mailboxes	-	-	-	-	2	0.8	2	0.8	1	0.4	4	1.6
Public transportation	-	-	-	-	29	11.8	21	8.2	8	3.1	6	2.5
Specialized sites	5	1.9	6	2.3	18	7.3	17	6.7	7	2.7	4	1.6
Advertising by the entrances, in elevators, etc.	-	-	-	-	3	1.2	2	0.8	4	1.6	5	2.0
Radio	2	0.8	1	0.4	39	15.9	44	17.3	4	1.6	1	0.4
From school children who receive this information in schools	2	0.8	-	-	6	2.4	13	5.1	1	0.4	5	2.0
Relatives, friends	30	11.5	19	7.3	39	15.9	53	20.8	74	28.9	57	23.4
None of the above	6	2.3	8	3.1	2	0.8	5	2.0	4	1.6	3	1.2
I don't get that kind of information	9	3.4	17	6.5	-	-	-	-	-	-	-	-

In the **Kyrgyz Republic**, young people aged 18-29 years (63.5%), representatives of the generations 30-60 years old more often receive information about renewable energy from social media and internet forums/sites, etc., compared to other age groups. Television remains the main source of renewable energy information for groups in all four age cohorts: 42.9% (18-29 years old), 49% (30-45 years old), 57.7% (46-60), 73.8% (61+).

In **Tajikistan**, Television as a source of information about renewable energy is very popular in all age groups: 90.7% (18-29 years old), 90.5% (30-45 years old), 92.6% (46-60), 86.7% (61+). In second place are social media and the Internet. It is important to note the popularity of periodicals - newspapers, magazines - in all age groups. Radio is also listened by a part of respondents. Another source of information is close environment - relatives, friends, colleagues.

In **Uzbekistan**, Television also remains the main source of information about renewable energy 72.4% (18-29 years old), 60.1% (30-45 years old), 77.6% (46-60), 77.4% (61+). Social media is the second most popular among all age categories, with the 18-45 age group being the most popular. Relatives and friends are an important source of information in all age groups.

Table 11.3: Please tell us from which information sources do you get news/different information about renewable energy (e.g. solar and wind energy)? (by age groups)

Answer options	Kyrgyz Republic								Tajikistan								Uzbekistan							
	18-29		30-45		46-60		61+		18-29		30-45		46-60		61+		18-29		30-45		46-60		61+	
	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%
Television	67	42.9	100	49.0	56	57.7	48	73.8	165	90.7	162	90.5	87	92.6	39	86.7	63	72.4	101	60.1	118	77.6	72	77.4
Newspapers and magazines	-	-	1	0.5	-	-	2	3.1	64	35.2	48	26.8	28	29.8	14	31.1	5	5.7	5	3.0	15	9.9	6	6.5
Social media	99	63.5	120	58.8	52	53.6	18	27.7	114	62.6	103	57.5	52	55.3	18	40.0	59	67.8	111	66.1	59	38.8	28	30.1
Internet forums	31	19.9	36	17.6	13	13.4	4	6.2	26	14.3	29	16.2	25	26.6	4	8.9	16	18.4	36	21.4	29	19.1	9	9.7
Street billboards, posters, banners	2	1.3	1	0.5	-	-	-	-	9	4.9	10	5.6	2	2.1	-	-	2	2.3	3	1.8	3	2.0	-	-
Leaflets, booklets distributed on the street or in mailboxes	-	-	-	-	-	-	-	-	2	1.1	1	0.6	1	1.1	-	-	-	-	2	1.2	3	2.0	-	-
Public transportation	-	-	-	-	-	-	-	-	19	10.4	13	7.3	13	13.8	5	11.1	3	3.4	3	1.8	6	3.9	2	2.2
Specialized sites	6	3.8	3	1.5	2	2.1	-	-	17	9.3	11	6.1	4	4.3	3	6.7	2	2.3	5	3.0	2	1.3	2	2.2
Advertising by the entrances, in elevators, etc.	-	-	-	-	-	-	-	-	3	1.6	-	-	2	2.1	-	-	2	2.3	2	1.2	2	1.3	3	3.2
Radio	-	-	-	-	1	1.0	2	3.1	29	15.9	28	15.6	22	23.4	4	8.9	2	2.3	-	-	2	1.3	1	1.1
From school children who receive this information in schools	1	0.6	-	-	1	1.0	-	-	6	3.3	5	2.8	5	5.3	3	6.7	-	-	5	3.0	1	0.7	-	-
Relatives, friends	13	8.3	18	8.8	12	12.4	6	9.2	33	18.1	32	17.9	22	23.4	5	11.1	23	26.4	44	26.2	44	28.9	20	21.5
None of the following	2	1.3	7	3.4	-	-	5	7.7	2	1.1	-	-	3	3.2	2	4.4	1	1.1	1	0.6	-	-	5	5.4
I don't get that kind of information	1	0.6	4	2.0	2	2.1	3	4.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Difficult to answer	7	4.5	11	5.4	7	7.2	1	1.5	-	-	1	0.6	-	-	-	-	-	-	-	-	2	1.3	3	3.2

Regardless of education level, Television is the most common source of information about renewable energy in the three countries, social media, internet are also significant for respondents with higher education.

Table 11.4: Please tell us from which information sources do you get news/different information about renewable energy (e.g. solar and wind energy)? (by level of education)

Answer options	Kyrgyz Republic						Tajikistan						Uzbekistan					
	Secondary		Secondary specialized		Higher		Secondary		Secondary specialized		Higher		Secondary		Secondary specialized		Higher	
	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%
Television	148	51.8	65	63.1	58	53.7	170	90.4	117	93.6	166	88.8	156	75.4	121	64.0	77	74.0
Newspapers and magazines	2	1.4	-	-	1	0.9	63	33.5	40	32.0	51	27.3	10	4.8	12	6.3	9	8.7
Social media	172	44.5	50	48.5	67	62.0	107	56.9	75	60.0	105	56.1	78	37.7	110	58.2	69	66.3
Internet forums	48	14.2	17	16.5	19	17.6	19	10.1	19	15.2	46	24.6	37	17.9	38	20.1	15	14.4
Street billboards, posters, banners	1	0.2	1	1.0	1	0.9	8	4.3	6	4.8	7	3.7	1	0.5	3	1.6	4	3.8
Leaflets, booklets distributed on the street or in mailboxes	-	-	-	-	-	-	1	0.5	1	0.8	2	1.1	2	1.0	2	1.1	1	1.0
Public transportation	-	-	-	-	-	-	19	10.1	12	9.6	19	10.2	6	2.9	7	3.7	1	1.0
Specialized sites	5	0.9	4	3.9	2	1.9	13	6.9	10	8.0	12	6.4	3	1.4	5	2.6	3	2.9
Advertising by the entrances, in elevators, etc.	-	-	-	-	-	-	2	1.1	1	0.8	2	1.1	4	1.9	3	1.6	2	1.9
Radio	2	1.4	1	1.0	-	-	32	17.0	21	16.8	30	16.0	2	1.0	1	0.5	2	1.9
From school children who receive this information in schools	2	1.4	-	-	-	-	7	3.7	4	3.2	8	4.3	3	1.4	2	1.1	1	1.0
Relatives, friends	26	8.0	17	16.5	6	5.6	45	23.9	20	16.0	27	14.4	50	24.2	53	28.0	28	26.9
None of the following	9	4.9	3	2.9	2	1.9	1	0.5	1	0.8	5	2.7	3	1.4	3	1.6	1	1.0
I don't get that kind of information	17	8.5	7	6.8	2	1.9	-	-	-	-	-	-	-	-	-	-	-	-
Difficult to answer	8	2.5	2	1.9	-	-	1	0.5	-	-	-	-	2	1.0	3	1.6	-	-

In the **Kyrgyz Republic**, Television is actively used both in cities (60.8%) and in rural areas (49.0%), but the popularity of the Internet and social media is higher: in cities - 75.3%, in villages - 70.2%.

In **Tajikistan**, Television is also popular in urban areas (90.5%) and villages (90.6%), along with the Internet, which is more popular in urban areas (82.4%) compared to villages (71%). Printed publications (newspapers, magazines) are read more often in urban areas (37.2%) than in villages (28.4%). Radio is listened to more often in villages (18.7%) than in towns (10.9%). Close environment is a source of information more in rural areas (19.3%), in urban areas slightly less (16.1%).

In **Uzbekistan**, the Internet is becoming as popular a source of information as Television. For rural residents, Television is prioritized by 72.9% (for urban residents 69.3%), and for urban residents the Internet is 73.8% (for rural residents 63.3%). Close environment is also one of the sources of information for rural residents - 31.9%, for urban residents - 22.1%.

Table 11.5: Please tell us from which information sources do you get news/different information about renewable energy (e.g. solar and wind energy)? (by type of settlement)

Answer options	Kyrgyz Republic				Tajikistan				Uzbekistan			
	Urban		Rural		Urban		Rural		Urban		Rural	
	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%
Television	79	60.8	192	49.0	124	90.5	329	90.6	201	69.3	153	72.9
Newspapers and magazines	-	-	3	0.8	51	37.2	103	28.4	22	7.6	9	4.3
Social media	70	53.8	219	55.9	85	62.0	202	55.6	160	55.2	97	46.2
Internet forums	28	21.5	56	14.3	28	20.4	56	15.4	54	18.6	36	17.1
Street billboards, posters, banners	1	0.8	2	0.5	4	2.9	17	4.7	5	1.7	3	1.4
Leaflets, booklets distributed on the street or in mailboxes	-	-	-	-	1	0.7	3	0.8	4	1.4	1	0.5
Public transportation	-	-	-	-	14	10.2	36	9.9	10	3.4	4	1.9
Specialized sites	1	0.8	10	2.6	7	5.1	28	7.7	6	2.1	5	2.4
Advertising by the entrances, in elevators, etc.	-	-	-	-	2	1.5	3	0.8	6	2.1	3	1.4
Radio	-	-	3	0.8	15	10.9	68	18.7	4	1.4	1	0.5
From school children who receive this information in schools	1	0.8	1	0.3	7	5.1	12	3.3	3	1.0	3	1.4
Relatives, friends	12	9.2	37	9.4	22	16.1	70	19.3	64	22.1	67	31.9
None of the following	4	3.1	10	2.6	1	0.7	6	1.7	4	1.4	3	1.4
I don't get that kind of information	4	3.1	22	5.6	-	-	-	-	-	-	-	-
Difficult to answer	3	2.3	7	1.8	-	-	1	0.3	3	1.0	2	1.0

Summary of findings

Respondents-heads of HHs were asked 12 sources or channels from which they get news/ information about renewable energy (e.g. solar and wind energy).

Television as a source of information is most used in Tajikistan, then in Uzbekistan and less in the Kyrgyz Republic. Watching TV channels is popular in all countries regardless of age, except for the Kyrgyz Republic, where young people (18-29) watch TV channels less. Watching TV channels does not depend on the level of education, type of settlement, except for the Kyrgyz Republic, where urban residents (60.8%) watch more TV than rural residents (49%). Men and women equally receive information from TV.

Periodicals (newspapers and magazines) are sources of information in Tajikistan. In the other countries, the Kyrgyz Republic and Uzbekistan, this source is not popular. Most of them are read by young people (18-29) with secondary and secondary specialized education, living in cities, slightly more women than men.

Social media, Internet forums, specialized sites - that is, *the Internet* is an important source of information in all three countries in the following order: Tajikistan 81.2%, Kyrgyz Republic 73.6%, Uzbekistan 71.6%. Young and middle-aged people more often turn to the Internet, as do those with higher education. Most Internet users are urban residents. More men than women get information about renewable energy on the World Wide Web.

Relatives, friends, i.e. close environment is one of the sources of information for almost one third of respondents from Uzbekistan (26.2%), Tajikistan (18.4%) and Kyrgyz Republic (9.4%). Communication with relatives is more relevant for the generation from 30 to 60 years old and does not depend on the level of education. There is no particular difference in the answers of urban and rural residents, except for Uzbekistan, where rural residents receive information from their close environment more than urban residents 22.1% and 31.9%, respectively. Men in the Kyrgyz Republic and Uzbekistan receive more information from relatives than women. Women-heads of HHs in Tajikistan noted relatives and friends as a source of information more than men.

Radio as a source of information is popular in Tajikistan. Age cohorts 18-29, 30-45, 46-60 listen to radio more often, more in villages than in cities. Listening does not depend on the level of education or gender.

Public transportation as a source of information is also noted only in Tajikistan. There are no particular differences in the answers by age, gender, education level or place of residence.

APPENDIX 1

SURVEY QUESTIONNAIRE

Country code: _____ Questionnaire No _____
Region _____
City _____ Village _____
Type of settlement _____
Name of the mahallah _____

Hello! My name is /last name, first name, patronymic/. I represent _____. Our organization conducts surveys of the population on various topics. We are currently conducting a survey on household energy supply problems. This is an international research project that is being carried out in several countries with the support of the Asian Development Bank (ADB), the Institute of Central Asia Regional Economic Cooperation (CAREC). The selection of people for the survey is carried out according to a special mathematical procedure. The opinions expressed in the course of the survey will only be used in aggregate form after computer processing. We ask you to take a little time to answer our questions.

Thank you for cooperation!

A0. Date of the interview (day/month) day _____ month _____

A1. LANGUAGE OF THE INTERVIEW (should be adapted for each country):

INTRODUCTION

1. What type of energy supply does your household have problems with in the SUMMER? (multiple choice)

1. With hot water supply/water heating
 2. With electricity
 3. With gas
 4. Other (write) _____
 5. No problems
- (99) Difficult to answer

2. What type of energy supply does your household have problems with in the WINTER? (multiple choice)

1. With hot water supply/water heating
 2. With electricity
 3. With gas
 4. With district heating
 5. Other (write) _____
 6. No problems
- (99) Difficult to answer

HEATING

3. What is the type of accommodation you have? (single choice)

1. Separate apartment in a multi-storey building
2. Separate private house
3. Part of the house (house for two owners) / half part of the house
4. Hostel
5. Temporary building
6. Other (write) _____

4. How many years ago was the house you live in built? /INTERVIEWER, IF THE RESPONDENT DOES NOT KNOW, ASK OLDER FAMILY MEMBERS/

_____ years
(99) DO NOT READ OUT!! I don't know, difficult to answer

5. How many years have you been living in it? _____ years

6. What is the approximate area in square meters of all living/heated premises/rooms of your house?
INSTRUCTIONS TO THE INTERVIEWER: IF THE RESPONDENT MENTIONS THE TOTAL AREA, ASK TO CALCULATE THE APPROXIMATE AREA OF ONLY RESIDENTIAL PREMISES.

_____ square meters

(99) *DO NOT READ OUT!!* I don't know, difficult to answer

7. What materials were mainly used to build the house in which you and your family currently live?
(multiple choice)

1. Brick
 2. Mudbrick
 3. Reed slabs
 4. Wood
 5. Concrete
 6. Monolith
 7. Other (write) _____
- (99) *Difficult to answer*

8. Is your house connected to a district heating system or do you have autonomous heating? (single choice)

1. District → **GO TO QUESTION 9**
2. Autonomous → **GO TO QUESTION 11**
3. Mixed - district and autonomous heating → **GO TO QUESTION 9 AND AFTER IT GO TO QUESTION 11**
4. Heating from the boiler room → **GO TO QUESTION 9**
5. Other (write) _____

Everyone answers

8a. Where do you get hot water from? (single choice)

1. district Water heating → **GO TO QUESTION 9**
2. Autonomous water heating → **GO TO QUESTION 8b**
3. Mixed–district and autonomous water heating → **GO TO QUESTION 8b**
4. Other (write) _____

8b. If you have autonomous water heating, then how exactly do you heat the water? (multiple choice)

1. Electricity
2. Gas
3. Solar energy
4. Coal
5. Other (write) _____

DISTRICT HEATING

9. If your house is connected to the district heating system, are you satisfied with the quality of the heat supply of the district heating batteries in WINTER? (single choice)

1. Yes, I'm quite satisfied, the temperature is acceptable
2. No, I'm not satisfied, it's too cold
3. No, I'm not satisfied, it's too hot
4. No, I'm not satisfied, the heat supply is unstable, sometimes it doesn't work
5. No, I'm not satisfied, for other reasons (specify for what reasons?)

(99) *Difficult to answer*

10. What do you do if there is no heat in your house with district heating or there is not enough heat?

How do you heat up? *(multiple choice)*

1. Heat the boiler
2. Kindle the fireplace
3. Heat the oven
4. Turn on the portable heater
5. Turn on the floor heating
6. Turn on the heat pump / canopy
7. Turn on the supply of warm air in air conditioners
8. We use solar panels
9. Other *(write)* _____
10. We don't have such problem

10a. Approximately how much per month does your household pay for heating in winter by the size of the living area, over the last three heating seasons? (in local currency)

WRITE THE AMOUNT IN LOCAL CURRENCY _____

(99) Difficult to answer

If the respondent has only district heating after this block go to question 23

AUTONOMOUS HEATING

11. What type of autonomous heating system is in your house? *(multiple choice)*

1. Oven
2. Boiler
3. Fireplace
4. Air conditioner
5. Electric heater
6. Underfloor heating
7. Heat pump/canopy
8. Solar panels
9. Other *(write)* _____

12a. If you have an autonomous heating system, what energy source do you use to heat your house during the winter season?

(single choice, ask the respondent to choose one main source)

1. Coal
 2. Fuel oil/diesel
 3. Natural gas from underground pipes
 4. Propane (gas in cylinders)
 5. Electricity
 6. Biofuels (dung)
 7. Kerosene
 8. Firewood
 9. Solar panels
 10. Waste and garbage (rubber, plastic, paper, etc.)
 11. Other *(write)* _____
- (99) Difficult to answer*

12b. If you have an autonomous heating system, what other energy sources do you use to heat your house in the winter season? *(multiple choice, ask the respondent to choose additional sources, if any)*

1. Coal
 2. Fuel oil/diesel
 3. Natural gas from underground pipes
 4. Propane (gas in cylinders)
 5. Electricity
 6. Biofuels (pressed dung)
 7. Kerosene
 8. Firewood
 9. Solar panels
 10. Waste and garbage (rubber, plastic, paper, etc.)
 11. Other (write) _____
- (99) Difficult to answer*

13. What is the average monthly heating expenditure of your household in winter (including all types of heating used in winter over the past three heating seasons?) *(in local currency)*

WRITE THE AMOUNT IN LOCAL CURRENCY _____

(99) Difficult to answer

14. If you use several types of energy sources in one heating season, then for what reason? *(multiple choice)*

1. Due to interruptions in the supply of the main source
2. Due to the high cost of the main source, to save money
3. We use one type of energy source
4. Other (write) _____

15. What are you guided by when choosing the main source of heating? *(single choice)*

1. I choose based on considerations of the least harm to the environment
 2. I choose based on considerations of the least harm to the health of my family
 3. I choose based on considerations of the least financial burden
 4. I choose based on considerations of uninterruptedness/reliability of energy supplies, scarcity
 5. Due to the presence of an existing heating system
 6. Other (write) _____
- (99) Difficult to answer*

16. How many months of the year is your house heated? _____ number of months

17. Mark the months in which the house is heated and how many days in a month do you heat your house?

Month	A. Heating	
	Mark the months	How many days?
January	1	
February	2	
March	3	
April	4	
May	5	
June	6	
July	7	
August	8	
September	9	
October	10	
November	11	
December	12	
<i>Difficult to answer</i>	<i>(99)</i>	

18a. What are the main non-financial difficulties with heating that you experienced last winter?

WRITE _____
(99) Difficult to answer

18b. Did you have any interruptions in supplies, difficulties with heating last winter? (single choice)

1. Yes, several times a week → **GO TO QUESTION 19**
2. Yes, a few days a month → **GO TO QUESTION 19**
3. Yes, a few days a quarter → **GO TO QUESTION 19**
4. Yes, a few days a year → **GO TO QUESTION 19**
5. No, I didn't → **GO TO QUESTION 20**

(99) Difficult to answer → GO TO QUESTION 20

19. Do you have experience of changing the heating system in your house over the past 5 years (except for moving to another house)? (single choice)

1. Yes → **GO TO QUESTION 19A**
2. No → **GO TO QUESTION 20**

(99) Difficult to answer → GO TO QUESTION 20

19a. Yes, we switched from...

1. District heating
2. Gas
3. Electricity
4. Coal
5. Solar panels
6. Other *(write)* _____

19b. ...To...

1. District heating
2. Gas
3. Electricity
4. Coal
5. Solar panels
6. Other *(write)* _____

20. Do you plan to change the autonomous heating system in the next five years, including moving to

another house? (single choice)

1. Yes, I plan to switch to
 1. District heating
 2. Gas
 3. Electricity
 4. Coal
 5. Solar panels
 6. Other (write) _____
2. No, I don't plan to change it → **GO TO QUESTION 21**

20a. For what reason do you plan to change the heating system? (multiple choice)

1. Problems with the existing system
2. Access to infrastructure (gas pipeline/district heating) has appeared/will appear
3. For financial reasons
4. It is possible to take a loan / credit for these purposes
5. New technical solutions have appeared (regulation of the heating level, etc.)
6. For environmental reasons (environmental protection, health protection)
7. Convenience, time-saving
8. Climate warming/winter becomes warmer
9. Climate cooling / winter becomes colder
10. Other (write) _____
(99) *Difficult to answer*

21. Do you think next winter there will be problems with heating associated with ...? (multiple choice)

1. Supply disruptions
2. Difficulties in paying for energy (financial difficulties)
3. Other (write) _____
4. *There will be no problems*

22. Which of the following best describes how your household controls the temperature of the house in WINTER? (multiple choice)

1. We set one temperature and leave it most of the time
2. We adjust the temperature manually
3. We turn the equipment on or off as needed
4. There is no possibility of temperature control in our household
5. Other (write) _____

22a. Which of the following best describes how your household controls the temperature of your house in the summer? (multiple choice)

1. We set one temperature and leave it most of the time
2. Adjust the temperature manually
3. We turn the equipment on or off as needed
4. There is no possibility of temperature control in our household
5. Other (write) _____

COOLING (all respondents answer)

23. What type of cooling system is in your house? (multiple choice)

1. Air conditioning → **GO TO QUESTION 24**
2. Fan → **GO TO QUESTION 24**
3. Sunscreen films for windows → **GO TO QUESTION 24**
4. There is no cooling system in our house → **GO TO QUESTION 23A**
5. Other (write) _____

23a. Do you plan to connect the cooling system?

1. Yes
 2. No
- (99) *Difficult to answer*

Everyone who chose option 4 in question 23 and answered 23a goes to question 29

24. What energy sources do you use to cool your house during the summer season? *(multiple choice)*

1. Electricity
 2. Solar panels
 3. Other (write) _____
 4. I never cool my house → **GO TO QUESTION 29**
- (99) *Difficult to answer*

25. How many months of the year does you cool your house down? _____ number of months

26. Note the months in which the house is cooled down and how many days in a month do you cool the house down?

Month	B. Cooling	
	Mark the months	How many days?
January		
February	2	
March	3	
April	4	
May	5	
June	6	
July	7	
August	8	
September	9	
October	10	
November	11	
December	12	
<i>Difficult to answer</i>	(99)	

27. Do you plan to change the cooling system? *(single choice)*

1. Yes, I want to switch to ...
 1. Air conditioner
 2. Fan
 3. I want to stop using an air conditioner / fan
2. No, I don't plan to change it → **GO TO QUESTION 29**

27a. For what reason do you plan to change the cooling system? *(multiple choice)*

1. The existing system does not cool down enough
 2. For financial reasons
 3. There are new technical solutions, improvements
 4. For environmental reasons (environmental protection, health protection, etc.)
 5. Climate warming (summers are getting hotter)
 6. Other _____
- (99) *Difficult to answer*

COOKING (everyone answers)

29. What is the main source of energy used in your household for cooking? *(single choice)*

1. Coal
 2. Natural gas from underground pipes
 3. Propane (gas in cylinders)
 4. Electricity
 5. Firewood
 6. Waste and garbage (rubber, plastic, paper, etc.)
 7. Biofuels (dung)
 8. *Other (write)* _____
- (99) Difficult to answer*

29a. What additional energy source do you use in your household for cooking? *(multiple choice)*

1. Coal
 2. Natural gas from underground pipes
 3. Propane (gas in cylinders)
 4. Electricity
 5. Firewood
 6. Waste and garbage (rubber, plastic, paper, etc.)
 7. Biofuels (dung)
 8. *Other (write)* _____
- (99) Difficult to answer*

30. If you use several energy sources for cooking, then for what reason? *(multiple choice)*

1. Due to interruptions in the supply of the main source
 2. Because of the high cost, to save money
 3. Convenience
 4. *Other (write)* _____
- (99) Difficult to answer*

31. How much do you pay for the main source of energy that you use for cooking per month on average in summer? *(in local currency) (single choice)*

WRITE THE AMOUNT IN LOCAL CURRENCY _____

(97) We do not pay for coal/firewood/dung, etc.
(99) Difficult to answer

POWER SUPPLY (everyone answers)

32. Is there a device/meter in your household that records electricity consumption? *(single choice)*

1. Yes
2. No

33. Do any of your household electricity bills include the costs of energy used for non-domestic purposes, such as agricultural buildings or equipment, small businesses? *(single choice)*

1. Yes
2. No

34a. Is electricity being turned off in your locality on schedule/are there rolling blackouts? *(single choice)*

1. Yes → **GO TO QUESTION 34b**
2. No → **GO TO QUESTION 35**

34b. Approximately for how many hours on average in a typical month is the electricity cut off?
WRITE HOW MANY HOURS ON AVERAGE _____
(99) Difficult to answer

- 35. Did you have any financial problems with paying electricity bills in 2022-2023?**
1. Yes, I had big problems → GO TO QUESTION 35A
 2. Yes, I had some problems → GO TO QUESTION 35A
 3. Yes, I had minor problems → GO TO QUESTION 35A
 4. No → GO TO QUESTION 37

35a. Please mark the months in which you had financial problems with paying electricity bills

<i>Month</i>	Financial problems. <i>Mark the months</i>
January	1
February	2
March	3
April	4
May	5
June	6
July	7
August	8
September	9
October	10
November	11
December	12
<i>Difficult to answer</i>	<i>(99)</i>

- 36. How did you solve the problems related to the payment of electricity bills? (multiple choice)**
1. We took a loan from a bank
 2. Borrowed money from close people
 3. Started to save more
 4. Reduced the cost of celebrations, vacations, etc.
 5. Reduced the cost of necessities (food, clothing, etc.)
 6. Other *(write)* _____

- 37. Do you use your own equipment that generates electricity? (single choice)**
1. Yes
 1. Diesel generator
 2. Solar panels
 3. Other _____
 2. No

38. How much do you pay or paid per month over the past year on average ... (in local currency) (one answer option for each line)

	sum	
1. For electricity		<i>(97) I don't use it</i> <i>(98) Refused to answer</i> <i>(99) Difficult to answer</i>
2. For gas		<i>(97) I don't use it</i> <i>(98) Refused to answer</i> <i>(99) Difficult to answer</i>
3. For coal		<i>(97) I don't use it</i> <i>(98) Refused to answer</i> <i>(99) Difficult to answer</i>
4. For district heating		<i>(97) I don't use it</i> <i>(98) Refused to answer</i> <i>(99) Difficult to answer</i>

ENERGY SAVING, ENVIRONMENTAL PROTECTION AND HEALTH
(all respondents answer)

39. Do you and your household members try to save energy? *(single choice)*

1. Yes
 2. No
 3. Sometimes
- (99) Difficult to answer*

40. Do you think that the use of fossil energy (coal, oil, gas) is harmful to the environment and the health of your family? *(single choice)*

1. Yes
 2. No
- (99) Difficult to answer*

41. Do you have energy-saving light bulbs in your house? *(single choice)*

1. Yes →GO TO QUESTION 43
 2. No →GO TO QUESTION 42
- (99) Difficult to answer →GO TO QUESTION 43*

42. If you don't use such bulbs, what is the reason?

1. It's expensive
 2. I don't like their lighting
 3. Presence of hazardous substances
 4. There is flickering, voltage drops
 5. Out of stock in stores
 6. I didn't think about it
 7. Other (write) _____
- (99) Difficult to answer*

43. What do you think the largest amount of electricity is spent on in your everyday life? *(multiple choice)*

1. Electric stove
2. Kettle
3. Slow cooker
4. Oven
5. Microwave oven
6. Lighting (light bulbs)
7. Television set
8. Air conditioner
9. Fan
10. Washing machine (automatic, semi-automatic)
11. Dishwasher
12. Water heater/boiler/Ariston
13. Portable batteries
14. Refrigerator
15. Freezer
16. Computer/Laptop
17. Tape recorder
18. Coffee machine
19. Other (write) _____
20. I don't have any of that

44. Do you pay attention to the energy efficiency class of household appliances? *(single choice)*

1. Yes
2. No
3. I don't know what energy-efficient household appliances are
(99) Difficult to answer

45. What energy saving methods do you use? *(multiple choice)*

1. Switch off appliances that are not in use
2. Turn off the lights if there are no people in the room
3. Use less electrical appliances
4. Watch less TV
5. Cook less
6. Insulate the apartment
7. Proper wiring and appliances
8. Use energy-saving, energy-efficient appliances
9. Other *(write)* _____
(99) Difficult to answer

46. In your opinion, is there a need to isolate (seal, patch, insulate) any of the following in your household from heat / cold loss? *(one answer option for each line)*

	Yes	No
1. Window	1 → GO TO QUESTION 47	2 → GO TO QUESTION 49
2. Door	1 → GO TO QUESTION 47	2 → GO TO QUESTION 49
3. Wall	1 → GO TO QUESTION 47	2 → GO TO QUESTION 49
4. Roof	1 → GO TO QUESTION 47	2 → GO TO QUESTION 49
5. Other (Write) _____	1 → GO TO QUESTION 47	2 → GO TO QUESTION 49

47. Do you plan to isolate (seal, patch, insulate) all the items you have chosen? *(single choice)*

1. Yes, I plan to → GO TO QUESTION 49
2. No, I don't plan to → GO TO QUESTION 48

48. If you do not plan such improvements in insulation / cooling, then for what reason?

1. Not enough information on how to do this
2. There is not enough information about what financial support is available
3. It's too expensive
4. Other *(write)* _____

SOURCES OF INFORMATION *(all answer)*

49. Tell me, please, from what sources of information do you receive news/various information about renewable energy (for example, solar and wind energy)? *(multiple choice)*

1. Television
2. Newspapers and magazines
3. Social networks
4. Internet forums
5. Street billboards, posters, banners
6. Leaflets, booklets distributed on the street or in mailboxes
7. Public transport
8. Specialized web-sites
9. Advertising at entrances, in elevators, etc.
10. Radio
11. My children learn it in school
12. Relatives, friends
13. None of the above

14. Other (write) _____
 (99) Difficult to answer

SOCIO-DEMOGRAPHIC BLOCK (everyone answers)

D1. Respondent's gender /write down without asking/ **READ OUT ONLY IF GENDER IS NOT CLEAR/**

1. Male
2. Female

D2. How old are you? _____

/write down the number of years /

D3. What is your nationality? (single choice)

1. Kyrgyz
2. Uzbek
3. Tajik
4. Other /what/ _____

(98) Refused to answer /do not read out/

D4. What is the highest level of education you have received? I mean only the completed level of education (single choice)

1. Incomplete secondary (9 classes)
2. Secondary (11 classes)
3. Secondary specialized and vocational education (college, technical school)
4. Higher education (specialist, bachelor, master, candidate, doctor, PhD)

D5. Please indicate your marital status? (single choice)

1. Married
2. Divorced
3. Widowed
4. Single/unmarried and never been married

(99) Refused to answer /do not read out/

D6. How many children do you have under the age of 18? _____

D7. How many people - adults and children - are currently live in your family, including yourself?

DO NOT include those who just came to visit, those who serve in the military, or children who are studying at a college / university in other cities and countries or have gone to work in other countries.

999. I live alone (alone)

- 1) Total people _____
- 2) Children under 16 years old [16 years old and under] _____
- 3) Adults [17-57 years old] _____
- 4) Seniors [58 years and older] _____

D10. What is the approximate monthly income of your household, if you add up all salaries, scholarships, pensions and other income (in local currency)? (single choice)

For Kyrgyz Republic	For Tajikistan	For Uzbekistan
Less than 6000 KGS	Less - 800 TJS	Less than 1,200,000 UZS
6,001 - 12,000 KGS	801 - 1,400 TJS	1,200,001-2,000,000 UZS
12,001 - 20,000 KGS	1,401 - 2,400 TJS	2,000,001-3,200,000 UZS
More than 20,000 KGS	More than 2,400 TJS	More than 3,200,000 UZS
(99) difficult to answer	(99) difficult to answer	(99) difficult to answer

D11. What is your current employment? *(single choice)*

1. I work for myself - individual activity (sole proprietorship without hired employees)
2. I work for myself - an entrepreneur (with hired employees)
3. Self-employed / do not have an official / permanent place of work
4. Private sector employee
5. Employee of the public sector
6. Civil servant
7. Student
8. Pensioner
9. Housewife/Householder
10. Unemployed
11. Farmer
12. Other (specify) _____

(99) Refused to answer /do not read out/

D12. How much do you pay in TJS/KGS/UZS on average per month in winter on ...?

D 13. How much do you pay in TJS/KGS/UZS on average per month in the summer on ...?

Expenses	D12. In winter	D13. In summer
1. for meals		
2. for heating the house		
3. for electricity		
4. for water supply		
5. for housing		
6. for education		
7. for treatment		
8. to support business		
9. to repay debts, loans, debts		
10. for recreation, leisure		
11. family events (weddings, anniversaries, etc.)		
12. for clothes, shoes		
13. services (beauty salons)		
14. I save money		
15. other expenses		

D14. Imagine that you have the opportunity to switch to more environmentally friendly energy sources, such as solar panels, windmills, etc.

Based on the price you are currently paying, how much more are you willing to pay for green energy sources? Please tell your maximum percentage *(single option)*

WRITE IN PERCENTAGE _____%_____

(96) No, I am not ready to spend money on eco-friendly energy sources

(97) I have already switched to an eco-friendly energy source

(99) Difficult to answer

APPENDIX 2

Table A: Research sample (Kyrgyz Republic)

Survey sample by settlements

Region	District	Urban	Rural	Number of questionnaires N=522
Batken		Batken		20
Batken	Batken		Ak-Turpak partially	15
Batken	Batken		Zar-Tash	15
Batken	Kadamjay		Min-Chynar	15
Batken	Kadamjay		Kyrgyz-Kyshtak	15
Osh	Kara-Suu	Kara-Suu		20
Osh	Aravan		Achi	13
Batken	Aravan		Oktyabr	13
Osh	Aravan		Tepe Korgon	13
Osh	Aravan		Langar	13
Osh	Aravan		Khauz	13
Osh	Aravan		Naiman	13
Osh	Aravan		Pakhtachi	13
Osh	Kara-Suu		Zarbalik	13
Osh	Kara-Suu		Kara-Seget	13
Osh	Kara-Suu		Andijan	13
Osh	Kara-Suu		Asancheck	13
Osh	Kara-Suu		Kyzyl-Abad	13
Osh	Kara-Suu		Telman	13
Osh	Kara-Suu		Madaniyat	13
Jalal-Abad		Jalal-Abad		20
Jalal-Abad	Nooken	Kochkor-Ata		25
Jalal-Abad	Bazar-Korgon		Kolot	12
Jalal-Abad	Bazar-Korgon		Bazar-Korgon	12
Jalal-Abad	Bazar-Korgon		Dzhany-Abad	12
Jalal-Abad	Bazar-Korgon		Mogol-Korgon	13
Jalal-Abad	Nooken		Aral	13
Jalal-Abad	Nooken		Byurgendyu	13
Jalal-Abad	Nooken		Beget	13
Jalal-Abad	Suzak		Changyr-Tash	13
Jalal-Abad	Suzak		Munduz	13
Jalal-Abad	Suzak		Munduz	13
Jalal-Abad	Suzak		Kyummyush-Aziz	13
Gorkenesh Osh		Osh		45
Gorkenesh Osh			Zhapalak	10

Table B: Research sample (Tajikistan)**Survey sample by settlements**

Region	District	Urban	Urban-type settlement	Rural	Number of questionnaires N=500
Sogdia	Asht		Shaydon		5
Sogdia	Asht			Charogon	16
Sogdia	Asht			Kalam	16
Sogdia	Asht			Sohili Sir	17
Sogdia		Isfara			17
Sogdia		Konibodom			17
Sogdia	Konibodom			Niyozbek	17
Sogdia	Konibodom			Kuchkak	17
Sogdia	Konibodom			Hamirjui	17
Sogdia	B. Gafurov			Ovchikalacha	38
Sogdia		B. Gafurov			6
Sogdia	B. Gafurov			Isfisor	38
Sogdia	B. Gafurov			Histevarz	38
Sogdia	J.Rasulov			Gulhona	13
Sogdia	J.Rasulov		Mehrobod		5
Sogdia	J.Rasulov			Somoniyon (Uzbekkishlak)	14
Sogdia	J.Rasulov			Zarafshon	13
Sogdia		Khujand			61
Sogdia	Spitamen		Navkat		6
Sogdia	Spitamen			Safedteppa	13
Sogdia	Spitamen			Saidkala	13
Sogdia	Spitamen			Kurkat	14
Sogdia		Istaravshan			20
Sogdia	Istaravshan			Guliston	23
Sogdia	Istaravshan			Bogi Kalon	23
Sogdia	Istaravshan			Lakat	23

Table C: Research sample (Uzbekistan)**Survey sample by settlements**

Region	District	Urban	Rural	Number of questionnaires N=500
Andijan		Andijan		10
Andijan	Shakhrikhan	Shahrikhan		10
Andijan	Asaka	Asaka		9
Andijan	Kurganteppa	Korasuv		9
Andijan	Kurganteppa	Kurganteppa		10
Andijan	Izbaskan	Poytug		12
Andijan	Zhalakuduk	Akhunboboev		10
Andijan	Khojaabad	Khojaabad		10
Andijan	Shakhrikhan		Nazarmahram	10
Andijan	Bulakbashi		Naiman	10
Andijan	Pakhtaabad		Uchkuza	10
Andijan	Asaka		Bozorboshi	10
Andijan	Izbaskan		Korayantok	10
Andijan	Altynkul		Mirabad	10
Andijan	Andijan		Aral	10
Andijan	Balykchi		Maslahat	10
Namangan		Namangan		10
Namangan	Yangikurgan	Yangikurgan		10
Namangan	Turakurgan	Turakurgan		10
Namangan	Uichi	Uychi		10
Namangan	Chartak	Chartak		10
Namangan	Chust	Chust		10
Namangan	Namangan	Girvon		10
Namangan	Chust	Olmos		10
Namangan	Chartak	Karaskan		10
Namangan	Turakurgan	Aktash		10
Namangan	Namangan		Tepakurgan	10
Namangan	Chust		Zvutkan	10
Namangan	Turakurgan		Ertepa	10
Namangan	Uichi		Ezgulik	10
Namangan	Yangikurgan		Gaiston	10
Fergana		Fergana		10
Fergana		Kokand		10
Fergana		Kuvasai		10
Fergana		Margilan		10
Fergana	Kuva	Kuva		10
Fergana	Yozyovon	Yozyovon		10
Fergana	Buvaidin	Chinabad		10
Fergana	Baghdad	Baghdad		10
Fergana	Rishtan	Rishtan		10
Fergana	Uzbekistan	Yaipan		10
Fergana	Altyaryk	Tinchlik		10
Fergana	Fergana		Okbilol	10
Fergana	Tashlak		Besarang	10
Fergana	Uchkuprik		Sarikurgan	10
Fergana	Kushteppa		Garmidan	10
Fergana	Altyaryk		Okmozor	10
Fergana	Kushteppa		Loison	10
Fergana	Rishtan		Amirabod	10
Fergana	Dangar		Tulaboi	10



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