

American University of Central Asia

Policy Brief

**Coal Consumption in the Bishkek
Residential Areas. Private House Heating.**

By

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POLICY BRIEF

Objectives of the research

Air pollution is the most critical issue in Bishkek, especially during the winter months when the presence of smog is strongly felt. In recent years, Bishkek has consistently ranked high in the list of cities with the most polluted air, often exceeding the hazardous threshold of 300 μg for PM_{2.5} and reaching levels as high as 500 μg . Moreover, according to UNICEF (2022) between January 7, 2021, and June 30, 2022, air pollution caused 112 deaths. There has been a 20% increase in the number of people suffering from respiratory diseases. Furthermore, the economic cost of air pollution is estimated to be 2 billion KGS or 24.9 million USD loss during that period.

Data on air quality in Bishkek is collected from multiple sources, including low-cost monitors and professional sensors, all indicating a significant level of air pollution during the winter months.

Background

Air pollution is one of the major risks that put the lives of humans, animals, and nature in danger of struggling with a variety of diseases. Like, cancer, heart attack and asthma. It not only spreads the negative impact on the environment but also it reduces worker productivity and increases mental health problems. The cleanest and green city in the

According to the research of Move Green Organization during the lockdown in Covid-19, private house heating is found to be the main contributor to air pollution compared to other sources. To tackle this issue, the government has already implemented a policy to gasify residential areas. Currently, 27 out of 47 residential areas have been successfully gasified by Gazprom. Despite the many studies done on the topic of smog in Bishkek, there are still gaps in the analysis of this issue. Our research aims to assess the effectiveness of gasification efforts and delve into the coal consumption in residential areas of Bishkek. Through collecting primary data from households from Bishkek and Osh cities, this study aims to provide further policy recommendations for reducing emissions from private houses.

former Soviet Union Bishkek, Kyrgyzstan changed to one of the most polluted cities in the region. The reason behind this negative transformation is internal migration, worse social-economic conditions, improper construction of private houses, vehicles, domestic and fragile quality heating domestic energy resources and low-quality gasoline. Due to cold

weather and using more energy resources in the winter people are more suffering from the polluted atmosphere of the city. According to a survey in 2019, 6.67 million people lost their lives because of bad air conditions (Dzushupov, 2022).

Air quality is improving in high-income or developed countries but still, low- and middle-income countries are in danger of increasing air pollution. Bishkek, the lower-middle income capital, is among the top 10 most polluted cities in the world (Dzushupov, 2022). Even during the winter people are requested to not do sport in open areas and

Literature Review

The primary cause and sources of air pollution in Bishkek, Kyrgyzstan are domestic heating in private houses and coal-based power stations (CCPS). The heating device that is used by people is more dangerous and harmful in comparison to CCPS due to empty low temperature fuel combustion when the essential part of fuel is not converted to heat, but it changes to toxic gases like carbon monoxide. (Dzushupov, 2022). According to the World Bank report the number of used soiled fuel in urban areas of Kyrgyzstan is 40% for residential heating. (Dzushupov, 2022). The sharp increase in population of Bishkek also increased air pollution, in 2018 the population doubled, and it exceeded one million. Civil and political authority encouraged people to use gas as an alternative to coal in order to deal with air pollution. GazProm is a Russian Corporation that provides natural gas in the residential area of Bishkek. P.4 In fact, people are mostly using cheap coal for heating because their financial condition cannot allow them to cover gas since people in Kyrgyzstan are living below the poverty line. That's why they prefer to care about surviving rather than the environment. Regarding economic cost of air pollution in Bishkek The researcher figured out that there is a connection between income per capita and emission per capita. This link can clearly be seen in the case of Kyrgyzstan where increase of income leads to high levels of consumption and emission level. As a result, the rich families build new houses and lifestyles due to their demand for heating and decreasing CO₂ emissions related to their income.

recommended to close their windows to avoid polluted air and keep their safety. Compared to other years from October 2019 to July 2022 the level of air pollution was much higher in Bishkek, Kyrgyzstan. This city witnessed a decrease in average level of pollution during the summer season. Data shows that lung cancer increases among Bishkek citizens from 53 to 74 per 100,000 and asthma from 24 to 77 per 100,000. (Dzushupov, 2022). The reason behind related illnesses due to the air condition was the result of lost productivity and economic cost too.

Although there is not enough research and data on the topic of climate change awareness and household behavior patterns in Kyrgyzstan, the wealthier people become aware of the negative impact of energy resources on air quality, the more they are willing to use high quality heating sources. Data from recent years shows that the coal consumption is increasing and consumed by the private houses. Unreliability and demand for growth among citizens and lack of electricity supply are the major drivers of increasing coal consumption in recent years. The National Statistical Committee Kyrgyz Household Integrated Survey (KIHIS) targeted 5000 households as the largest panel in the country to measure consumption based on poverty and household expenses' (Sultanelieve et al, 2021, p.26) . The outcome of data figures out that five main sources of energy in kyrgyzstan, wood, coal, dung, corn diesel, brushwood and LPG. In the period between 2013-2019 there was a decrease in consumption of brush wood and dung but an increase of coal. "The total consumption of coal in 2013 was 67,137 centimeters and will rise to 82,038 centers in 2019 as a result, the consumption of coal increased by 22% in six years" (Sultanelieve et al., 2021). According to the WHO, there is a direct impact of air pollution on the economic cost of a country. As an example, "pollution cost in Europe is close to USD 1,6. trillion" (Sultanelieve et al, 2021). In addition, the economic cost of air pollution can lead to decrease of GDP and minimization of labor productivity, increase of migration and mortality, and reduction of work hours. In this case, the key



factor for developing sustainable policy is economic appraisal. Overall, the period of extreme air pollution in Bishkek proved that the link of climate conditions

to the level of air quality in the country is more significant.

Methodology and Data Collection

The study sample comprised 200 households, with 100 households in Bishkek and 100 households in Osh. To avoid duplication issue, the study team divided into two subgroups for Bishkek and four subgroups for Osh, with each subgroup assigned to a specific area to conduct the survey. The surveyors visited each household and interviewed the head of the household or an elderly member. Only one respondent was interviewed per household to avoid duplication.

The survey questionnaire consisted of 14 questions in total. Most of the questions were closed-ended with multiple-choice options, while a few questions were open-ended to allow for qualitative data. The survey questions were designed to gather information on participants' awareness of air pollution in the city, the main sources of air pollution, and the sources of energy they used to heat their houses during winter. The survey also asked about the total area that participants heated during winter, how much money they spent on energy, their preferred type of energy, and whether they currently used coal and whether they wanted to change to gas or continue using coal.

Results and Discussions

The data analysis indicates that there are notable discrepancies between Bishkek and Osh in terms of awareness about air pollution, the main sources of air pollution, and the types of energy used for heating houses. Specifically, 87% of respondents in Bishkek were aware of air pollution, while only

The survey questions were developed based on a review of relevant literature. The questions were also piloted with a small group of participants to ensure clarity and understanding. The survey responses were collected and were digitalized for analyzing them.

To ensure confidentiality and anonymity, the survey team informed respondents of the purpose of the study and obtained their verbal consent to participate. Respondents were assured that their personal information would be kept confidential, and only aggregate data would be reported. Data were stored and handled securely to prevent unauthorized access and maintain confidentiality.

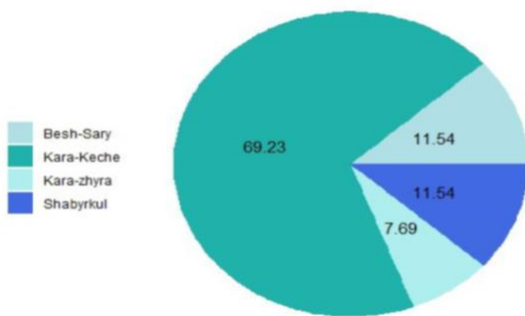
Overall, the survey was an effective method for collecting data on the sources of air pollution and energy sources used for heating houses during winter in Bishkek and Osh cities. The survey results will provide valuable insights into the current energy use patterns and attitudes toward alternative energy sources, which can inform policy decisions and interventions aimed at reducing air pollution in these cities.

35% of respondents in Osh were aware. In terms of identifying the main sources of air pollution, 42% of respondents in Bishkek cited cars, 22% private houses, and 20% CHP. In Osh, 52% of respondents did not know the main sources of air pollution, while 24% cited cars, 21% private houses, and only 3% CHP.

Regarding energy sources for heating houses, gas was the most common source in Bishkek, with 43% of respondents using pure gas and around 50% using a combination of gas and other sources of energy. Around 24% of respondents in Bishkek used electricity for heating, and only 11.2% used pure coal. However, when considering those using a combination of energy sources, the percentage of coal users in Bishkek increased to around 22%. In contrast, coal was the predominant source of energy for heating houses in Osh, with 40% of respondents using coal and 20% using gas. Furthermore, a significant proportion of Osh respondents relied solely on coal due to insufficient gas supply.

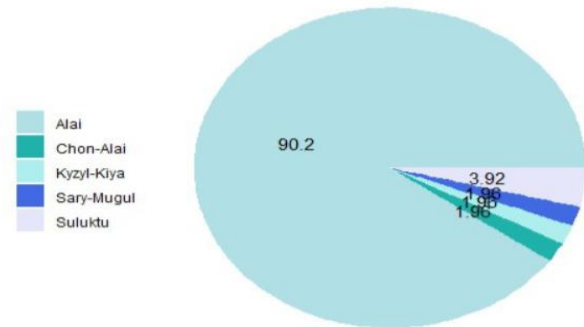
According to our data analysis, financial difficulties are the main barrier for people in Bishkek to switch from coal to gas for heating their houses. Even though gas pipes are available, many people still prefer using coal because the cost of installing a gas boiler and heating system is around \$1500, which is a significant expense. Additionally, in Bishkek, the price for one ton of coal ranges from 4000 to 5000 soms, which is similar to the cost of gas. Two major types of coal are supplied to Bishkek from Kara-Keche and Kazakhstan Shabyrkul.

Graph 1. Types of Coal used in Bishkek



In Osh, the situation is different, with the price of one ton of coal ranging from 7000 to 10000 soms, which is significantly higher than in Bishkek. Coal is supplied only from Alai, and due to the insufficient supply of gas, the majority of people in Osh do not want to switch from coal to gas for heating their houses.

Graph 2. Types of Coal used in Osh



Despite the inconvenience of using coal, many people continue to rely on it because of the high cost of switching to gas.

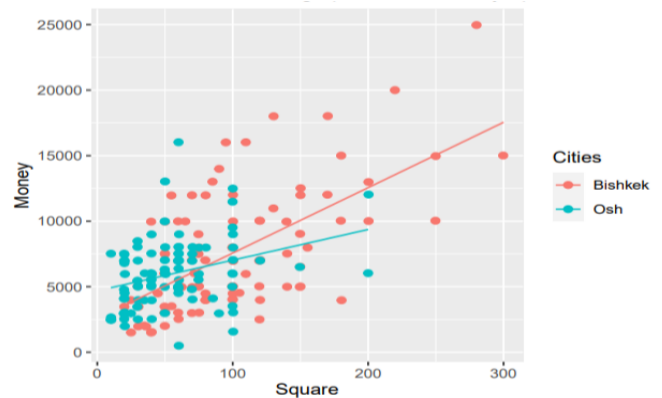


Figure 1. Correlation of Heating Space and Money Spent

These results suggest that targeted interventions are necessary to tackle air pollution and promote cleaner energy sources for heating houses in both cities. In Bishkek, efforts should focus on raising awareness about air pollution and promoting the use of cleaner energy sources, such as gas and electricity. In Osh, improving gas supply and promoting cleaner energy sources are essential to reduce dependence on coal.

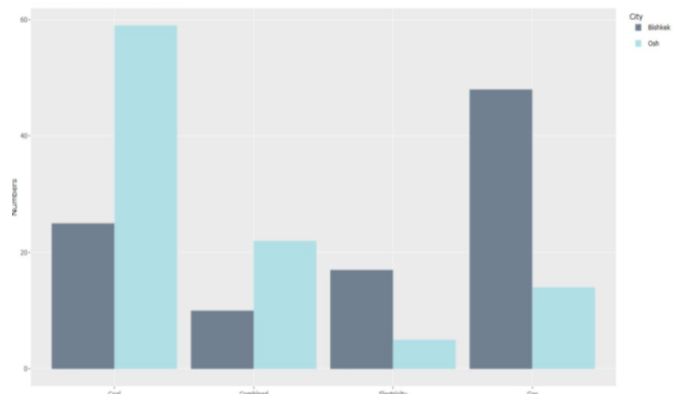


Figure 2. Fuel heating in Bishkek and Osh

Table 1. Total Expenses of Installation of Gas Boiler

Type of Expense	Prices in Bishkek
Application for gasification	free
Services of Engineer	1000s
Installation of gas matter, laying a gas pipelines	22 500s
Installation and buying of gas boiler	Russian gas boiler 55 000s German 68 000s Installation 7000s
Commissioning works	3000s
Total	94 000

Conclusion and Policy Recommendations

Due to the exclusive reliance on Russia as the sole supplier of gas for Kyrgyzstan, concerns arise regarding the potential weaponization of gas. The current lower gas prices indicate the possibility of Russia employing a predatory dumping strategy. Given the absence of gas resources within Kyrgyzstan and the lack of reliable alternative gas suppliers in neighbouring countries, Russian gas stands as a monopoly. The consequences of predatory dumping could result in Kyrgyzstan becoming energy dependent on Russia. Therefore, gasification alone may not offer a sustainable long-term solution for private household heating. In the short term, to encourage the adoption of gas in gasified residential areas, it is advisable for the government to provide credit incentives to those who cannot afford gas boilers do to the financial difficulties.

However, for a sustainable long-term perspective, it is highly recommended for the government to diversify energy resources. Kyrgyzstan, being rich in water resources, can leverage this advantage by constructing large and small-scale dams for hydroelectric power generation. Additionally, the government can promote the development of wind and solar power. Given that both Bishkek and Osh are relatively sunny cities, the installation of solar power batteries in each private household can be an effective solution. By implementing these measures, Kyrgyzstan can enhance energy diversification and reduce its dependence on a single energy source and hence the decrease the emission form private house heating.

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