INCIDENCE OF DISTRICT HEATING AND NATURAL GAS NETWORKS ON ENERGY POVERTY ACROSS KAZAKHSTAN

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Overview

Lack of access to modern fuels, high fuel prices, poor building insulation, and income poverty are one of the aspects leading to the energy poverty problem. In EU countries, energy poor persons are defined as "individuals not able to adequately heat their homes at affordable cost". In developing countries lack of access to clean and commercial fuels and a high dependence on traditional biomass are the commonly accepted indicators of energy poverty. As in case of Kazakhstan, both definitions may be applicable. Kazakhstan may be particularly highly affected by this phenomenon due to the high heating demand and severe continential climate, as well as due to the high use of coal and biomass in some of its regions. This paper investigates the linkages between energy affordability and lack of access to modern energy sources (district heating and gas) across the regions of Kazakhstan.

Methods

This study combines and analyses data for the years 2011-2013 from the two Surveys on living conditions: D-004 Quarterly Survey of income and expenditure of households, and D-006 Annual Household Survey. These surveys are administered by Committee of Statistics of the Republic of Kazakhstan. The quarterly questionnaire on income and expenditure consists of 13 sections, including section on housing and energy expenditure. The households were selected by random sampling based on Population Census. The survey covered 12000 households in 2011-2013 which is 0.2-0.3% of the total number of households in Kazakhstan. The households are representative at the country and regional level. The regional disaggregation corresponds to administrative division of the country: 14 regions and 2 cities.

This study considered only energy affordability aspect of energy poverty in Kazakhstan by applying "10% threshold of household income spent on energy" indicator. The choice of indicator was predermined by data availability.

Results

The fuel choice mainly depends on network gas pipeline and district heating availability. Western regions and some part of Southern regions mainly rely on gas and central heating, while North and Central show huge reliance on coal, especially in the rural areas.

28% of surveyed households were found to spend more than 10% of their income on energy. The highest share of energy poor population was found to be in coal dependent North and Central Kazakhstan: 62% of households in Akmola, 53% in North Kazakhstan and 51% in Kostanay regions. By contrast, energy poverty was much less prevalent in oil and gas rich regions: 1% in Atyrau and Mangistau and 8% in West Kazakhstan regions. Energy poverty was higher in rural areas, with low access to network gas and district heating, as well as in the regions with higher heating degree days (North and Central Kazakhstan).

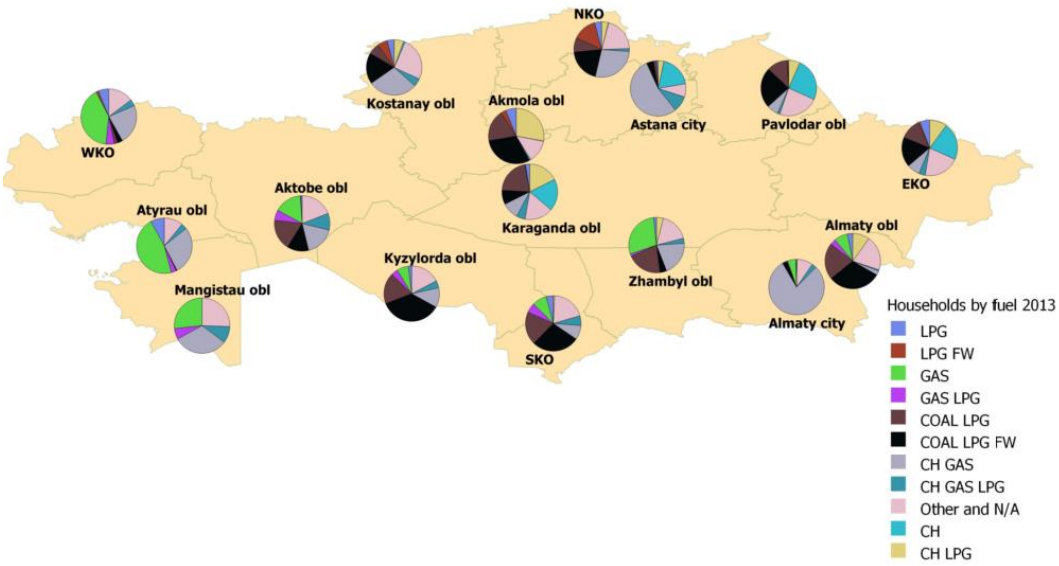

Figure 1 - Share of households by fuels used by regions of Kazakhstan (CH- central heating, GAS-distribution network gas, LPG- liquefied petroleum gas, FW – firewood)

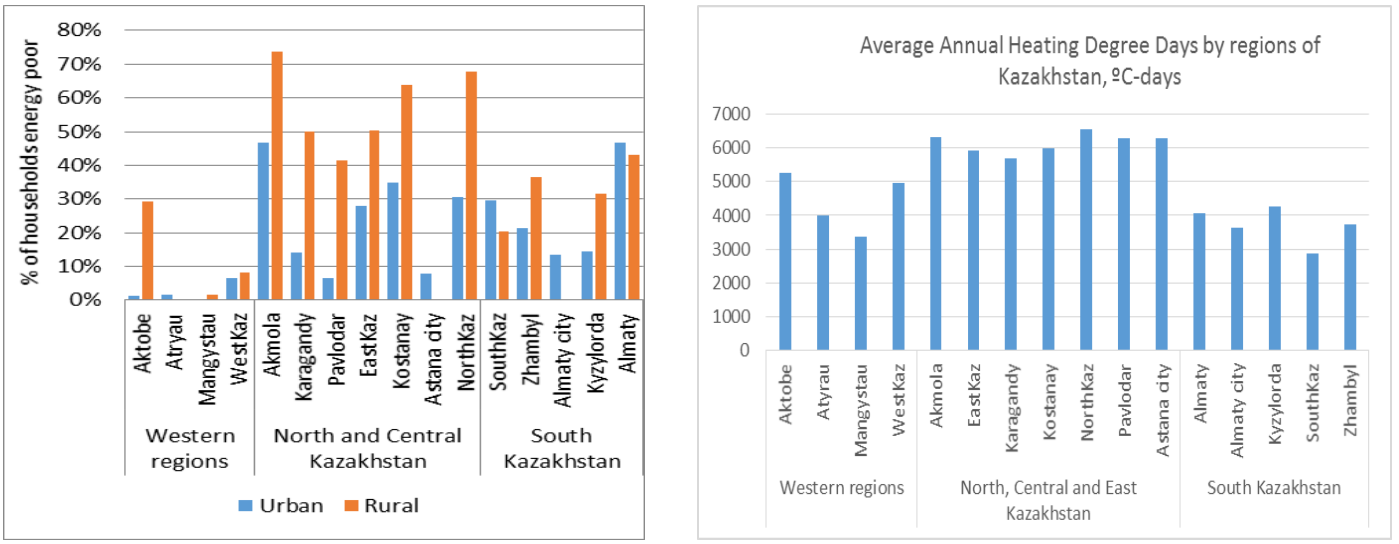

Figure 2 - Share of households experiencing energy poverty (10% income indicator) (left) and and annual average heating degree days (right)

Conclusions

This study demonstrated that households without access to modern fuels in Kazakhstan also suffer from energy affordability, due to lower incomes and higher energy expenditures or combination of both. The construction of gas pipeline to the North and Central Kazakhstan could improve the situation, but have been postponed by the Government due to its high cost and uncertainties in the payback of the project. Thus, other alternative options, including LPG, renewable sources of heat in combination with building renovation should be considered. Alternative (and composite) metrics, currently under development, will help in assessing the energy poverty issue in a more deep and precise way.