Energy storage applications kyrgyzstan

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Kyrgyzstan has considerable untapped renewable energy potential. Existing renewable energy consists of large HPPs, which account for 30% of total energy supply, but only 10% of hydropower potential has been developed. Opportunities to develop decentralised renewable energy technologies are especially promising, primarily small hydropower stations on rivers in the mountains. In 2016, there was approximately 40MW of small hydro capacity.

Other viable options for renewable energy development in Kyrgyzstan include generating heat from solar energy and biogas, and electricity from wind and solar resources; no projects so far exploit these technologies.

The National Energy Program and the Strategy for Fuel and Energy Sector Development (covering 2010-25) are the key policies for sustainable energy development. The rapid expansion of renewables, especially hydro, is a priority for energy sector development, and the Strategy supports the construction of approximately 100 small hydroelectric plants with total capacity of 180MW.

Developing small HPPs is one of the Kyrgyz government"s top priorities because it is hoped that increased indigenous energy production will reduce fuel import reliance as well as emissions.

Kyrgyzstan"s geographic location and climatic conditions are quite favourable for the broader development of solar energy, evident in solar radiation maps. Annual specific power generation by photoelectrical equipment has a potential 300kilowatt hours per square metre (kWh/m2), and annual specific productivity of solar hot water supply could be up to 750kWh/m2 (heat). These figures assume the availability of increasingly inexpensive photoelectrical converters, modules and flat solar collectors, as well as the necessary scientific-technical capacity.

Kyrgyzstan has more than 30 geothermal sources, but only some of them are used, and then only in sanatoriums and resorts (e.g. Issyk-Ata and Teplye Klyuchi) due to their low capacity. One method of using low-capacity geothermal energy involves collecting scattered low-temperature (5?C to 10?C) natural heat or industrial waste heat through heat pumps for heat supply. However, heat pumps are not widely used in Kyrgyzstan for several reasons, such as low electricity tariffs, lack of consumer knowledge on modern residential heat supply technologies, and a lack of specialised installation companies.

The main barriers to using biomass are its high cost and low conversion efficiency compared with fossil fuels, underdeveloped supply logistics, and risks associated with intensification of agriculture. Biomass capacity includes agriculture (livestock and plants), the food industry and solid domestic waste. Forestry waste, wastewater treatment systems, wood processing and the paper industry are not included because quantities are

negligible.

The economic and productive capacity of biomass from livestock, plant material and the food industry relies heavily on the productivity of processing equipment and quantities provided by farms.

There are currently no waste-to-energy projects or initiatives. Municipalities of large cities have been considering building plants for converting non-recyclable waste materials into electricity and heat, but no plans have yet been fully developed or implemented.

Both energy supply and demand offer many opportunities for efficiency improvements in Kyrgyzstan. Infrastructure is aged, worn and highly inefficient with losses above 20%. Residential and commercial building stock was constructed during the Soviet era with few efficiency standards. Energy savings potential in buildings is estimated at a minimum of 15%, while modernisation and rehabilitation in the energy system could yield 25% savings.

The Law on Energy Savings is the main legislation related to energy efficiency. In March 2013, a Law on Energy Conservation and Energy Efficiency in Buildings was adopted, and a State Programme on Energy Saving and Energy Efficiency Policy Planning for 2015-2017 was approved in August 2015.