#### What are the benefits of a hydropower reservoir in Tajikistan and Kyrgyzstan?

The hydropower reservoir focuses on guaranteeing the supply of water to meet the demand in Uzbekistan and Turkmenistan. 3.2.1. System costs and CO 2 emissions The construction of SPHS in Tajikistan and Kyrgyzstan offers economic benefitsfor the whole region.

What are the benefits of energy storage beyond the energy sector?

Benefits of energy storage beyond the energy sector are shown. Long duration energy storageis key for high shares of solar PV and wind energy in the region. An open-access, integrated water and energy system model of Central Asia is developed. Central Asia's energy transition to a high share of renewable energy by 2050 is analyzed.

### Can energy storage solve transboundary water and energy conflict in Central Asia?

A solution for transboundary water and energy conflict in Central Asia is proposed. Benefits of energy storage beyond the energy sector are shown. Long duration energy storage is key for high shares of solar PV and wind energy in the region. An open-access, integrated water and energy system model of Central Asia is developed.

When is solar energy used in Tajikistan?

As shown in Fig. 9,the SPHS plant in Tajikistan stores solar energy seasonally from April to Novemberand generates electricity with a higher capacity factor during February and March. The main objective of hydropower is to supply water downstream and reduce its generation substantially in January and February.

### Why does Tajikistan need hydropower?

The main objective of hydropower is to supply water downstream and reduce its generation substantially in January and February. The demand in Tajikistan is smaller than the generation. This is because the main part of the electricity is exported to other countries, mainly Uzbekistan (exports to Afghanistan are not considered in this study). Fig. 8.

### What are the economic benefits of SPHS in Tajikistan and Kyrgyzstan?

3.2.1. System costs and CO 2 emissions The construction of SPHS in Tajikistan and Kyrgyzstan offers economic benefits for the whole region. Countries downstream can import hydropower-based electricity and reduce their fossil-based generation in different seasons.

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Afghanistan energy storage challenges of origins. Irshad AS, Samadi WK, Fazli AM, et al. (2023) Resilience and reliable integration of PV-wind and hydropower based 100% hybrid renewable energy system without any energy storage system for inaccessible

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