Tajikistan energy storage systems

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This International Energy Agency (IEA) energy sector review of Tajikistan was conducted under the auspices of the EU4Energy programme, which is being implemented by the IEA and the European Union, along with the Energy Community Secretariat and the Energy Charter Secretariat.

With abundant water potential from its rivers, natural lakes and glaciers, Tajikistan is almost exclusively reliant on hydro for electricity generation. It is home to some of the world"s largest hydropower plants and is ranked eighth in the world for hydropower potential with an estimated 527terawatt-hours (TWh). Currently only 4% of the country"s hydro potential is exploited.Tajikistan"s geographic proximity to some of the world"s fastest-growing energy markets means that investing in developing its hydropower potential can contribute to regional energy security and the clean energy transition, in addition to addressing Tajikistan"s high vulnerability to climate change and natural disasters.

Coupled with the IEA roadmap on cross-border electricity trading for Tajikistan, published in October 2021, this report aims to give a holistic overview of Tajikistan"s energy sector and to assist policy making at all levels in order to facilitate the effective delivery of the National Development Strategy for 2030 and its ambitious goals, which include increasing hydropower generation capacity by 10gigawatts and raising annual electricity exports by 10TWh. It also supports government efforts for ongoing energy sector reforms, aimed at restructuring the state-owned vertically integrated electric utility with financial viability issues, introducing market mechanisms to alleviate power sector challenges and updating its regulatory and tariff regimes.

The report commends the government of Tajikistan for setting clear goals for its national development strategy and the subsequent sectoral development programmes, caveats the introduction of domestic coal as a key support for national energy security structures, and advocates for the introduction of other renewable sources and enhanced regional co-operation for achieving energy security and sustainable development goals.

Electricity can be generated in two main ways: by harnessing the heat from burning fuels or nuclear reactions in the form of steam (thermal power) or by capturing the energy of natural forces such as the sun, wind or moving water.

Electricity production tends to closely match demand, which in turn is driven by economic and population growth and changes to the structure of the economy.

Unlike other energy commodities such as coal, oil and natural gas, electricity trade between countries is relatively limited as it is more technically complex and requires a direct cross-border interconnection. Such connections can help to balance out supply and demand across regions, which will be increasingly important as variable renewables like solar and wind make up a larger share of electricity generation.

Power generation, which includes electricity and heat, is one of the largest sources of CO2 emissions globally, primarily from the burning of fossil fuels like coal and natural gas in thermal power plants.

Growth in electricity demand has slowed down or even reversed in many advanced economies due to energy efficiency efforts and the shift towards less energy-intensive forms of economic activity, such as services. But it is still growing rapidly in many emerging market and developing countries, especially those where a significant fraction of the population still lacks access to electricity.

Electricity is primarily used for heating, cooling, lighting, cooking and to power devices, appliances and industrial equipment. Further electrification of end-uses, especially transportation, in conjunction with the decarbonisation of electricity generation, is an important pillar of clean energy transitions.