Armenia office energy storage

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Historically, Armenia has heavily relied on energy imports, primarily from Russia and Iran. Diversifying energy sources and reducing import dependencies are key Armenian policy priorities. With no significant domestic fossil fuel reserves, hydroelectric power is the primary local energy source. Yerevan aims to expand renewables to meet decarbonization targets and decrease import reliance.

However, integrating more variable renewable energy presents challenges. A flexible power system with storage technologies and increased connectivity with neighbouring countries are essential to accommodate growing renewable energy volumes. This newsletter offers insights into Armenia’s energy sector, recent developments, challenges, and plans.

Armenia’s energy sector has been significantly shaped by its geographical and geopolitical circumstances. With no significant fossil fuel reserves, the country heavily relies on energy imports, which account for 78% of its primary energy supply. Being landlocked restricts Armenia’s access to import routes, further complicated by strained relations with Azerbaijan and Turkey, leaving only Georgia and Iran as viable options.

Armenia has utilized existing Soviet-era gas infrastructure to import natural gas from Russia through Georgia at low costs, leading to increased dependence on Russian energy imports over time. Additionally, a second gas pipeline from Iran provides another import route, primarily utilized through a barter agreement where Armenia exchanges electricity for natural gas, only partially using the imported volumes for domestic consumption.

Presently, Armenia is actively seeking ways to diminish its reliance on energy imports. Significant progress has been made in enhancing energy efficiency and deploying renewable energy sources. In 2022, Armenia published the program on energy saving and renewable energy for 2022- 2030. These endeavours have resulted in a notable achievement: a year-on-year reduction of 10% in gas imports from Russia in 2023.

Armenia’s generation mix is diversified, with gas contributing 42%, nuclear 32%, and hydro 22%. Since 2015, electricity generation from natural gas has increased by 38%, while hydro generation has declined by 15%. The total generation capacity stands at 4 GW, which exceeds peak demand needs (~1.3 GW). However, due to an aging power park, the available capacity is comparatively lower at 3.1 GW.

The entirety of Armenia’s 448 MW nuclear capacity is housed in the Metsamor nuclear power plant. Initially reactivated during the mid-1990s energy crisis, decommissioning of Metsamor has been repeatedly delayed. Currently slated for decommissioning by the end of 2026, there are considerations for extending its operational lifetime until 2036. Additionally, plans are underway for constructing a second nuclear reactor with an estimated capacity of 1-1.2 GW.

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As solar capacity continues to rapidly expand in the country, concerns regarding gird stability have commenced to rise. An increased share of variable generation in tandem with a slow ramping time of the Metsamor nuclear power plant and an ageing gas power plant park pose significant challenges to balance the day-night generation profile changes brought about by solar PV.

An expansion of current interconnection capacities with Georgia and Iran from 200 to 350 MW and 340 to 1,200 MW, respectively, is paramount to accommodate renewable"s projected expansion. Additionally, talks revolving around an increment in storage capacities in the form of pump hydro in the Vorotan cascade and a utility scale battery project are on the table.

Currently, Armenia is in the initial stages of developing a pilot project on battery storage, with plans for a utility-scale project with an estimated installed storage capacity of 1,200 MWh to be tendered in the coming years. The precise installed capacity and necessity of these storage projects will depend significantly on the progress of expanding transmission capacities with Georgia and Iran. The financing of these projects and their exact impact on end-consumer tariffs remain unclear.

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