Yerevan energy storage research and development

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????2019,·(Andrea Wiktorin):",?

In the past decades, Armenia has achieved significant progress in utilizing renewable energy sources, primarily through hydropower, which has contributed between a quarter to a third of the country"s energy output. Despite this progress, the majority of Armenia’s electricity still comes from non-renewable sources. Last year Armenia produced 8,907.9 GWh of electricity, up 16% from 2021. The vast majority came from thermal power plants in Yerevan and Hrazdan (43.5%) and the Metsamor Nuclear Power Plant (32%).

Hydropower accounted for 21.8%, while solar stood at 2.7% and wind power at just 0.02%. Overall, renewable sources (hydro, solar, wind) combined generated 2,183 GWh or 24.5% of the total. Armenia exported 17.3% of the total electricity output to Iran and Georgia.

Renewable energy inevitably has a political side to it. In its recent resolution on EU-Armenia relations, adopted on March 15, the European Parliament called on the Armenian authorities to "take crucial steps to accelerate the development of renewable energy, increase energy efficiency and diversify energy sources, taking into account that natural gas imports from Russia still represent over 80% of Armenia"s gas imports, as well as the bilateral cooperation between Armenia and Iran on energy exchange." Earlier, in 2017, when it signed the Comprehensive and Enhanced Partnership Agreement (CEPA) with the EU, Armenia committed to enhancing the security and safety of the energy supply, including by promoting the use of renewable energy sources.

Armenia"s progress in renewables came from two sources: small hydro and solar. However, wind power and other types of renewable energy are still not economically feasible at this time.

Armenia’s Public Services Regulatory Commission, the country’s utilities regulatory body, reported that as of the beginning of this year, there were 60 utility-scale solar farms operating in Armenia, with a combined installed capacity of 204.8 MW and an average annual generation of 444.8 GWh. These solar farms are concentrated in Aragatsotn (accounting for 45.3% of the installed capacity), Gegharkunik (29%), and Vayots Dzor (20.5%). Together, these three regions contribute nearly 95% of Armenia’s total installed solar capacity.

The first license for a solar farm in Armenia was granted in November 2017, but only 12 were built in the first three years. Last year saw a significant surge in growth, with more than half of all solar farms (34 of 60) built in 2022 alone. These 34 solar farms account for 75% of the total capacity, providing 154 out of 204.8 MW.

In addition to the 204.8 MW capacity of utility-scale solar farms, there are further 11,122 grid-connected solar

power systems (like rooftop panels) with a combined capacity of 207.5 MW as of March 1, the Public Services Regulatory Commission told EVN Report.

Data provided by the commission reveals an incredible growth in distributed generation in the past several years. By the end of 2019, the installed capacity of distributed solar generation stood at just 32.9 MW, spread across almost 2,000 systems. In two years, the combined capacity more than quadrupled to reach 136 MW across almost 7,000 systems at the end of 2021.

In 2017, Tamara Babayan, a sustainable energy expert, estimated the potential of Armenia"s distributed solar power at 1,280 MW and almost 1,800 GWh in annual generation. This estimate is based on the assumption that half of the available rooftop area in Armenia is developable, indicating that there is significant potential for further growth in the sector.

In its long-term strategy (up to 2040) for the energy sector, adopted in January 2021, the Armenian government identified the maximum utilization of renewable energy potential as a priority. In consideration of both local resources and global trends, the government has prioritized solar as the preferred source of renewable energy over other alternatives. By 2030, the government intends to increase electricity generation to 12,000 GWh and electricity exports to 5,000 GWh compared to 7,600 GWh and 1,250 GWh in 2019, respectively. It hopes to increase solar energy generation to 1,800 GWh to make up 15% of the total by then. To meet the goal, around 1,000 MW of solar power capacity needs to be installed, including distributed generation.

There are currently two large solar farms either under construction or in the planning phase. Together, they will have a capacity of 255 MW and generate an estimated 430 GWh annually.