

## Armenia energy storage for demand response

This International Energy Agency (IEA) in-depth review of the energy policies of Armenia follows the same format as that used for the IEA peer reviews of member countries. This in-depth review of Armenia 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 and the Energy Charter.

Armenia depends on imports to meet much of its energy needs, particularly natural gas from the Russian Federation. It is one of the few ex-Soviet republics to avoid significant energy subsidies, and it is the only country in the Caucasus region to possess a nuclear power plant. In January 2021, the government approved a new Energy Sector Development Strategic Programme that sets the path for the sector's transition through 2040.

Key government priorities include promoting maximum use of the country's potential for renewable energy and energy efficiency; increasing power transmission links with Armenia's neighbours; gradually liberalising the domestic electricity market; and maintaining and, possibly, increasing the role of nuclear power. This report assesses the energy sector and related challenges facing Armenia and proposes policy recommendations to improve sector governance, energy efficiency, and security of supply.

The Armenian government approved the Energy Sector Development Strategic Programme (hereinafter "Energy Strategy") in January 2021, setting the path for the sector's transition through 2040. The publication and approval of this strategic document are welcomed and should form a useful basis for Armenia's future energy legislation. The 2021 Strategy replaces the government's previous energy policy document, which dates from 2015.

The principal bodies involved in energy sector governance in Armenia include the Ministry of Territorial Administration and Infrastructure (MTAI), which is responsible for overall energy policy-making, the Ministry of Environment, the Public Service Regulatory Commission (PSRC) and the Committee on Nuclear Safety Regulation (ANRA). The Statistics Committee (ArmStat) is the main provider of energy-related data and statistics

In a recent government restructuring, the former Ministry of Energy Infrastructures and Natural Resources was integrated into the MTAI. The transfer and addition of the energy agenda to the already large portfolio of responsibilities of the MTAI risk placing existing resources under pressure and causing insufficient coordination among ministries and other governmental entities dealing with energy-related policies. This could negatively impact effective and timely implementation of several important programmes in the sector.

Since the last IEA review in 2014/15, the government has taken decisive steps towards implementing a

liberalised electricity market, with a launch in February 2022 (as this report was going to press) featuring a new wholesale market model, direct contracts, a balancing mechanism and long-term direct capacity contracts. Free and open trade, as well as cooperation among all energy market participants, as envisioned by these reforms, would help promote investments from the international community and strengthen regional integration.

Armenia has a diverse generation mix that includes thermal, hydropower and nuclear. However, all of its thermal generation relies on gas, around 85% of which is imported from Russia. Furthermore, Armenia imports all of its nuclear fuel from Russia. Armenia therefore effectively relies on fuel imports from one country to produce nearly 70% of its electricity, raising concerns about the diversity of supply.

Armenia has adopted the international energy statistics methodology and standards and has released energy balances in the internationally comparable format since 2015. The cooperation of the national stakeholders to achieve this is to be commended. Unfortunately, however, compilation of the energy balance and GHG inventory does not receive funding from the state budget. Complementing and gradually replacing external funding with contributions from the state budget would ensure sustainability for these activities and help retain relevant trained human capacity.

An improved approach could include enhancing the government's own modelling capabilities and institutional learning capacity. The development of comprehensive energy system models demands sufficient and targeted allocations from the state budget, regardless of whether modelling is outsourced or capacities are developed within the ministry.

Exploration of modelling scenarios extending to 2050 and beyond will also be important for mapping pathways to reach Armenia's climate goals under the Paris Agreement. Since the energy sector is the largest source of GHG emissions in Armenia, a resolute and consistent implementation of its National Programme on Energy Saving and Renewable Energy will prove essential for reaching its recently updated Nationally Determined Contributions (NDCs).

Armenia is aiming to expand interconnections with Georgia and Iran. This highlights the need to develop new market rules to enable increased cross-border trading. Armenia is working on such arrangements within the context of its CEPA agreement with the EU, as well as within the EAEU Common Electricity Market, currently under development. Developing these two processes in parallel is likely to require careful coordination.

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