

Prepared by PhD Artashes Sargsyan, Chairman of NGO Ecoteam, UNDP and UNIDO expert on energy issues

ADVANCEMENT IN SOLAR PV INSTALLATIONS IN ARMENIA

Armenia has not its own fossil fuels resources and prioritizes the development of renewable energy resources. Over last five years Republic of Armenia (RA) has significantly advanced in solar PV stations installations. Natural climatic conditions for solar energy use are favorable in Armenia. Annual average value of sunshine hours is 2500 hours. Average annual flow of solar radiation on horizontal surface is 1720 kWh/m². For comparing purposes¹, in Central Europe this average value is 1000kWh/m², particularly, in Poland, Czech Republic, and Slovakia 950-1050kWh/m², in Hungary – 1200 kWh/m², in Bulgaria – 2000 kWh/m².

Country’s average energy demand is more than 3 Mtoe. 27% of energy demand in 2020 is covered with domestic energy production mostly from nuclear and hydro resources². Armenia imports natural gas and oil mainly from the Russian Federation (78.6%). Natural gas is imported from Russia via pipeline through Georgia. Natural gas is imported also from Iran on the basis of barter agreement - natural gas in exchange of exported electricity.

In 2021, Government of Armenia (GoA) approved the RA Energy Sector Development Strategic Programme to 2040 and the Action Plan to Ensure Implementation of the RA Energy Sector Development Strategic Programme, based least-cost strategies to develop the entire energy system and the measures necessary to implement this strategy. In 2022, the GoA approved the Programme on Energy Saving and Renewable Energy for 2022-2030, the Action Plan Ensuring Implementation of the First Phase (2022-2024) of the Programme. The government has approved the plan to increase

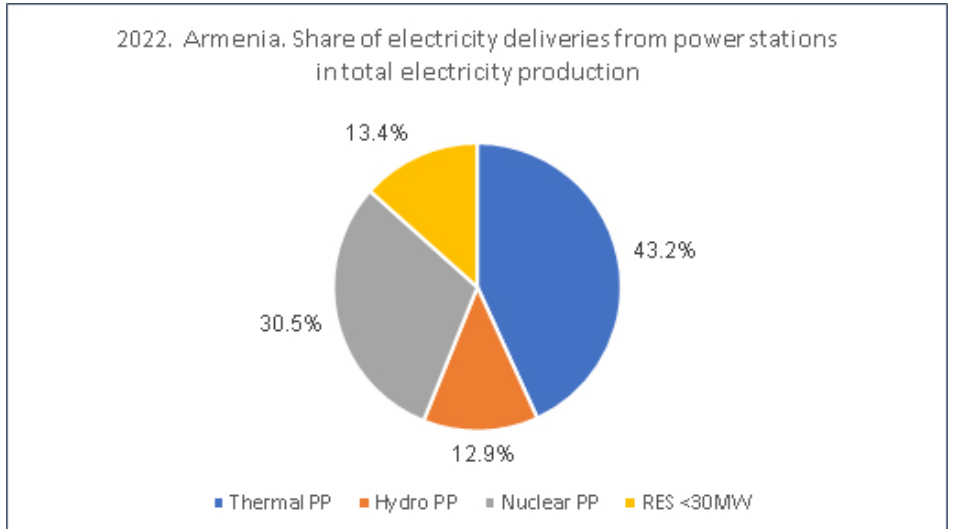


Diagram 1

renewables to 66% of the power generation mix by 2036.

Armenia adopted the Law on Energy in 2001: it includes provisions for market

Commission’s (PSRC) has introduced feed-in tariffs on electricity from RES within that period.

Further, we present some figures and

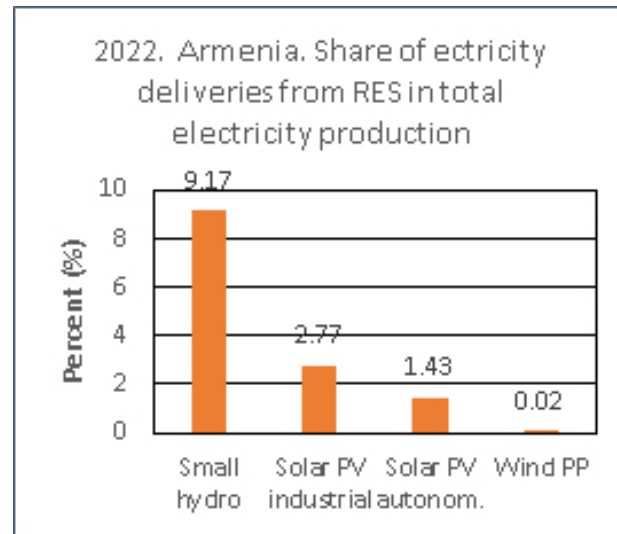


Diagram 2

diagrams to illustrate progress in solar PV applications in Armenia. In 2022, amount electricity generated and delivered from all types of power stations was 8618.8 mln. kWh, the final electricity consumption - 6404.7 mln. kWh³. Share of renewable electricity in final electricity consumption was 33.1% with large and mean hydro power stations (more than 30MW) and 16.8% without large and mean

rules and ownership structure. The law on Energy Saving and Renewable Energy (2004) defines the policy principles for renewables and energy savings. It also defines small HPP as a station with capacity less than 10MW, after law’s amendment (in 2011) – less than 30 MW. The Government of Armenia has obliged to purchase all the electricity from RES, including small hydro during 15 years from the start of operation. The Public Services Regulatory

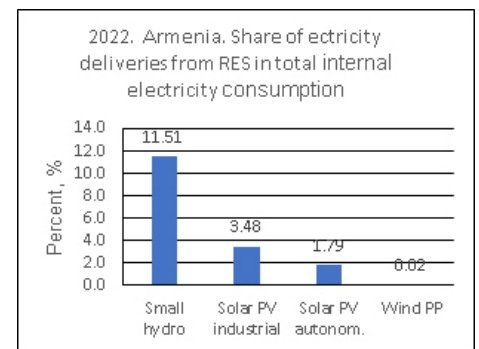


Diagram 3

page 8 hydro taking into account only small hydro, solar PV, and wind.

Shares of electricity generation by different types of power stations in total volume of electricity generation in Armenia for 2022 are presented on the Diagram 1. On the Diagram 2 are presented shares of electricity generation by different types of renewable energy sources (RES - small hydro with capacities less than 30Mw, solar photovoltaic, wind) in total electricity generation. There are no geothermal power plants in Armenia. The only Lusakert biogas based power plant is not in operation for several years. As can be seen from the Diagram 2, solar photovoltaic stations stand on the second place after small hydro regarding the electricity generation shares in total electricity production. Share for both Solar PV industrial and PV autonomous producers totals 4.2%. The PV stations' generated electricity share in country's final electricity consumption is higher and totals 5.27% (see Diagram 3).

According to data received from Electricity Network of Armenia (ENA), the installed capacity of PV industrial stations + PV autonomous producers in

2020 – 101.6MW, in 2021 – 220.9MW, in 2022 – 408.1MW. For comparing purposes, in 2018 there were 9 Industry-scale PV stations with total capacity of 7.02 MW and 784 PV autonomous generators with total capacity of 16.15MW, so totally installed PV capacity was 25.17 MW (see

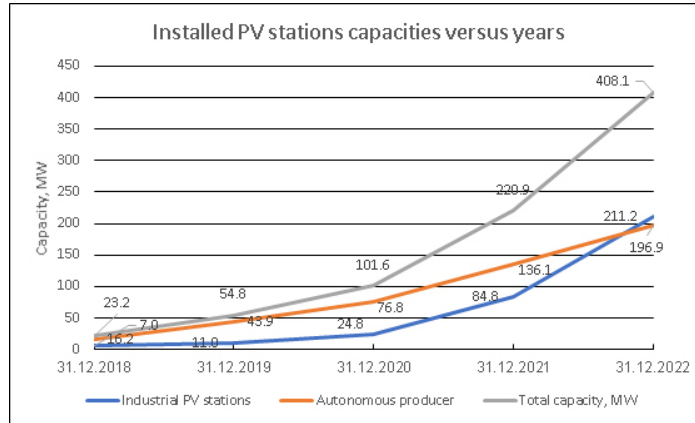


Diagram 4

Diagram 4).

What mechanisms are used for autonomous PV providers. There is no license required to operate PV station with capacity less than 500kW for legal person and with capacity less than 150 kW for individuals.

In case of autonomous PV provider Net metering mechanisms has been used while PV station supply electricity to ENA. For this purpose, the reverse multi-tariff electronic meter is installed in accordance with state regulations. Excess electrical

energy above the needs is sold to ENA. If the amount of electricity provided by the autonomous energy producer is positive as a result of the annual calculation, the autonomous energy producer shall be reimbursed at the rate of 50% of the tariff set by the Commission (around 24

AMD/kWh without VAT, 1 Euro is around 417 AMD, 2023) according to Armenian regulations established through Public Services Regulatory Commission.

Currently three local organizations have capacities to manufacture solar PV panels from solar cells, but solar PV cells are completely imported from abroad. Though there exists capacities to establish manufacture of solar invertors, but all invertors

for are also imported from abroad.

References:

Sargsyan A. Assessment of Renewable Energy Potential in Armenia (2017 Update). Yerevan, Lusabats Publishing House, 2017-29p.

Armenia Energy Profile. International Energy Agency, 2021. <https://www.iea.org/reports/armenia-energy-profile/overview>

RA Public Services Regulatory Commission- www.psrc.am

Standard & Poor's upgrades Armenia's ranking from 'BB-' From 'B+'

Standard & Poor's credit rating agency has upgraded Armenia's ranking from 'BB-' From 'B+' and affirmed its short-term foreign and local currency sovereign credit ratings at 'B'. The outlook is stable.

The stable outlook balances Armenia's strong economic growth prospects and improved fiscal balance sheet against its moderately weak external position and elevated geopolitical risks.

According to the agency, the upgrade reflects the improvements in Armenia's GDP per capita and fiscal performance.



The country's close geographic, economic, and cultural ties with Russia have positioned it as one of the preferred destinations for Russian individuals and businesses seeking refuge from their home

country's economic and political stresses. As a result, migrant and capital inflows have propelled economic growth, with real GDP in Armenia increasing by 12.6% in 2022, and have narrowed Armenia's persistent fiscal and current account deficits," S&P says.

Financial inflows also resulted in a 22% appreciation of the Armenian dram against the U.S. dollar in 2022. This substantial currency appreciation has helped to shrink the government debt stock in U.S. dollar terms.