

# RES in ARMENIA

EaP 4<sup>th</sup> Energy Panel

17-18 October 2019  
Vilnius, Lithuania

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# Armenian Power system is a good developed sector of economy

- Armenian energy sector had passed through difficult reform. At the result of the experience obtained during the energy crisis 1993-1995 the energy policy was created, which provides reasonable level of energy security. The Government of Armenia pays special attention to energy security and energy independence of the country for securing sustainable development of the economy of country.
- Taking into account lack of fossil fuel and dependence on import of primary energy resources, the Government of Armenia is continuously looking for new opportunities to increase energy security through diversification of supply, development of renewable energy, energy efficiency, new investments, new technologies, market liberalization, regional cooperation, as well as sustainable infrastructure.

# Strategy documents

- In December 2015, Government of RA adopted a strategy document titled “Long-term (up to 2036) development pathways of RA energy sector” where the development of energy production from RES has been declared as one of the main priorities (the updated document will be available by the end of 2019).
- In December 2016, Government of RA adopted “Concept on Development of Hydro Energy in Armenia”
- In February 2017, Energy Efficiency Action Plan for Armenia in 2017-2018 (NEEAP-2) was adopted.
- In December 2016 Solar Energy Development Program was adopted.
- In April 2018, “Concept on Accumulation and Management of Renewable Energy in Armenia” was adopted.

# RES is a priority

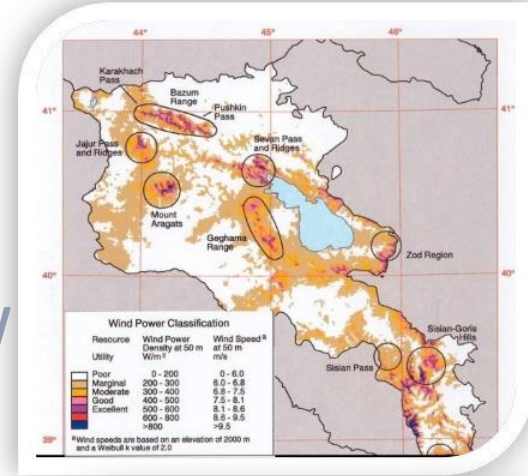
- Armenia has significant RES, among which had to be noted hydro, wind, solar and geothermal energy resources.
- During the last two decades, it was significantly implementing the renewable energy sources (RES) - mainly small hydro power plants (SHPP) for electricity generation. The last developments show that there is an increasing interest to introduce solar PV systems not only for the private use but also to implement the grid connected Solar PV power plants for electricity production.

# Feasible Renewable Energy Potential by Technology

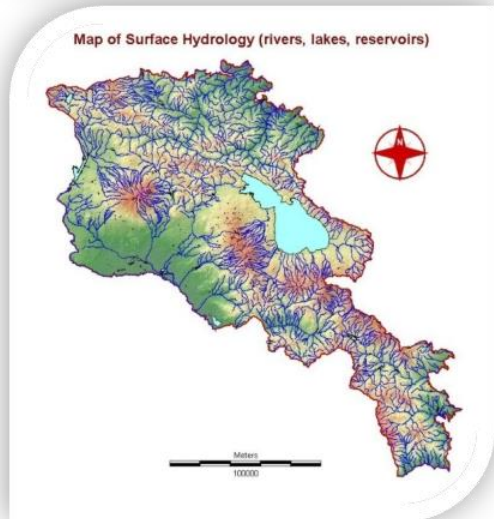
Solar  
>1GW



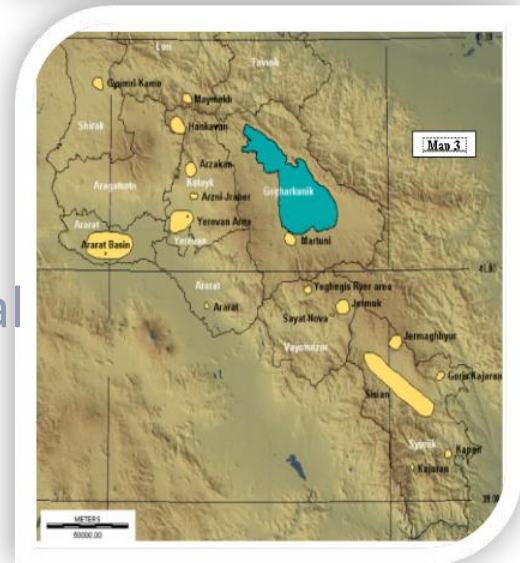
Wind  
800MW



Hydro  
370MW



Geothermal  
25-50MW



# Promoting the use of RES

- Renewables are supported with a special power purchase guarantee that is 20 years for the solar (up to 5 MW), wind, bio and geothermal units and 15 years for SHPPs (up to 30 MW).
- Feed-in tariffs for renewable plants are adjusted based on changes in exchange rate and inflation.
- Changes in acting Laws allow implementation of the net metering system for consumers to sell the surplus electricity produced by the customers to the system using RES.

# Hydro

At present much attention is provided to the implementation of Energy Projects with use of renewable energy resources.

- **Hydro energy** (17% + 13% SHPP) is more developed in Armenia than the other renewable energy resources.

Total installed capacity of seven HPPs owned by the “International Energy Corporation” CJSC amounts to 559.4 MW with production about 456.9 million kWh.

Total installed capacity of three HPPs owned by “Contour Global Hydro Cascade” CJSC amounts to 405.4 MW with production about 934.6 million kWh.

As of 1 July 2019, 186 small HPPs are operating with total installed capacity of 370 MW and the production of 1 billion kWh.

There are also 28 small HPPs under construction with total installed capacity of 58.9 MW.

# Wind

- Two **wind power** plants (WPP) are in operation with total installed capacities of 2.9 MW and 2 others with 5.3 MW are in stage of construction.

Two foreign companies are studying the wind potential of Armenia for constructing up to 150 MW wind station. They have already completed the wind potential assessment monitoring and proposed business plans, which are now under discussion.



# Solar

- According to the 1st stage of «Solar PV plant construction Investment project» that was approved by the Government Decision dated 29<sup>th</sup> of December 2016 it is foreseen to construct utility scale Masrik-1 solar PV power plant with 50-55 MW capacity in Gegharkunik Marz of Armenia.

On March 21, 2018 the international tender was completed. The winner was consortium of «Fotowatio Renewable Ventures» Dutch and «FSL» Spain companies, that has proposed the lowest price (4,19 \$/cent for 1 kWxh (approx. 20,11 AMD) VAT excluded).

- Construction of other 5 PV plants with about 60 MW total capacity will follow-up by means of announcing international tenders.

# Solar

- For the production of electricity in solar FV power plants with up to 5 MW capacity 27 companies (totally for about 63 MW) have been licensed, 10 of which (totally for about 8,01 MW) are already operated.
- 12 organizations have been licensed (with a total limit of 10 MW) for up to 1 MW solar PV stations, 2 other plants (totally for about 1.98 MW) are under construction.
- As of September 20, 2019 Technical terms were given to 1495 autonomous energy producers with capacity up to 500kW (total capacity 22,39MW), 1345 of which have already been connected to energy system (total capacity 18,4 MW).

# Solar thermal energy

In Armenia solar thermal energy is rapidly developing:

- The private sector is importing both parts for solar water-heating systems, with a view to their subsequent assembly, and complete sets. Currently, the use of solar water-heating systems in Armenia is not only to ensure energy savings, but also has become cost-effective.
- In 2013 the solar water-heating equipments with 2 MW total capacity were installed, in 2014-2015 the total capacity of these equipments reached 8 MW, and it is significantly progressing growth of these indicator in subsequent years.
- In August, 2017 an «Energy Efficient» credit program was started. The project envisages the installation of solar water heaters and PV systems for about 400 families in Gegharkunik and Shirak regions. As of September 2019 in the framework of this program 2711 solar water heaters and 124 solar PV systems were installed in 146 communities.
- Currently the possibility of implementing the above mentioned program in forest communities is being considered.

# Geothermal Energy

- In the result of Exploratory Drilling Grant Program (Program) it is foreseen to construct a Geothermal Power Plant at Karkar site, Syunig Region, Armenia. Within the framework of the Program «Preliminary Cost Calculations for Karkar Geothermal Power Plant» and 2 narrow wells exploratory drilling results have been prepared by Icelandic «Verkis» Company.
- Within the framework of Exploratory Drilling Program it is foreseen to find investment companies with international experience for the construction of Geothermal /Organic Rankin Cycle operating/ Power Plant at Karkar Geothermal site. Wells test reports as well as the final cost calculation reports have been sent to more than 50 international investors by e-mail. Key information regarding above mentioned Project is available on web-site <http://r2e2.am/en/2018/02/27/re/>.

# Energy Efficiency

- Energy saving and energy efficiency is a priority for the Government of RA as a means of improving energy security of the country, improving economic competitiveness and minimizing the negative impact on the environment;
- For promoting energy efficiency the Government commitment of RA is reflected in the RA Law on Energy Saving and Renewable Energy, in the National Program on Energy Saving and Renewable Energy and in the second phase of the National Energy Efficiency Action Plan for Armenia in 2017-2018 (NEEAP-2).

# Energy Efficiency

- As a result of the implementation of NEEAP-2 investment field will be improved in RA which will enable to attract local and foreign investments in energy efficiency sector. Law on Energy Saving and Renewable Energy was amended to enforce elements of Energy Performance in Buildings Directive (EPBD), the Government decree was adopted and technical regulation was prepared for mandatory enforcement of EE in (re)construction of public and residential buildings, the groundwork for adoption of eco-labeling regulations is undergoing, draft legal regulations are prepared for requiring energy auditing for large energy consumers, market-based energy tariffs has created a favorable environment for private sector investments in SMEs through multiple green credit lines (EBRD, GGF, AFD, IFC, WB).

**THANK YOU  
FOR ATTENTION**