

Renewable Energy and Energy Efficiency- Innovative policies and financing instruments for the EU's southern and eastern neighbours

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RENEWABLE ENERGY IN THE REPUBLIC OF ARMENIA

Loss of energy security is a subject of great risk for our country, which is situated in hard geopolitical zone but for all that is keeping its political and economic stability. What will be the impact of energy security loss on social-economic life of the country could be assessed by the bitter experience gained during energy crisis in Armenia during 1993-1995.

Armenia is almost completely dependent on imported primary energy sources. It does not have any oil wells, gas wells, or refineries. There is also no coal production. The only domestically produced primary energy is electricity mainly from the hydroelectric plants and, conditionally from the single nuclear power plant. So, Armenia is obliged to develop its energy sector based on renewables and energy efficiency measures in all branches of economy.

For securing the necessary level of energy security and independence a special attention in the Energy Sector Development Strategy of Armenia, adopted in June 2005 by the Government of Armenia, is given to following: a) ensuring renewable energy sources and energy efficiency; b) development of nuclear energy; c) diversification of energy resources; and d) regional integration.

Armenia has significant renewable energy resources, among which had to be noted hydro, wind, solar and geothermal energy resources.

For stimulating the development of renewable sources of energy, within the next 15 years from the date of coming into force of the electricity (capacity) license shall be purchased pursuant to law with fixed tariff. Tariff of 4.5 cents per kWh for small hydro power plants, 7 cents per kWh for wind power plant and 7 cents per kWh for biomass "hard city waste" power was fixed by the Public Services Regulatory Commission of the Republic of Armenia (the mentioned tariffs don't include VAT). Recently tax and custom privileges for equipment to be imported for wind farms were adopted by law. For creation of more comfortable and attractive conditions, currently, the methodology for determination of tariff limits for wind and biomass energy is being considered by Public Services Regulatory Commission. Recently tax and custom privileges for imported equipment for wind farms were adopted by law.

Hydro energy is the most developed and traditional sphere of renewable energy in Armenia. The economically justified hydro potential is around 4.0 billion kWh/yr, 2.0 of which have already been developed. The all remaining economically feasible hydro potential is to be developed during the next 15 years.

Generation of hydro electricity is possible by using the existing HPP cascades at Sevan-Hrazdan and Vorotan and also by construction of new major HPPs at Meghri (capacity – 140 MW; annual electricity generation – 840 million kWh), Loriberd (capacity – 60 MW; annual electricity generation – 200 million kWh) and Shnogh (option 1: capacity – 75 MW; annual electricity generation – 300 million kWh or option 2: capacity – 124 MW; annual electricity generation – 460 million kWh). The economically justified potential from small HPPs amounts to 600 million kWh/yr, of which 200 million kWh is generated at existing small HPPs.

The GoA already undertakes the following measures relevant to development of hydro energy resources. By financial assistance of KfW the German Fichtner Company elaborated FS for the construction of Loriberd HPP. The intergovernmental agreement was signed between the Government of Armenia and the Government of Islamic Republic of Iran for the construction of Meghri HPP. According to application of appropriate legal policy the construction of small HPPs has been intensified, particularly 58 are in the process of construction.

Armenia has substantial wind energy resources. In order to define the country's potential more accurately, the Ministry of Energy of RA with technical assistance from USAID employed the "Solaren" company and the American National Renewable Energy Laboratory to develop the "Wind Energy Map of Armenia". Preliminary results show that the existing wind energy resources in Armenia are sufficient to build a network of wind power plants with a 450 MW economically reasonable capacity. 2.6 MW wind power station was put in operation in 2005. The wind energy potential is to be developed over the next 15-20 years. Negotiations for the construction of 25 MW wind farm at Sotk between Public Relations Regulatory Commission of RA and Solaren Company and completion of monitoring at Qarakhach and commencement of construction works of wind farm by Italian Gierret Company would be completed during 2007. Currently, we continue to investigate more precisely wind potential in different territories of Armenia in the framework of assistance provided by KfW and German Federal Ministry for Economic Cooperation and Development.

Armenia has a significant solar energy potential which, used for thermal energy and electricity production, can substantially reduce the amount of imported energy. The average annual amount of solar energy flow per square meter of horizontal surface is about 1720 kWh. One fourth of the country's territory is endowed with solar energy resources of 1850 kWh/m². The surface sunshine on the Lake Sevan basin may be considered a record – 2800 hours. The portion of the direct annual radiation upon the entire territory is also significant – 65-70%, which is rather unique for application of concentration collectors. With recent world-wide developments in solar energy for power generation purposes as well expensive tariffs per unit of capacity and always applied subsidy mechanisms, the possibilities of its phase-by-phase deployment in Armenia are considered.

Progress is attained in construction and installation of solar –water heaters (SWH), also enlargement of the market is noticed. Armenia has all the necessary preconditions (specialists and infrastructures) for development of the new solar PV technologies in Armenia.

Biomass is not widely used as a power or gas source in Armenia. However, activities have commenced for implementation of large-scale investigations, including studies for

production of ethyl alcohol from crop that could be cultivated on waterless uplands of Armenia. Currently we are making first steps for development of bioethanol production.

Utilization of geothermal resources' potential is promising for Armenia and its development as a renewable energy resource is attractive for private investors, too. Drilling works at Jermaghbyur site by private investor according to signed MoA between the Governemet of RA and Argentinian private company and negotiations with the World Bank for financing the exploration of new geothermal resources at Karkar site have commenced.

The position of the Government with regard to utilization of renewable energy resources is stated in Law on Energy and Law on Energy Efficiency and Renewable Energy as well as in the Energy Sector Development Strategy of Armenia. The draft of National project on energy saving was presented to the Government.

By the assistance of international donor organizations, such as WB and EBRD, USAID, Kafesjan Foundation, Fund for Energy Efficiency and Renewable Energy was established. The Board of Trustee of the mentioned fund is headed by Prime Minister of RA.

Fund for reconstruction and construction of small HPPs by German Bank KfW was established. The activity of the mentioned funds directed to development of renewable energy is the real evidence of international cooperation.

According to rough estimations the above mentioned renewable energy resources of Armenia in long-term perspective (2025) could satisfy about 35 % of electricity demand of the Republic of Armenia.