Production of electricity from renewable energy sources installations – SERC achievements and development policy

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Newark, New Jersey – Washington, DC, U.S.A.

Background and traditions

- Feasibility studies into the construction of hydropower stations in Bulgaria started at the end of the 19th and the beginning of the 20th c.
- In 1891 in the town of Gabrovo Ivan Hadjiberov installed a dynamo at the wheel of his water mill which supplied several bulbs with carbon filament (1879 – Ò. À. Edison received a patent over such light bulbs), and in 1892 provided electricity for 20 el.bulbs in a textile factory;
- 1900 - for the electrification of the town of Sofia a hydropower station "Pancharevo" was constructed with a capacity of 4 MW;
- 1906 - the hydroelectric station "Ivan Hadjiberov (Usteto)" was constructed with a capacity of 235 kW. Its aim was to supply the textile factory and part of the lighting of the town of Gabrovo;

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- 1911 - on the river Yantra a hydropower station "Hristo Lulev" was built, now called "Yantra" with a capacity of 250 kW, which supplied several textile factories in the town of Gabrovo;
- 01.01.1914 hydropower station (HPS) "Enina" with a capacity of 1,01 MW – located approximately 10 êì from the town of Kazanlak. The energy produced was used for supplying several factories, street lighting and for household needs;
- In the next years at many locations small HPS were constructed used for supplying industrial sites and for household needs;

- In the beginning of the 1920ies water syndicates started emerging and the construction of big stations and cascades of HPS was launched;
- The Rila cascade started with the building of the Pastra HPS (5,52 MW), whose first machine was operational in 1924. The second HPS of the cascade – the Rila HPS (10,4 MW) – became operational in 1929 ;
- The first HPS built entirely with Bulgarian capital was the Vucha 1 HPS (14 MW) – it became operational in 1933 ;
- In the first 40 years of the last century 35 HPS were built out of which over 25 are still operational.

Progress of the hydropower engineering

- In the period 1950 – 1990 the largest HPS cascades were built which actively participated in covering the peak consumption and the regulation of the parameters of the electrical power system:

1. "Batashki vodnosilov pat" – 1958 Batak HPS 44 MW, 1958 Peshtera HPS 125 MW, 1959 "Aleko" 69 MW;
2. "Arda": 1958 Studen Kladenets HPS 62 MW, 1963 Kardjali HPS 108 MW, 1964 Ivailovgrad HPS 108 MW;
3. "Belmeken – Sestrimo" – construction starts in 1964. Momina Klisura HPS 120 MW, Sestrimo HPS 270 MW, Belmeken HPPS 375 MW;

4. "Dospat - Vucha" – 1972 Teshel HPS 60 MW, Devin HPS 80 MW, 1975 Antonivanovtsi HPPS 160 MW, Vucha HPS 21 MW, Krichim HPS 80 MW;

- These cascades are included in 2 big HPPS, whose aim is to improve the work of the system at minimum regimes – Belmeken HPPS (375 MW), Orpheus HPPS (160 MW);
- After 1990 the biggest hydropower site was built– Chaira HPPS (864 MW);
- There is a project for the construction of the Gorna Arda HPS cascade (170 MW) and Tzankov Kamak HPS (100 MW).

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Rehabilitation of the existing HPS

- In 1996 there started a program for the rehabilitation of the big stations participating in the regulation of the system;
- The first rehabilitated station is the Peshtera HPS;
- The rehabilitation covers the improvement of the flow part aiming at an increase in the effectiveness of the machines and updating of the regulation and automation of the hydro groups;
- All rehabilitated stations can be managed from the CDM remotely.

Legal framework

According to the current EERA:

- The license for the transmission or the respective distribution utility includes an obligation for the purchasing of the whole electric and heat power produced by the renewable energy sources (RES) in stations with a capacity up to 10 MW and in stations for combined production of electricity and heat;
- The transmission or the respective distribution utility purchases the electric and heat energy produced by the RES installation in volumes and along preferential prices determined in a Council of Ministers regulation.
- The extension and the reconstruction of the transmission and/or distribution networks connected with the linking of stations producing energy from RES is an obligation of the transmission , respectively distribution utility.

The bill for energy efficiency provides for:

- The drafting and implementation of programs and projects on the use of RES. Bulgaria has assumed the obligation that by 2010 12% of the generated primary power will be coming from RES;
- Creation and maintenance of an information system on the condition and use of RES;
- Exemption of state and local taxes, duties and charges for donations on the promotion of the use of RES;

The new bill on energy and RES provides that SERC will:

- Issue guarantees for the origin of the energy generated by RES;
- Issue green certificates to power stations using RES;
- Determines the rules for the trade in green certificates and the conditions under which the producers of electric power will provide data and will report before the Commission for Trade in Green Certificates.

EU policy on the development of the RES

The European Commission is implementing a strategy aimed at accelerating the investments in RES and doubling the share of the RES in the gross domestic consumption of the EU by 2010. This strategy includes a promotion campaign (2000-2003) aimed at the activities in the specific sectors of the RES and sets the following quantitative aims to be achieved by 2003:

- 1,000,000 photovoltaic systems;
- 15 million m^2 sun collectors;
- 10,000 ÌW wind generators;
- 10,000 ÌW cogeneration installations of biomass;
- 1,000,000 houses heated by biomass;
- 5 million tons of liquid bio fuel;
- 100 communities striving towards 100% HE power supply.

The European Commission encourages all organisations developing projects in the sectors above to participate. The initiative aims at attracting different organisations from the EU member-states and the candidate countries.

Condition of the RES installations in Bulgaria

- Traditional long experience in the use of RES installations using water energy (micro, small and average HPS<10 MW);
- Up to date in Bulgaria there are no operational stations using the power of the wind. There is interest expressed by a series of Bulgarian and foreign companies for the construction of wind RES installations with a total installed capacity of about 1400 MW;
- Availability of serious energy potential for the supply by biomass, for combined production of electricity and heat, which has not been used so far;
- Availability of potential of geothermal energy used at present for greenhouses, resorts, spas, which can be used for household needs and heating;
- Availability of a big energy potential of sun energy used at present for solar thermal systems for heating and hot water for the households , public and industrial sites. The first photoelectric stations of 1 MW are to be built.

Availability and energy potential of RES installations in Bulgaria

Resources TWh	Solar radiation	Wind	Biomass	Hydroenergy	Geothermal energy
Total	171,000	125,000	57 - 62	21	-
Accessible	95,000	62,300	-	-	-
Reserve	214	21 - 33	9 – 10	12	0,03

The expert opinion of Energoproekt is that by 2020 the accessible potential of RES installations can cover up to 7% of the total fuel energy balance of the country. The forecasts for energy production with the adopted distribution of 10% solar, 10% wind and 80% biomass for the period up to 2020 is as follows:

- By 2005 – insignificant quantity
- 2005 – 2009 – 400 million kWh/annually
- 2010 – 2014 – 1200 million kWh/annually
- 2015 – 2020 – 3200 million kWh/annually

It is expected that the heat generated by RES installations with the participation of 90% solar energy and 10% biomass by 2020 will reach 4,8 TWh/annually.

Types of pricing

- Calculation in accordance with the commercial aspects
- A pricing oriented towards the consumer
- A pricing oriented towards the distributor
- Political pricing

SERC concept for the development of the RES installations market

- Drafting national indicative prices for the consumption of power from RES installations;
- Setting the legislative framework for the RES energy market;
- Creating support mechanisms for the introduction of the TREC system (trade in certificates of RES installations) in Bulgaria in accordance with the European directive for energy derived from RES;
- The drafting mechanisms to support RES installations on a national level including the trade in RES certificates, investment aid, tax relief and schemes for direct cost support will create an opportunity for the introduction of TRECKIN (Global network for strengthening the efforts to establish and harmonize the TREC System) in Bulgaria;

- It would be expedient initially to permit the building of wind stations with the capacity of one field of up to 50 MW, connected to the transmission network. At this stage for the country the total installed capacity of these stations from the point of view of preserving the security, stability and flexibility of the energy system management should not exceed 250 MW;
- In order to reach the cost-covering purchasing price, sources of money outside the energy sector should be sought (setting up a special energy fund, tax exemptions, investment aid, etc.).

Thank you for the attention

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