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LEGAL REGULATIONS FOR THE USE OF RENEWABLE SOURCES OF ENERGY IN SERBIA AND THE REPUBLIC OF SRPSKA

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Abstract: The paper provides information on renewable energy sources (RES) and legislation related to the RES generated electricity in Serbia and the Republic of Srpska. In Serbia, hydropower, wind energy, solar energy, biomass and biogas are used for the RES generated electricity, whereas hydropower, solar energy, biomass and biogas are utilized in the Republic of Srpska. The paper gives an overview of the power of RES power plants and the percentage share of the thermal power plants and RES power plants in electricity production and the guaranteed (incentive) prices for RES generated electricity in Serbia and the Republic of Srpska. Furthermore, legal regulations related to the production of electricity from RES in Serbia and the Republic of Srpska are given. In the conclusion, it is pointed out that RES is increasingly used in Serbia and the Republic of Srpska for the production of electricity, that there are appropriate legal regulations and guarantees (incentive prices) for electricity generated by RES power plants.

Keywords: renewable energy sources (RES), hydropower, wind energy, solar energy, biomass, biogas, legal regulations for RES use.

1. INTRODUCTION

In most developed countries, the law regulates the possibility of production and sale of heat and electricity generated by renewable energy sources (RES), which include hydropower, solar energy, wind energy, biomass and biogas, geothermal energy, sea and ocean energy, etc. Since the production of electricity from renewable sources is in most cases more expensive than the production of energy from fossil fuels with the application of classical technologies, the so-called support systems, i.e., financial and non-financial incentive measures for investment in the construction of plants using renewable energy sources have been introduced. The most commonly used financial incentive measure is the increased purchase price of the produced electricity, which is implemented mainly using two models.

The first model is based on a certain amount of electricity produced from renewable energy sources, the so-called green energy, which will be purchased during the year (Quota System). The second model consists of the application of defined purchase prices for delivered electricity produced from renewable energy sources (Feed-in tariff). In most European countries, the model of defined purchase prices (Feed-in tariff) is applied. In addition to financial measures, countries often adopt additional measures to encourage the production of electricity from renewable energy sources through tax reduction or exemption, participation in investments for selected technologies, which represent the strategic direction of the country. Encouraging the production of thermal energy from renewable energy sources is currently done mainly through the financial support for investments (in the initial phase) and tax exemptions (in the more

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developed phases of the incentives application). One of the important characteristics of incentive measures for the increased use of renewable energy sources is the selective encouragement of the selected technologies development. In addition to financing research and development projects, the construction of demonstration projects is also financed. The basic criteria for the selection of renewable energy sources and technologies to be encouraged are the available energy potential, the possibilities of the economy and the degree of international development of technologies and markets [1].

2. RENEWABLE SOURCES OF ENERGY IN SERBIA

Hydropower, solar energy, wind energy, biomass and biogas are used for the RES generated electricity in Serbia. Serbia has installed 16 large and 100-200 small-scale hydropower plants, 9 wind power plants, 28 biogas power plants and 1 biomass power plant.

The powers of renewable sources of energy plants in Serbia are given in Table 1.

The powers and the percentage share of the thermal power plants and RES power plants in Serbia are given in Table 2. [2-5].

Table. 1. Powers of renewable sources of energy plants in Serbia

Power plants	MW
Hydropower	2446
Wind power	398
Biogas	27
Solar power	11
Biomass	2
Total	2884

Table 2. Powers and the percentage share of the thermal power plants and RES power plants in Serbia

Power plants	MW	%
Thermal power plants	4054	58.43
RES power plants	2884	41.57
Total	6938	100

3. LEGAL REGULATIONS FOR THE RENEWABLE SOURCES GENERATED ENERGY PLANTS OPERATING IN SERBIA

To date, several legal regulations for the renewable sources generated power plants operating in Serbia have been issued as follows:

– Law on Energy (Official Gazette of RS, 84/2004);

– Energy Development Strategy of the Republic of Serbia up to 2015 (Official Gazette of RS, 44/2005);

– Program for the implementation of the strategy for the development of energy in Serbia 2007-2012 (Official Gazette of RS, 17/2007 and 73/2007);

– Decree on the conditions for acquiring the status of a privileged producer of electricity and the criteria for assessing the fulfilment of those conditions (Official Gazette of RS, 72/2009);

– Law on Planning and Construction (Official Gazette of RS, 72/2009 and 81/2009);

– Decree on incentive measures for the production of electricity and the use of renewable energy sources and combined production of electricity and heat (Official Gazette of RS, 99/2009);

– Decree on amendments to the Decree on determining the program for implementation of the Energy Development Strategy of the Republic of Serbia up to 2015 for the period 2007 – 2012 (Official Gazette of RS, 99/2009);

– Law on Energy (Official Gazette of RS, 27/2011);

– Rulebook on conditions, content and manner of issuing certificates on energy properties of buildings (Official Gazette, 61/2011);

– Rulebook on the energy efficiency of buildings (Official Gazette, 61/2011);

– International obligations of the Republic of Serbia regarding RES;

– Decree on incentive measures for privileged producers of electricity (Official Gazette of RS, 8/2013);

– Decree on the manner of calculation and manner of distribution of collected funds according to the basic fees for incentives for privileged producers of electricity (Official Gazette of RS, 8/2013);

– Decree on the conditions and procedure for obtaining the status of a privileged producer of electricity (Official Gazette of RS, 8/2013);

– Decree on the amount of special compensation for incentives in 2013;

– Law on Energy (Official Gazette of RS, 145/2014);

– Law on Energy (Official Gazette of RS, 95/2018);

– Law on Energy (Official Gazette of RS, 40/2021);

– Law on Renewable Energy Sources (Official Gazette of RS, 40/2021);

– Regulations on incentive measures for privileged producers of electricity (Official Gazette of RS, 56/2016, 60/2017, 91/2018 and 54/2019) [1].

Incentive purchase prices for 1 kWh of electricity produced by renewable energy power plants in Serbia are given in Table 3 (Official Gazette of RS, 56/2016).

Table 3. Incentive purchase prices for 1 kWh of electricity produced by renewable energy power plants in Serbia

Type of power plant of the privileged producer of electricity	Installed power P (MW)	Incentive purchase prices (c€/kWh)	Maximal effective operating time (h)
Hydropower plant			5000 in the year of the incentive period
	up to 0.2	12.60	
	0.2-0.5	13.933-6.667*P	
	0.5-1	10.60	
	1-10	10.944-0.344*P	
	10-30	7.50	
On the existing infrastructure	up to 30	6.00	5000 in the year of the incentive period
Biomass power plants			8600 in the year of the incentive period
	up to 1	13.26	
	1-10	13.82-0.56*P	
	over 10	8.22	
Biogas power plants			8600 in the year of the incentive period
	0-2	18.333-1.111*P	
	2-5	16.85-0.370*P	
	over 5	15	
Landfill gas power plants and gas from municipal wastewater treatment plants		8.44	8600 in the year of the incentive period
Wind power plants		9.2	9000 in the quartal of the incentive period
Solar power plants			1400 in the year of the incentive period
	on the building up to 0.03	14.60-80*P	
	on the building 0.03-0.5	12.404-6.809*P	
	on the ground	9	
Geothermal power plants		8.2	8600 in the year of the incentive period
Power plants with highly efficient combined			8600 in the year of the incentive period
	up to 0.5	8.20	
	0.5-2	8.447-0.493*P	

Type of power plant of the privileged producer of electricity	Installed power P (MW)	Incentive purchase prices (c€/kWh)	Maximal effective operating time (h)
production of electricity and heat using natural gas	2-10	7.46	
Waste power plants		8.57	8600 in the year of the incentive period

These prices are valid for 12 years from the signing of the contract with the Electro Power Industry of Serbia for the production and sale of electricity from the appropriate RES.

In Serbia, the number of small hydropower plants, solar power plants on the ground and roofs of residential and other buildings and wind farms of a higher power is constantly increasing [1-5].

4. RENEWABLE SOURCES OF ENERGY IN THE REPUBLIC OF SRPSKA

Hydropower, solar energy, biomass and biogas are used for the RES generated electricity in the Republic of Srpska.

The Republic of Srpska has installed 4 large hydropower plants (743 MW) and around 30 small-scale hydropower plants (66.6 MW). The total power of all hydropower plants in the Republic of Srpska is 809.6 MW.

Basic information on large hydropower plants in the Republic of Srpska is provided in Table 4.

The Republic of Srpska has installed 3 large solar power plants of the power between 0.25 and 1 MW, the total power of 1584 MW, and more than 50 small-scale solar power plants.

The Republic of Srpska has installed 4 cogeneration plants for the production of heat and electrical energy from biomass and biogas (Novo Selo in the municipality Modriča, Agricultural Cooperative Livač from Laktaši, Donji Žabari and Prijedor).

The powers of renewable sources of energy plants in the Republic of Srpska are given in Table 5.

Powers and the percentage share of the thermal power plants and RES power plants in the Republic of Srpska are given in Table 6. [1, 2].

Table 4. Basic information on large hydropower plants in the Republic of Srpska

River	Hydropower	MW
Trebišnjica	Trebinje 1	180
Trebišnjica	Dubrovnik	108 (for RS)
Drina	Višegrad	345
Vrbas	Bočac	110
Total	4	743

Table 5. Powers of renewable sources of energy plants in the Republic of Srpska

Power plants	MW
Hydropower	
Large	743
Small-scale	66.6
Solar power	
Large	1.58
Small-scale	4.76
Biogas	2.26
Total	818.2

Table 6. Powers and the percentage share of the thermal power plants and RES power plants in the Republic of Srpska

Power plants	MW	%
Thermal power plants	900	52.38
RES power plants	818.2	47.62
Total	1718.2	100

5. LEGAL REGULATIONS FOR THE RENEWABLE SOURCES GENERATED ENERGY PLANTS OPERATING IN THE REPUBLIC OF SRPSKA

The Republic of Srpska has adopted the following legal regulations regarding the use of renewable energy sources:

– Decision on the methodology for determining the level of purchase prices of electricity generated from renewable sources of installed capacity up to 5 MW (Official Gazette of the Republic of Srpska 71/2004),

– Law on Energy (Official Gazette of the Republic of Srpska 49/2009),

– Energy Development Strategy of the Republic of Srpska up to 2030 (adopted at the session of the National Assembly of the Republic of Srpska on March 14, 2012).

– Rulebook on Encouraging the Production of Electricity from Renewable Energy Sources and Efficient Cogeneration (Official Gazette of the Republic of Srpska, 116/2013, 88/2014, 43/2016 and 29/2019).

– Decision on the amount of guaranteed purchase prices and premiums for electricity produced from renewable energy sources and in the efficient cogeneration (Official Gazette of the Republic of Srpska, 41/2020).

– Law on Electricity (Official Gazette of the Republic of Srpska, 68/2020).

Guaranteed purchase prices for electricity produced in renewable energy power plants in the Republic of Srpska are given in Table 7 (Official Gazette of the Republic of Srpska 41/2020).

Table 7. Guaranteed purchase prices for electricity produced in renewable energy power plants in the Republic of Srpska

Type of power plant according to the source of energy and the installed power	Sales in mandatory purchase at guaranteed purchase prices			Market sales and consumption for individual needs	
	Guaranteed purchase price KM/kWh	Reference price KM/kWh	Premium (in guaranteed price) KM/kWh	Reference price KM/kWh	Premium KM/kWh
Hydropower plant					
Up to and including 1 MW	0.1396	0.0570	0.0826	0.1026	0.0370
Over 1 MW up to and including 5 MW	0.1152	0.0570	0.0582	0.1026	0.0126
Over 5 MW to10 MW	0.1113	0.0570	0.0543	0.1026	0.0087
Power plants on solid biomass					
Up to and including 1 MW	0.2298	0.0570	0.1728	0.1026	0.1272
Over 1 MW up to and including 10 MW	0.2153	0.0570	0.1583	0.1026	0.1127
Power plants on agricultural biogas up to and including 1 MW	0.2397	0.0570	0.1827	0.1026	0.1371
PV solar power plants (in operation as of 1 June 2020 to 31 Dec 2020					
On objects up to and including 50 kW	0.2191	0.0570	0.1621	0.1026	0.1165

Type of power plant according to the source of energy and the installed power	Sales in mandatory purchase at guaranteed purchase prices			Market sales and consumption for individual needs	
	Guaranteed purchase price KM/kWh	Reference price KM/kWh	Premium (in guaranteed price) KM/kWh	Reference price KM/kWh	Premium KM/kWh
On objects over50 kW up to and including 150 kW	0.2095	0.0570	0.1525	0.1026	0.1069
On objects over 150 kW up to and including 250 kW	0.1844	0.0570	0.1274	0.1026	0.0818
On objects over 250 kW up to and including 1 MW	0.1501	0.0570	0.0931	0.1026	0.0475
On the ground up to and including 150 kW	0.1968	0.0570	0.1398	0.1026	0.0942
On the ground from150 kW up to and including 250 kW	0.1713	0.0570	0.1143	0.1026	0.0687
Conventional energy sources in an efficient cogeneration plant (guaranteed purchase price for plants with an installed capacity of up to and including 10 MW, and a premium for sale on the market and consumption for individual needs for plants with an installed capacity of up to and including 30 MW)					
New cogeneration plants on gas up to and including 1 MW	0.1311	0.0570	0.0741	0.1026	0.0285
New cogeneration plants on gas from 1 MW up to and including 10 MW	0.1068	0.0570	0.0498	0.1026	0.0042
New cogeneration plants on gas from 10 MW up to and including 30 MW	0	0	0	0	0.0042
New cogeneration plants on lignite up to and including 1 MW	0.1088	0.0570	0.0518	0.1026	0.0062
New cogeneration plants on lignite from1 MW up to and including10 MW	0.0786	0.0570	0.0216	0.1026	0
New cogeneration plants on lignite from 10 MW up to and including 30 MW	0	0	0	0	0
Landfill gas in an efficient cogeneration plant					
Up to and including1 MW	0.0632	0.0570	0.0062	0.1026	0
From 1 MW up to and including10 MW	0.0570	0.0570	0	0.1026	0
PV solar power plants (in function as of 1 Jan 2021)					
On objects up to and including 50 kW	0.2029	0.0570	0.1459	0.1026	0.1003

Type of power plant according to the source of energy and the installed power	Sales in mandatory purchase at guaranteed purchase prices			Market sales and consumption for individual needs	
	Guaranteed purchase price KM/kWh	Reference price KM/kWh	Premium (in guaranteed price) KM/kWh	Reference price KM/kWh	Premium KM/kWh
On objects over 50 kW up to and including 150 kW	0.1936	0.0570	0.1366	0.1026	0.0910
On objects over 150 kW up to and including 250 kW	0.1696	0.0570	0.1126	0.1026	0.0670
On objects over 250 kW up to and including 1 MW	0.1373	0.0570	0.0803	0.1026	0.0347
On the ground up to and including 150 kW	0.1824	0.0570	0.1254	0.1026	0.0798
On the ground from 150 kW up to and including 250 kW	0.1581	0.0570	0.1011	0.1026	0.0555

Guaranteed purchase prices apply to the purchase of electricity from producers who exercise the right to mandatory purchase of electricity at guaranteed purchase prices.

In the Republic of Srpska, an increase in the number of solar and small hydropower plants is noticeable, and the construction of wind farms is planned [1-2].

6. CONCLUSION

In the light of all above mentioned it can be concluded that:

Serbia

– Hydropower, wind energy, solar energy, biomass and biogas are used to obtain electricity from renewable energy sources in Serbia.

– The total power of all renewable energy power plants is 2884 MW.

– 58.43% of electricity is generated by thermal power plants, and 41.57% is generated by power plants on renewable energy sources.

– The legal regulations prescribe the purchase prices of electricity generated by renewable energy sources power plants, and their 12-year validity upon signing of the contract between the producers of electricity generated by renewable energy sources and the Electric Power Industry of Serbia.

– Small-scale hydropower plants, solar power plants and wind power plants are increasingly used for electricity production in Serbia.

The Republic of Srpska

– Hydropower, solar energy, biomass and biogas are used to generate electricity from renewable energy sources in the Republic of Srpska.

– The total power of all renewable energy power plants is 818.2 MW.

– 52.38% of electricity is generated by thermal power plants, and 47.62% by power plants on renewable energy sources.

– The legal regulations regulate the purchase prices of electricity generated by renewable energy sources power plants, and that they are valid 15 years from the signing of the contract between the producers of electricity from renewable energy sources and the Electric Power Industry of the Republic of Srpska.

– Small-scale hydropower plants and solar power plants are increasingly used for electricity production in the Republic of Srpska.

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ЗАКОНСКА РЕГУЛАТИВА ЗА КОРИШЋЕЊЕ ОБНОВЉИВИХ ИЗВОРА ЕНЕРГИЈЕ У СРБИЈИ И РЕПУБЛИЦИ СРПСКОЈ

Сажетак: У раду су дате информације о обновљивим изворима енергије (ОИЕ) и законској регулативи која се односи на производњу електричне енергије из ОИЕ у Србији и Републици Српској. У Србији се за производњу електричне енергије из ОИЕ користи хидроенергија, енергија ветра, соларна енергија, биомаса и биогас, а у Републици Српској хидроенергија, соларна енергија, биомаса и биогас. У раду је дат преглед снага електрана на ОИЕ и процентуално учешће термоелектрана и електрана на ОИЕ у производњи електричне енергије и гарантоване (подстицајне) цене за електричну енергију из ОИЕ у Србији и Републици Српској. У даљем тексту је дата законска регулатива која се односи на производњу електричне енергије из ОИЕ у Србији и Републици Српској. У закључку је истакнуто да се у Србији и Републици Српској све више користе ОИЕ за производњу електричне енергије, да постоји одговарајућа законска регулатива и гарантоване (подстицајне цене) за електричну енергију из ОИЕ електрана.

Кључне речи: обновљиви извори енергије (ОИЕ), хидроенергетика, енергија ветра, соларна енергија, биомаса, биогас, законска регулатива за коришћење ОИЕ.

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