



**REPUBLIC OF SERBIA
Ministry of Mining and Energy**

**Report on the Implementation of the National Renewable Energy Action
Plan of the Republic of Serbia for 2018 and 2019**

LIST OF ABBREVIATIONS

AIB	– Association of Issuing Bodies
GFEC	– Gross final energy consumption
GHG	– Greenhouse gases
EE	– Energy efficiency
EU	– European Union
EnC	– Energy Community
EC	– European Community
IPA	– Instrument for Pre-Accession Assistance of the European Union
ktoe	– Kilotonne of oil equivalent
Mtoe	– Million tonnes of oil equivalent
SHPP	– Small hydropower plants
NREAP	– National Renewable Energy Action Plan
RES	– Renewable energy sources
PPA	– Model power purchase agreement
TEEnC	– Treaty establishing the Energy Community
EUROSTAT	- Statistical Office of the European Union

INTRODUCTION

Adopting the Law on ratification the Treaty establishing the Energy Community between the European Community and the Republic of Albania, Republic of Bulgaria, Bosnia and Herzegovina, Republic of Croatia, Former Yugoslav Republic of Macedonia, Republic of Montenegro, Romania, Republic of Serbia and the United Nations Interim Administration Mission in Kosovo in line with United Nations Security Council resolution 1244 (“Official Gazette of the Republic of Serbia”, Number 62/06), the Republic of Serbia became an Energy Community member in 2006.

Pursuant to the provision set forth in Article 20 of the Treaty establishing the Energy Community (hereinafter referred to as “TEEnC”), the Republic of Serbia has undertaken to implement European Directives in the field of renewable energy sources (hereinafter referred to as “RES”) – Directive 2001/77/EC on the promotion of electricity produced from renewable energy sources and Directive 2003/30/EC on the promotion of the use of biofuels or other renewable fuels for transport. As of 2009, the aforementioned Directives were gradually superseded and eventually repealed in January 2012 with the new Directive 2009/28/EC of the European Parliament and of the Council of 23rd April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC (CELEX No. 32009L0028).

In line with the Directive 2009/28/EC and Energy Community Ministerial Council Decision of 18th October 2012 (D/2012/04/MC-EnC) a very demanding and binding goal of achieving a 27% share of renewable energy sources in gross final energy consumption in 2020, was set for the Republic of Serbia. The same Decision required preparation of the National Renewable Energy Action Plan of the Republic of Serbia in line with the approved template for the preparation of this document (Decision 2009/548/EC) and its submission to the Energy Community Secretariat. The National Renewable Energy Action Plan was adopted by the Republic of Serbia in June 2013 (“Official Gazette of the Republic of Serbia”, No. 53/13).

Pursuant to Article 66 of the Energy Law (“Official Gazette of the Republic of Serbia”, No. 145/14 and 95/18 – as amended) the Ministry in charge of activities in the energy sector shall monitor the National Renewable Action Plan implementation and submit a report on its implementation to the Government (hereinafter referred to as the “Report”). Moreover, in line with Article 15 of the Energy Community Ministerial Council Decision (D/2012/04/MC-EnC), TEEnC signatories shall provide the EnC Secretariat with a Report every other year. The first Report was submitted by 31st December 2014 and it contains data for 2012 and 2013. The second Report was submitted by 31st December 2016 and it contains data for 2014 and 2015. The third Report was submitted by 31st December 2018 and it contains data for 2016 and 2017. The fourth Report was submitted by 31st December 2020 and it contains data for 2018 and 2019.

The fourth Report of the Republic of Serbia was made in line with the recommended template of the European Commission (which is adapted by the EnC Secretariat for TEEnC signatories), definitions and calculation rules set forth in the Directive 2009/28/EC and Regulation (EC) No. 1099/2008 of the European Parliament and of the Council.

Data shown in the Report were determined based on the 2020 Energy Balance of the Republic of Serbia, which was adopted by the Government on 29th December 2019 (“Official Gazette of the Republic of Serbia”, 94/19) and the working version of the Energy Balance for 2021 and statistical data provided by the Statistical Office of the Republic of Serbia to EUROSTAT for 2018 and 2019. As a data source on the power plants with the status of temporary privileged electricity producers, privileged producers and RES producers, the Register of Eligible Electricity Producers (<https://www.mre.gov.rs/doc/registar-03082020.html>), maintained by the Ministry of Mining and Energy pursuant to Article 75 of the Energy Law was used for the preparation of the Report.

The Energy Balance of the Republic of Serbia for 2021 presents realized production and consumption for 2019, estimated data for 2020 and forecasts for 2021. The balancing of energy from renewable energy sources includes production and consumption of electricity from small and large watercourses, wind and solar energy, biogas energy, as well as the production and consumption of heat energy from geothermal energy and solid biomass (firewood, pellet and briquette). Geothermal energy utilization is tracked by the Statistical Office of the Republic of Serbia as part of its statistical research, and the figures on such utilization do not include geothermal energy utilization through the use of heat pumps. Geothermal energy is used solely for heating purposes.

The solid biomass production and consumption includes firewood, pellet and briquette production and consumption for energy purposes to meet the heating needs. Article 5(3) of the Directive 2009/28/EC stipulates that motor biofuels and other liquid biofuels that do not meet the sustainability criteria set forth in Article 17(2), (3), (4), (5) and (6) of the Directive, shall not be taken into account while calculating the share of renewable energy sources.

1. Sectorial, overall shares of RES and actual consumption of energy from renewable sources in the preceding 2 years (2018 and 2019) (Article 22(1)(a) of Directive 2009/28/EC)

Table 1: The sectorial (electricity, heating and cooling, and transport) shares of energy renewable sources and overall share of energy from renewable sources in GFEC

	2018	2019
RES – heating and cooling (%)	24,29	26,64
RES – electricity (%)	28,66	30,11
RES - transport (%)	1,18	1,14
RES – overall share in GFEC (%)	20,32	21,44
<i>from cooperation mechanism (%)</i>	0	0
<i>Surplus for cooperation mechanism (%)</i>	0	0

Table 1a: Calculation of contribution of using RES of each sector to GFEC (ktoe)

	2018	2019
(A) GFEC of RES for heating and cooling	1057,5	1112,7
(B) GFEC of electricity from RES	896,8	951,2
(C) GFEC of energy from RES in transport *	24,3	25,1
(D) Gross total RES consumption (estimated surplus in relation to the target)	1954,3	2063,9
(E) Transfer of RES to EU Member States	0	0
(F) Transfer of RES from other Contracting Parties and 3rd countries	0	0
(G) RES consumption adjusted for target (D)-(E)+(F)	1954,3	2063,9

*Calculated in accordance with the rules and multiplication factors of the RES Directive 2009/28/EC. The shown values refer to electricity used in the transport sector, in accordance with the SHARES calculation methodology developed by the Statistical Office of the European Community- EUROSTAT for the purposes of uniform monitoring of the achievement of the objectives of EU member states in the field of RES. This tool is also used to monitor the achievement of the goals of the members of the Energy

Community and can be downloaded from the website of the European Commission <https://ec.europa.eu/eurostat/web/energy/data/shares>.

Calculation method for individual values given in Table 1 and Table 1a

Gross final energy consumption (GFEC) was calculated in line with Article 2 of the Directive 2009/28/EC as an overall final energy consumed for energy purposes in the industry, transport, households, public and commercial activities, agriculture, forestry and fisheries, including own consumption of electricity and heat energy in the sector of electricity and heat energy production, and losses in the transmission and distribution of electricity and heat energy.

The share of renewable energy sources in heating and cooling is calculated as the result of dividing the gross final consumption of energy from renewable sources in the heating and cooling sector (as defined in Article 5(1)(b) and Article 5(4) of the Directive 2009/28/EC) by the gross final consumption of energy for heating and cooling.

The gross final consumption of energy from renewable sources for heating and cooling is calculated as the quantity of energy produced from renewable sources used in district heating and cooling systems, plus the quantity of energy from renewable sources used in industry, households, public and commercial activities, agriculture, forestry and fisheries, for heating, cooling and processing purposes (Article 5(4) of the Directive 2009/28/EC).

The share of renewable energy sources in electricity is calculated as the GFEC from renewable energy sources (as defined in Article 5(1) and (3) of the Directive 2009/28/EC) divided by the gross final consumption of electricity.

Gross final consumption of electricity from renewable energy sources is calculated as the quantity of electricity produced from renewable energy sources, excluding the electricity production in pumped storage units (reversible power plants) (Article 5(3) of the Directive 2009/28/EC).

The share of renewable energy sources in transport is calculated as the final energy from renewable sources consumed in transport (please see Article 5(1)(c) and Article 5(5) of the Directive 2009/28/EC) divided by the consumption in transport of: 1) oil; 2) diesel; 3) biofuel used in road and rail transport and 4) electricity used in land transport, whereby it was taken into account that energy counted in other sectors is not counted in the transport sector, in order to avoid double counting.

The GFEC from renewable sources is calculated as the sum of: gross final consumption of electricity from renewable energy sources, gross final consumption of energy from renewable sources for heating and cooling and gross final consumption of energy from renewable sources in transport.

All calculations were made by using the SHARES tool downloaded from the European Commission website <https://ec.europa.eu/eurostat/web/energy/data/shares> which is used to calculate the share of RES in EU countries and members of the EnC, in order to monitor achievement of goals in the field of RES. SHARES is a tool of the Statistical Office of the European Union - EUROSTAT and it has been adapted to calculate the share of energy from renewable sources in accordance with Directive 2009/28/EC. The main advantage of this tool is that the same methodology for calculating individual values is applied to each EU member or EnC member. Its application prevents irregularities that might arise using a variety of methods and parameters when calculating the share of RES.

Results achieved in terms of RES utilization increase and analysis of the shown data

Since 2009, when the legal framework with incentive measures (“feed-in” tariffs) was established for the first time in the Republic of Serbia, until 7th December 2020, 265 new

plants with the total installed capacity of 514,262 MW were constructed for the production of electricity from RES, as follows:

- 1) 121 small hydropower plants with the total installed capacity of around 77,268 MW;
 - 2) 107 solar power plants with the capacity of 8,816 MW;
 - 3) 8 wind power plants with the capacity of around 397,960 MW, while 2 wind power plants have gained the temporary privileged producer status with the total capacity of 168 MW;
 - 4) 28 biogas power plants with the total capacity of around 27,838 MW;
 - 5) 1 biomass power plant with the capacity of 2,38 MW.
- Data source is the Register of Privileged Electricity Producers: <https://www.mre.gov.rs/doc/registar-03082020.html>.

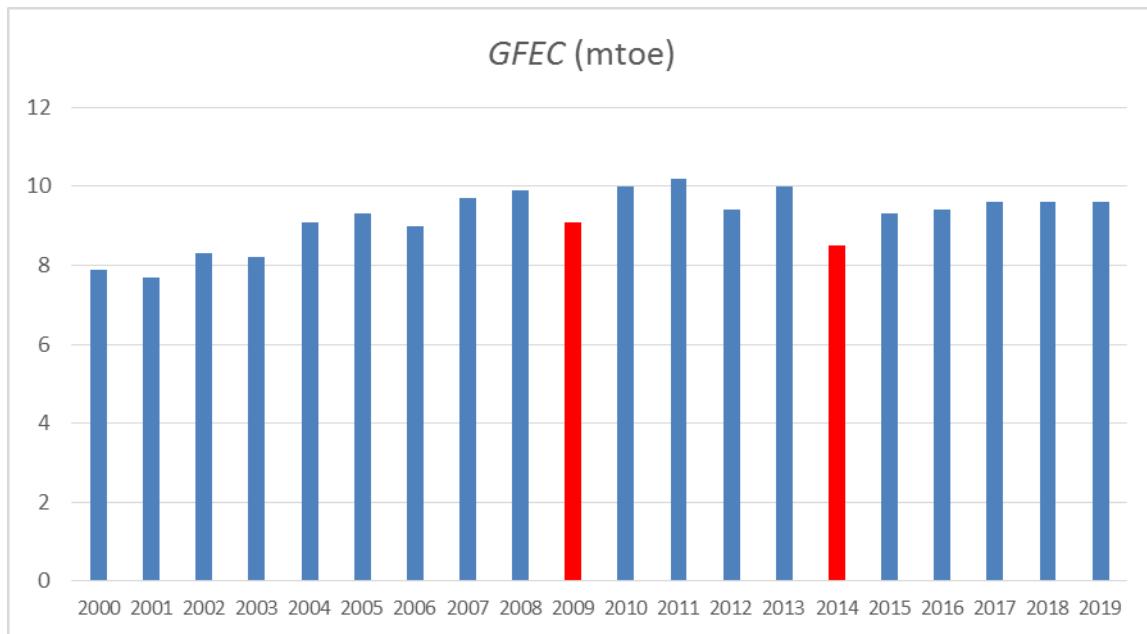
Overview of the planned (in line with NREAP) and constructed power plants in the RES field

Power plant type	Planned in line with NREAP [MW]]	December 2020			
		Temporary privileged producer status [number and MW]		Privileged producer status (constructed) [number and MW]	
HPP larger than 10 MW	250	0	0	0	0
HPP up to 10 MW	188	33	31,8	121	77,268
Biomass	100	0	0	1	2,38
Biogas	30	73	70,557	28	27,838
Wind	500	2	168	8	397,960
Solar	10	0	0	107	8,816
Geothermal	1	0	0	0	0
Waste	3	1	30,240	0	0
Landfill gas	10	1	3,09	0	0
TOTAL	1092	110	303,687	265	514,261

The gross final energy consumption in Serbia, in the period from 2000 to 2019 (Mtoe)

2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
7,9	7,7	8,3	8,2	9,1	9,3	9,0	9,7	9,9	9,1	10,0	10,2	9,4
2013	2014	2015	2016	2017	2018	2019						
10,0	8,5	9,3	9,4	9,6	9,6	9,6						

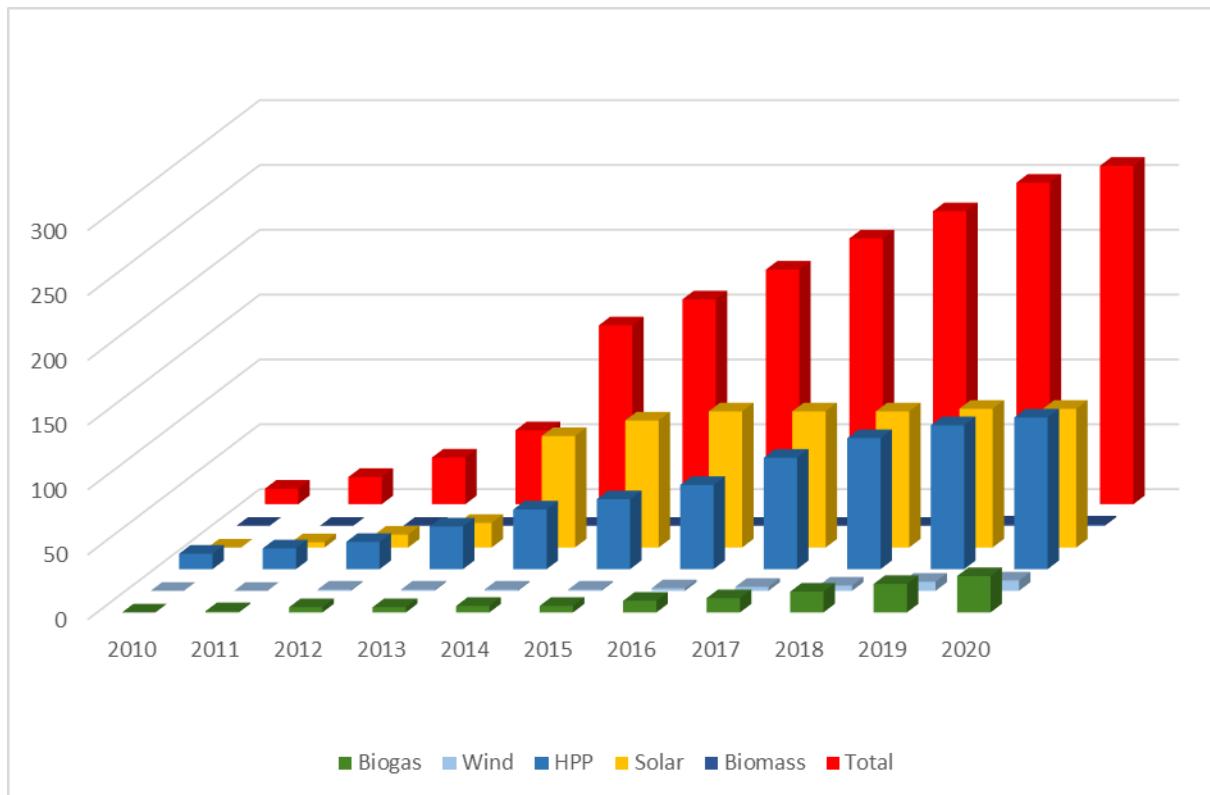
Note: From 2016, GFEC data are calculated in accordance with the SHARES methodology of the Statistical Office of the European Union, which is available at: <https://ec.europa.eu/eurostat/web/energy/data/shares>



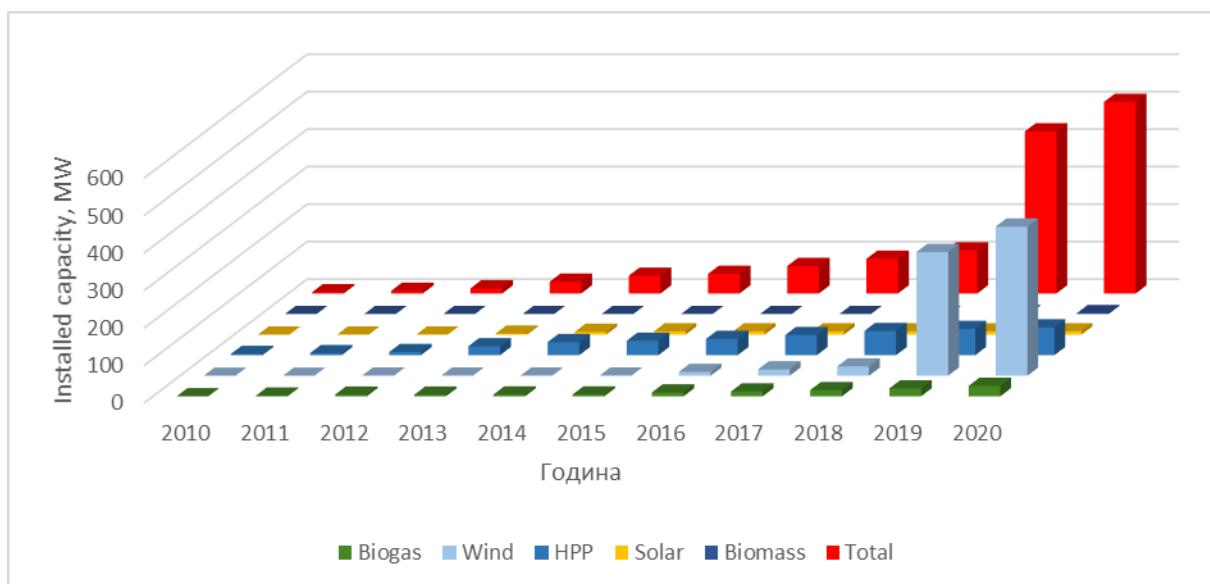
The gross final energy consumption in Serbia, in the period from 2000 to 2019 in Mtoe

Looking at GFEC data from Table, as well as RES shares from previous years, it may be assumed that the undertaken incentive measures do not generate results. However, as it was emphasized in the previous reports on the implementation of NREAP, the year 2009, which was chosen as the base year for calculating the binding target, had clearly expressed specificities which led to the fact that RES share in GFEC for 2009 was 21.2%, which is considerably higher value than the real perennial average value. All of this shows that for small countries, the value of GFEC is significantly affected by developments in the economic sector, and GFEC changes the trend depending on the operation of large energy consumers. Due to this fact, the share of RES in GFEC does not represent representative data on the actual progress in the use of renewable energy sources. This was particularly pronounced in 2014, when a significant decline in GFEC in 2014 compared to the average perennial trend resulted in the share of RES in GFEC in the amount of 22.86%, and that this value in the following years remained below values from 2014 (in 2015 the share was 21.99%, in 2016 the share was 21.15%, in 2017 the share was 20.29%) although in the meantime more than 500 MW of new capacities using RES were built, the share of RES in GFEC in 2019 was 21.44% and did not reach the value from 2014.

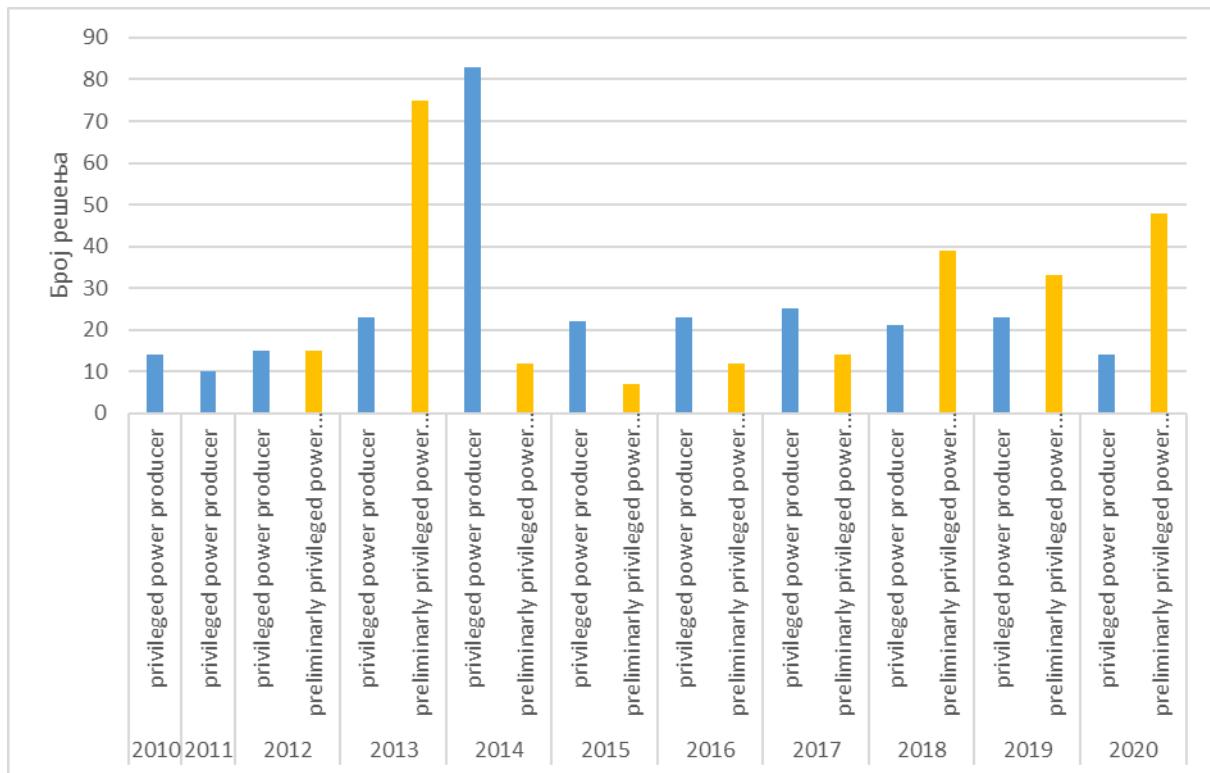
The growth of capacity and number of built power plants using RES is shown in Figures 1, 2 and 3. Based on the trends shown, it can be concluded that it took a few years for the new system of incentives to come to life, and then to gain investors' confidence in the functioning of the system, as well as to prepare appropriate projects, especially projects for the construction of large power plants.



Graph 1 The number of all types of power plants on RES from introducing the system of incentives with “feed-in” tariffs



Graph 2 Installed capacities of all types of power plants on RES from introducing the system of incentives with “feed-in” tariffs



Graph 3 The number of issued status of temporary and privileged producers from introducing the system of incentives with “feed-in” tariffs in the years of issuing the status

‘Table 1b: Estimate of total contribution (installed capacity, gross electricity generation) expected from each renewable energy technology to meet the binding 2020 targets and the indicative trajectory for the share of energy from renewable resources in electricity generation

	2018		2019	
	MW	GWh	MW	GWh
<i>Hydro:</i>	3043	10132,8	3074	10161,0
<i>Excl. pump storage</i>	2300	10132,8	2331	10161,0
<1MW	-	-	-	-
1MW–10 MW	-	-	-	-
>10MW	-	-	-	-
<i>Pump storage</i>	614	1147,8	614	931,4
<i>mixed</i>	-	-	-	-
<i>Geothermal energy</i>	0	0	0	0
<i>Solar energy:</i>	11	13	11	13,5
photovoltaic	11	13	11	13,5
concentrated solar power	0	0	0	0
Tide, wave, ocean energy	0	0	0	0
<i>Wind energy:</i>	227	150,4	398	898,2
onshore	227	150,4	398	898,2
offshore	0	0	0	0

	2018		2019	
	MW	GWh	MW	GWh
Biomass:	17	101,7	23,6	138,1
solid biomass	0	0	2,4	11,4
biogas	17	101,7	21,2	126,7
bioliquids	0	0	0	0
TOTAL:	3298	10429,8	3506,6	11062,6
<i>of which power plants with combined production</i>	-	-	-	-

„-“ data are not available

Note: The energy produced from hydropower plants and wind power plants is normalized in accordance with the rule set forth in Annex II to Directive 2009/28/EC.

Table 1c: Estimate of total contribution (final energy consumption) expected from each renewable energy technology to meet the binding 2020 targets and the indicative trajectory for the share of energy from renewable resources in heating and cooling sector

	2018 (ktoe)	2019 (ktoe)
Geothermal (excluding low temperature geothermal heat in heat pump applications)	5,1	5,2
Solar	-	-
Biomass	1052,4	1107,5
<i>solid biomass</i>	1044,6	1097,2
<i>biogas</i>	7,8	10,3
<i>bioliquids</i>	0	0
Renewable energy from heat pumps:	-	-
- of which aerothermal		
- of which geothermal		
- of which hydrothermal		
TOTAL	1057,5	1112,7
<i>of which district heating</i>	-	-
<i>of which biomass in households</i>	841,0	871,1

„-“ data are not available

Table 1d: Estimate of total contribution expected from each renewable energy technology to meet the binding 2020 targets and the indicative trajectory for the share of energy from renewable resources in the transport sector (ktoe)

	2018	2019
Bioethanol/ bio-ETBE [ktoe]	0	0
<i>share of biofuels (Article 21.2)</i>	0	0
<i>Imported [%]</i>	0	0
Biodiesel [ktoe]	0	0
<i>share of biofuels (Article 21.2)</i>	0	0

<i>Imported [%]</i>	0	0
Hydrogen from renewables [ktoe]	0	0
Renewable electricity [ktoe]	9,7	10
Road transport [ktoe]	0	0
Non-road transport [ktoe]	0	0
Others (as biogas, vegetable oils, etc.) – please specify [ktoe]	0	0
<i>share of biofuels (Article 21.2)</i>	0	0
TOTAL [ktoe]	9,7	10

2. Measures taken in the preceding 2 years and/or planned at national level to promote the growth of energy from renewable sources taking into account the indicative trajectory for achieving the national RES targets as outlined in the National Renewable Energy Action Plan (Article 22(1)(a) of Directive 2009/28/EC)

Table 2: Overview of all policies and measures

<i>Name and reference of the measure</i>	<i>Type of measure</i>	<i>Expected results</i>	<i>Target group and or activity</i>	<i>Existing or planned</i>	<i>Start and end dates of the measure</i>
1. Measure “Promotion of Electricity Production through Incentive Purchase Prices” Energy Law (“Official Gazette of the Republic of Serbia”, No. 145/2014 and 95/18, as amended)	financial regulatory	increase in the production of electricity from RES	energy entities	existing	2009
Measure implementation mechanisms					
1.1 Decree on Conditions and Procedure for Acquiring the Status of the Privileged Electricity Producer, Temporary Privileged Electricity Producer and Producer of Electricity from renewable energy sources (“Official Gazette of the RS”, No. 56/16, 60/17, 91/18)	financial regulatory	increase in the production of electricity from RES	energy entities	existing	15.12.2016.
1.2 Decree on Incentive Measures for production of electricity from renewable energy sources and from highly-efficient combined heat and power production (“Official Gazette of the RS”, No. 56/16, 60/17 and 91/18)	financial regulatory	increase in the production of electricity from RES	energy entities	existing	15.06.2016. - 31.12.2019.
1.3. Decree on Power Purchase Agreement (“Official Gazette of the RS”, No. 56/16 and 61/17)	financial regulatory	increase in the production of electricity from RES	energy entities	existing	15.06.2016.
1.4. Decree on the Amount of the special fee for promotion in 2018 (“Official Gazette of the RS”, No. 5/18)	financial regulatory	increase in the production of electricity from RES	final consumers of electricity	existing	01.01.2018-31.12.2018.

1.5 Decree on the Amount of the special fee for promotion in 2019 ("Official Gazette of the RS", No. 8/19)	financial regulatory	increase in the production of electricity from RES	final consumers of electricity	existing	01.01.2019-31.12.2019.
2. Measure "Guarantee of Origin of Electricity Produced from Renewable Energy Sources" Energy Law ("Official Gazette of the RS", No. 145/14 and 95/18, as amended)	financial regulatory	increase in the production of electricity from RES	energy entities	existing	2017
Measure implementation mechanisms					
2.1 Decree on the Guarantee of Origin ("Official Gazette of the RS", No. 82/17)	financial regulatory	increase in the production of electricity from RES	energy entities; final consumers of electricity; electricity suppliers	existing	2017
2.2 Rulebook on the Method of Calculation and Showing all shares of energy sources in sold electricity ("Official Gazette of the RS", No. 96/17)	regulatory	increase in the production of electricity from RES	electricity suppliers; final consumers of electricity	existing	2017
3. Measure "Promotion of Biofuel Production and Consumption" Energy Law ("Official Gazette of the RS", No. 145/14 and 95/18, as amended)	regulatory financial	increase in biofuel production and consumption	energy entities	existing	2019
Measure implementation mechanisms					
3.1 Rulebook on Requirements for biofuels ("Official Gazette of the RS", No. 73/19)	regulatory	increase in biofuel production and consumption	energy entities	existing	2019
3.2 Decree on Sustainability Criteria for Biofuels ("Official Gazette of the RS", No. 89/19)	regulatory	increase in biofuel production and consumption	energy entities and natural persons	existing	2019
3.3 Decree on the Mandatory Marketing of a Certain Percentage of Biofuels ("Official Gazette of the RS", No. 71/19)	regulatory	increase in biofuel production and consumption	energy entities and natural persons	existing	2019
4. Measure "Improvement of the Ministry of Mining and Energy Website" Internet address: http://www.mre.gov.rs/energetska-efikasnost-obnovljivi-izvori.php	informative-educative	to increase information availability to clarify administrative procedures in the RES field; to increase transparency in the work of the Ministry;	energy entities and natural persons	existing	2014.
5. Measure "Monitoring the situation in the area"					
Rulebook on calculation of the RES share ("Official Gazette of the RS", No. 37/20)	regulatory	Available statistical data important for monitoring the use of RES and calculating indicators in the field of RES based on statistical data	Expert and concerned public, state administration bodies	existing	2020

		using the EUROSTAT's SHARES tool. More precisely determined situation in the field on the basis of which the policy in the field of RES can be created in a better and more reliable way.			
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PROJECTS AND PROGRAMMES OF THE MINISTRY OF MINING AND ENERGY THAT CONTRIBUTE TO A HIGHER RES UTILIZATION

Projects financed through IPA 2012 EU Instrument for Pre-Accession Assistance

Updating the Register of Small Hydropower Plants

The purpose of the Project - Implementation of the Energy Development Strategy of the Republic of Serbia in the renewable energy sector by promoting and facilitating investment in the potential of small hydropower plants (SHPPs).

This project will comprise the analysis of the existing as well as new locations. Data analysis will include clearly defined locations with energy potential and technology for the best use of each locations in terms of energy efficiency and environmental protection. This analysis will be carried out in line with the national and EU legislation in this field. The updated Cadastre will present a more realistic potential for the construction of SHPPs, and thus promote and facilitate investment in SHPPs. The SHPP Cadastre should include SHPPs of estimated power between 100 kW and 10 MW.

The value of the project is EUR 1,400,000 (90% European Commission and 10% co-financing from the budget of the Republic of Serbia). The implementation of the project started on 27th February 2017, and the completion of the project was planned in 2019. The project is implemented by EPTISA Servicios de Ingenieria, S. L. Emilio Munoz 35-37, 28037 Madrid, Spain in a consortium with Bernard Ingenieure ZT GmbH Austria in cooperation with an Intersectoral Working Group consisting of the representatives of the state administration bodies. The direct beneficiary of the project is the Ministry of Mining and Energy.

The project has been extended until 27th February 27 2021. There were two extensions of the deadlines for the execution of the contract.

By Annex I, the Contract was extended for 10 months, until 28th December 2019, due to the delay in the installation of flow measurement equipment at the designated measurement points, occurred as a result of the complexity of determining the locations for installation of the equipment. The delay in installing the equipment at 20 measurement points occurred due to the unexpectedly long equipment delivery time, despite the fact that all the equipment was ordered and paid for on time. Since such measurements must be performed continuously for a period of one year, and since at that moment there was less time left than required until the end of the project, an extension of the deadline for the project implementation was approved.

By Annex II to the Contract: Due to the delay in the adoption of the Methodology for assessment of the locations for SHPPs, the Contract was extended for another 14 months, i.e. until 27th February, 2021. The analysis of locations by basins is in progress. The delay was due to the insistence of some members of the Intersectoral Working Group to deviate from the Terms of Reference and not assess the hydropower potential for the construction of

SHPPs in the second and third protection zones, considering that assessing this potential would encourage the construction of SHPPs in these protection zones. However, the Terms of Reference, on the basis of which the assessment of the project value was made, envisages the assessment of the entire potential for the construction of SHPPs available to the Republic of Serbia, and its scope could not be reduced.

Projects financed through IPA 2014 EU Instrument for Pre-Accession Assistance

Technical assistance to the Ministry of Mining and Energy for the implementation of the new Energy Law, the National Energy Efficiency Action Plan and the Renewable Energy Directive

The project started on 14th March, 2019 and will be completed 13th September, 2021. The project is implemented by Hulla & Co Human Dynamics GmbH & Co KG from Austria in consortium with SQ Consult from the Netherlands in cooperation with the Intersectoral Working Group consisting of the representatives of the state administration bodies. Due to the delay in contracting the project implementation with the successful bidder selected in the tender procedure, the implementation of the project started later than planned, which led to a postponement of the project completion deadline. The completion of the project has been postponed from 2018 to 2021. The value of the project is EUR 1,292,700 (90% European Commission, 10% co-financing from the budget of the Republic of Serbia.)

The project will analyse the shortcomings of the regulatory framework in relation to the EU acquis and the actual potential of biomass for the production of biofuels and bioliquids. The outcome of these activities will be two studies. The first study should present the potential for the use of biofuels and bioliquids in terms of EU recommendations and legislation, and the second study should present a model of the national verification scheme.

Cooperation between the Republic of Serbia and the Federal Republic of Germany in the energy sector

The cooperation between the Federal Republic of Germany and the Republic of Serbia is being implemented through the implementation of projects. The main partners of the Republic of Serbia within this cooperation are the Federal Ministry for Economic Cooperation and Development of the Federal Republic of Germany (in German: Bundesministerium für Wirtschaftliche Zusammenarbeit- BMZ), the German Development Bank (in German: Kreditanstalt für Wiederaufbau - KfW) and the German Agency for International Cooperation (in German: Deutsche Gesellschaft für Internationale Zusammenarbeit - GIZ), as part of the German Climate and Technology Initiative (in German: Deutsche Klima-und Technologieinitiative-DKTI).

Programme: "Development of a sustainable bioenergy market in Serbia"

Within this Programme a Study of the potential of wood biomass for energy purposes was conducted during the reporting period in November 2018, in cooperation with GIZ.

Programme: "Promoting the use of renewable energy sources - development of the biomass market"

The goal of the Programme is to use renewable energy sources in selected heating plants in the Republic of Serbia for the production of thermal energy or combined heat energy and electricity production, in order for some of them to switch from fossil fuels to biomass and use geothermal energy sources. The total funds of the Programme amount to 102 million euros, and the Program will be implemented in several phases.

The implementation of the first phase of the Programme started in June 2018. For this phase the funds from the KfW loan in the amount of 20 million euros were provided, as well as donations from the Federal Republic of Germany in the amount of 2 million euros and from the Swiss Confederation in the amount of 5 million euros. In November 2018, the Ministry formed the Central Project Implementation Unit (CPIU), consisting of 9 members, two of whom are consultants (for engineering and finance). During the implementation of the first phase of the Programme, biomass boilers with a total capacity of 30 MW will be installed in 5 heating plants: Priboj, Mali Zvornik, Novi Pazar, Prijepolje and Knjazevac, and CO₂ emissions will be reduced by 70% compared to the emissions before the implementation of the Programme.

It was originally envisaged that the following local self-government units would participate in the Programme: Mali Zvornik, Nova Varos, Novi Pazar, Prijepolje, Becej, Majdanpek, Kladovo, Priboj, Bajina Basta and Valjevo. During the project implementation, the following heating plants / cities withdrew from further cooperation: Nova Varos, Majdanpek, Kladovo, Bajina Basta, Valjevo, Becej. On 22nd October 2020, Majdanpek expressed a willingness to return to the Programme.

The interested heating plants join the Programme by concluding Trilateral Agreements with the Government of the Republic of Serbia and the Municipality.

2.a Progress in improving administrative procedures and removing administrative and non-administrative barriers to the use of renewable energy sources (Article 22(1)(e) of Directive 2009/28/EC)

In 2019, two decrees and a rulebook regulating the field of biofuels were adopted: Decree on Sustainability Criteria for Biofuels ("Official Gazette of RS", No. 89/19), Decree on the Mandatory Marketing of a Certain Percentage of Biofuels ("Official Gazette of the RS", No. 71/19) and Rulebook on the requirements for biofuels ("Official Gazette of the RS", No. 73/19).

With the adoption of these bylaws, Directive 2009/28/EC has been completely transposed into the legal framework of the Republic of Serbia governing the energy sector. Moreover, for the first time conditions have been created for placing biofuels on the market of the Republic of Serbia.

At the beginning of 2020, the Rulebook on calculation of the RES share ("Official Gazette of the RS", No. 37/20) was adopted, stipulating more closely the method for calculating the share of RES in the sector of electricity, heating and cooling production and in the transport sector, taking into account the calculation rules in accordance with Directive 2009/28/EC and the SHARES methodology developed by the Statistical Office of the European Union - EUROSTAT.

2.b Measures to ensure the transmission and distribution of electricity produced from renewable energy sources, and to improve the framework or rules for bearing or sharing costs relating to network connections and network reinforcements (Article 22(1)(f) of Directive 2009/28/EC)

Connection to the electricity grid or transmission and distribution system is governed by the Energy Law. Article 70 of the Energy Law and the Decree on Incentive Measures for Privileged Electricity Producers guarantee taking over of the total amount of energy produced in the plants using renewable energy sources, thus meeting the requirement of Article 16 of Directive 2009/28/EC on the guaranteed or priority taking over of energy produced using renewable energy sources.

The obligation to impose the minimum restriction on the purchase of energy from renewable energy sources is stipulated in Article 162 of the Energy Law, providing that electricity produced using RES has priority access in taking over electricity into the transmission or distribution system, except when the system security is compromised.

The obligation of transparent, objective and non-discriminatory reporting of costs for network access was introduced by Article 176 of the Energy Law, stipulating the rules on the publication of key market data. The consent to the rules is given by the Energy Agency.

3. Support schemes and other measures currently in place that are applied to promote utilizing energy from renewable sources, developments in the measures used with respect to those set out in the National Renewable Energy Action Plan (Article 22(1)(b) of Directive 2009/28/EC)

Table 3: Support schemes for RES

RES support schemes, 2019		Per unit support	Total (M€)*
Hydropower plants			
Guaranteed purchase of electricity from privileged producers – Feed-in tariff	Obligation/quota (%)		
	Penalty/Buy out option/ Buy out price (€/unit)		
	Average certificate price		
	Tax exemption/refund		
	Investment subsidies (capital grants or loans) (€/unit)		
	Energy production incentives		
	Feed-in tariff	7,81-13,,13c€/kWh	21,8
	Feed-in premiums		
	Tendering		
Solar power plants			
Guaranteed purchase of electricity from privileged producers – Feed-in tariff	Obligation/quota (%)		
	Penalty/Buy out option/ Buy out price (€/unit)		
	Average certificate price		
	Tax exemption/refund		
	Investment subsidies (capital grants or loans) (€/unit)		
	Energy production incentives		
	Feed-in tariff	9,38-15,21 c€/kWh	0,85
	Feed-in premiums		
	Tendering		
Wind power plants			
Guaranteed purchase of electricity from privileged producers – Feed-in tariff	Obligation/quota (%)		
	Penalty/Buy out option/ Buy out price (€/unit)		
	Average certificate price		
	Tax exemption/refund		
	Investment subsidies (capital grants or loans) (€/unit)		
	Production incentives	9,58 c€/kWh	60,1
	Feed-in tariff		
	Feed-in premiums		
	Tendering		
Biogas power plants			
Guaranteed	Obligation/quota (%)		

purchase of electricity from privileged producers – Feed-in tariff	Penalty/Buy out option/ Buy out price (€/unit)		
	Average certificate price		
	Tax exemption/refund		
	Investment subsidies (capital grants or loans) (€/unit)	15,62-19,095 c€/kWh	21,1
	Production incentives		
	Feed-in tariff		
	Feed-in premiums		
	Tendering		
	Biomass power plants		
Guaranteed purchase of electricity from privileged producers – Feed-in tariff	Obligation/quota (%)		
	Penalty/Buy out option/ Buy out price (€/unit)		
	Average certificate price		
	Tax exemption/refund		
	Investment subsidies (capital grants or loans) (€/unit)		
	Production incentives		
	Feed-in tariff	8,56-13,82 c€/kWh	1,3
	Feed-in premiums		
	Tendering		
Landfill gas power plants and sewage gas power plants			
Guaranteed purchase of electricity from privileged producers – Feed-in tariff	Obligation/quota (%)		
	Penalty/Buy out option/ Buy out price (€/unit)		
	Average certificate price		
	Tax exemption/refund		
	Investment subsidies (capital grants or loans) (€/unit)		
	Production incentives		
	Feed-in tariff	8,79 c€/kWh	0
	Feed-in premiums		
	Tendering		
Geothermal power plants			
Guaranteed purchase of electricity from privileged producers – Feed-in tariff	Obligation/quota (%)		
	Penalty/Buy out option/ Buy out price (€/unit)		
	Average certificate price		
	Tax exemption/refund		
	Investment subsidies (capital grants or loans) (€/unit)		
	Production incentives		
	Feed-in tariff	8,54 c€/kWh	0
	Feed-in premiums		
	Tendering		
Waste fired power plants			
Guaranteed purchase of electricity from privileged producers – Feed-in tariff	Obligation/quota (%)		
	Penalty/Buy out option/ Buy out price (€/unit)		
	Average certificate price		
	Tax exemption/refund		
	Investment subsidies (capital grants or loans) (€/unit)		
	Production incentives		
	Feed-in tariff	8,92 c€/kWh	0
	Feed-in premiums		
	Tendering		

	Feed-in premiums		
	Tendering		
Total annual estimated support in the electricity sector			105,15
Total annual estimated support in the heating sector			0
Total annual estimated support in the transport sector			0

*Data source: Report on the collected and paid incentive funds for privileged electricity producers for 2019, published by the guaranteed supplier on its website
<http://www.eps.rs/cir/snabdevanje/Documents/Izvestaj%20o%20prikupljenim%20i%20isplacenim%20Osredstvima%20za%20podsticaj%20povlastcenih%20proizvodjaca%20elektricne%20energije%20za%202019.pdf>

3.1. Information on the share of electricity produced from RES to final customers (Article 22(1)(b) of Directive 2009/28/EC)

Together with the delivered invoice for the supplied electricity or in another appropriate manner, the supplier and the public supplier of electricity are obliged to provide the customer with information on the share of each energy source in the total amount of electricity sold by such supplier in the previous year, as well as on the measures and manner, or effects of activities taken to increase the energy efficiency and protect the environment for production facilities from which the electricity was supplied (Article 196 of the Energy Law).

In 2017, the Ministry of Mining and Energy adopted the Rulebook on the method of calculation and presentation of the share of all types of energy sources in the sold electricity ("Official Gazette of RS", No. 96/17), which introduced the obligation of the supplier to publish the share of energy from RES in sold energy.

4. Information on the support schemes for RES that give additional benefits (but may also have higher costs), including biofuels made from wastes, residues, non-food cellulosic material, and ligno-cellulosic material (Article 22(1)(c) of Directive 2009/28/EC)

Currently there are no support schemes that would include additional benefits.

5. Information on the application of the system of guarantees of origin for electricity and heating and cooling from RES, and the measures taken to ensure reliability and protection of the system against fraud (Article 22(1)(d) of Directive 2009/28/EC)

The Energy Law stipulates that the guarantee of origin is a document with the sole purpose to prove to the final customer that the given share or quantity of energy was produced from renewable energy sources, as well as from the combined heat and power production with the high degree of primary energy utilization. Articles 82, 83, 84, 85, 86 and 87 of the Energy Law have established the legal basis for the enactment of the Decree on the guarantee of origin and Rulebook on the Method of Calculation and Showing all shares of energy sources in sold electricity. This Decree and the Rulebook specify the contents of the guarantee of origin of electricity produced from renewable energy sources, the procedure of issuance of guarantees, transfer and termination of validity of guarantees, manner of maintaining the register of issued guarantees of origin, as well as the manner of submitting data on produced electricity measured at the point of delivery to the transmission or to the distribution system. The Energy Law stipulates that the distribution system operator issues guarantees of origin.

In 2017, the Decree on the guarantee of origin ("Official Gazette of RS", No. 82/17) and the Method of Calculation and Showing all shares of energy sources in sold electricity ("Official Gazette of RS", No. 96/17) were adopted.

With the adoption of these two bylaws, the system of guarantees of origin has become functional. In 2019, the transmission system operator, as the body responsible for issuing guarantees of origin, became a member of the AIB (Association of Issuing Bodies). AIB is the European Association of Bodies for Issuing Guarantees of Origin. It is currently the only association in Europe that brings together 25 countries.

Guarantees of origin contain information on the attributes of production of 1 MWh of electricity and are used to publish the structure of the consumed electricity. The system of guarantees of origin offers to electricity customers the opportunity to demand from their suppliers to be supplied with "green" energy and in this way to stimulate energy production using RES.

Pursuant to the Law on Energy, JSC EMS Beograd, as the transmission system operator, has been assigned the role of a body for issuing guarantees of origin in Serbia and the role of the operator of the Register of Guarantees of Origin. On 11th November, 2020, JSC EMS, as a body for issuing guarantees of origin in Serbia, was connected to AIB HUB - a place where it is possible to export guarantees of origin of electricity produced in Serbia to other registers across Europe and import guarantees of origin from Europe to Serbia.

6. Developments in the preceding 2 years in the availability and use of biomass resources for energy purposes (Article 22(1)(g) of Directive 2009/28/EC)

Table 4: Biomass supply for energy use

	Amount of domestic raw material (*)		Primary energy in domestic raw material (ktoe)		Amount of imported raw material from EU (*)		Primary energy in amount of imported raw material from EU (ktoe)		Amount of imported raw material from non EU(*)		Primary energy in amount of imported raw material from non EU (ktoe)	
	2016	2017	2016	2017	2016	2017	2016	2017	2016	2017	2016	2017
Biomass supply for heating and electricity:												
Direct supply of wood biomass from forests and other wooded land energy generation (felling etc.) *	-	-	-	-	-	-	-	-	-	-	-	-
Indirect supply of wood biomass (residues and co-products from wood industry etc.)	-	-	-	-	-	-	-	-	-	-	-	-
Energy crops (grasses, etc.) and short rotation trees	-	-	-	-	-	-	-	-	-	-	-	-
Agricultural by-products / processed residues and fishery by-products	-	-	-	-	-	-	-	-	-	-	-	-
Biomass from waste (municipal, industrial etc.)	-	-	-	-	-	-	-	-	-	-	-	-
Others	-	-	-	-	-	-	-	-	-	-	-	-
Biomass supply for transport:												
Common arable crops for	-	-	-	-	-	-	-	-	-	-	-	-

biofuels												
Energy crops (grasses, etc.) and short rotation trees for biofuels	-	-	-	-	-	-	-	-	-	-	-	-
Others	-	-	-	-	-	-	-	-	-	-	-	-

,, - " data are not available

* Amount of raw material in m³ for biomass from forestry and in tonnes for biomass from agriculture and fishery and biomass from waste

Table 4a: Current domestic agricultural land use for production of crops dedicated to energy production (ha)

Land use	Area (ha)	Area (ha)
	2016	2017
1. Land used for common arable crops (wheat, sugar beet etc.) and oil seeds (rapeseed, sunflower etc.)	-	-
2. Land used for short rotation trees (willows, poplars)	-	-
3. Land used for other energy crops such as grasses (reed canary grass, switch grass, Miscanthus), sorghum	-	-

,, - " data are not available

7. Information on any changes in commodity prices and land use in the preceding 2 years associated with increased use of biomass and other forms of energy from renewable sources (Article 22(1)(x) of Directive 2009/28/EC)

Currently, there are no data available.

8. The development and share of biofuels made from wastes, residues, non-food cellulosic material, and ligno-cellulosic material (Article 22(1)(u) of Directive 2009/28/EC)

Table 5: Production and consumption of biofuels from Article 21(2)(ktoe)

Biofuels from Article 21(2) of Directive 2009/28/EC	2018	2019
Production – Fuel type	-	-
Consumption – Fuel type	-	-
Total production of biofuels from Art. 21(2)	-	-
Total consumption of biofuels from Art. 21(2)	-	-
% share of fuels from Art. 21(2) in total RES share - transport sector	-	-

,, - " data are not available

9. Information on the estimated impacts of the production of biofuels and bioliquids on biodiversity, water sources, water quality and soil quality in the preceding 2 years (Article 22(1)(j) of Directive 2009/28/EC)

There is currently no information on estimated impacts of the production of biofuels. The NREAP provides for a possibility of biofuel imports by the Republic of Serbia in case its own production capacities are not sufficient.

10. Estimated net greenhouse gas emission savings due to the use of energy from renewable sources (Article 22(1)(k) of Directive 2009/28/EC).

Table 6: Estimated GHG emission savings from the use of renewable energy (t CO₂eq)

Environment protection	2018	2019
Total estimated net GHG emission saving from using renewable energy	8.269.728	8.784.648
Estimated net GHG saving from the use of electricity from RES	4.474.128	4.707.781
Estimated net GHG saving from the use of renewable energy sources in heating and cooling sector	3.795.601	4.076.867
Estimated net GHG saving from the use of RES energy in transport	-	-

,, - " data are not available

11. The excess/deficit production of energy from renewable sources compared to the indicative trajectory which could be transferred to/exported to other Member States and/or third countries, as well as estimated potential for joint projects until 2020 (Article 22(1)(l) and (m) of Directive 2009/28/EC)

Table 7: Actual or estimated excess and/or deficit of production of renewable energy compared to the indicative trajectory which could be transferred to/from other Member States and/or third countries (ktOE)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Actual/estimated production excess or production deficit	0	0	0	0	0	0	0	0	-

11.1. Statistical transfers, joint projects and joint support scheme decision rules

The National Action Plan was adopted on 4th June 2013 and delivered to the EnC Secretariat together with the updated Document on Planned Cooperation Mechanisms (*Forecast document*) which, among other things, shows the estimated potential for joint projects with the EU member countries.

In October 2011, an agreement regarding the implementation of joint projects in the RES field was signed between the Ministry of Infrastructure and Energy of the Republic of Serbia (on behalf of the Government of the Republic of Serbia) and the Ministry of Economic Development of the Republic of Italy (on behalf of the Government of the Republic of Italy) on implementation of joint projects in the field of RES. The Agreement on Cooperation between the Government of the Republic of Serbia and the Government of the Republic of Italy in the field of energy underwent the ratification process at the National Assembly of the Republic of Serbia in December 2012. The President of the Council of Ministers of the Republic of Italy is expected to sign the Decree in the forthcoming period, which will fully complete the ratification process of both parties. In this way the preconditions required for the commencement of implementation of the Agreement and projects provided for in its Annex will be met. Construction of small hydropower plants in Serbia and "green" energy exports

to Italy are envisaged by the Agreement. The implementation of the Agreement has not taken place because the Italian party has not met the obligation to adopt the Decree in accordance with the Agreement. Therefore, the statistical transfer will not be carried out as planned by the National Action Plan for RES.

12. The manner of estimating the share for biodegradable waste in the waste used to produce energy, and actions taken to improve and verify such estimates (Article 22(1)(n) of Directive 2009/28/EC)

Based on data on the total quantity of municipal waste generated annually and the share of biodegradable fractions in such waste, the value of the biodegradable quantity of the municipal solid waste was estimated for the purpose of drafting the energy development strategy.

The morphological composition of municipal waste is shown in the Report on the performance of communal activities on the territory of the Republic of Serbia, prepared once a year in accordance with Article 8 of the Law on Communal Activities ("Official Gazette of RS", no. 88/11, 104/16 and 95/18).

CONCLUSION:

In reporting period 2018 and 2019, a steady growth in building new capacities for the production of electricity from RES was maintained in the Republic of Serbia. By December 2020, 265 power plants using RES with a total installed capacity of 514 MW were built within the system of incentive measures. However, regardless of the built capacities, the share of RES in GFEC in 2019 was 21.44% of the planned 25.6%. The value of this share in 2019 is lower than the highest recorded value so far in 2014, when the share of RES in GFEC was 22.86%. The reasons for such results lie in the fact that in small countries, the value of GFEC is significantly affected by developments in the economic sector in such a way that GFEC changes the trend depending on the operation of large energy consumers. The share of RES of 22.86% in 2014 was a consequence of the reduction of GFEC due to the effects of the floods on the electricity system that year, and not of the newly built RES capacities. Due to this fact, the share of RES in GFEC does not provide a true picture of the actual progress in the use of renewable energy sources and the construction of new capacities using RES.

At the end of 2019, a set of bylaws was adopted, regulating for the first time the field of usage of biofuels and creating conditions for placing biofuels on the markets of the Republic of Serbia. By adopting the above-mentioned bylaws, the Republic of Serbia has fully transposed Directive 2009/28/EC into the legal framework governing the energy sector.

In March 2020, the Rulebook on calculation of the RES share was adopted, which stipulates the method of calculating the share of RES in accordance with the rules of Directive 2009/28/ EC and SHARES methodology, developed by the Statistical Office of the European Union - EUROSTAT for the purpose of uniform monitoring of EU countries' progress in achievement of the objectives in the field of RES. The same methodology is applied for monitoring the members of the Energy Community with regard to achieving the objectives in the field of RES. Data on the basis of which the degree of the achieved objectives in 2020 in relation to the binding objectives will be determined, will be available within the Energy Balance of the Republic of Serbia for 2022.

In November 2020, JSC EMS, as a body for issuing guarantees of origin in Serbia, was connected to AIB HUB - a place where it is possible to export guarantees of origin of electricity produced in Serbia to other registers across Europe and import guarantees of origin from Europe to Serbia.

Also, in order to obtain more accurate data on biomass consumption, it is planned to conduct a new survey on biomass consumption for energy purposes in 2020 in the Republic of Serbia in 2021, in cooperation with the Statistical Office of the Republic of Serbia and the EnC Secretariat.

In the previous period, in the field of renewable energy sources, the Republic of Serbia drafted a number of bylaws that significantly improved the business environment for the development of projects in this field. However, bearing in mind the need to create a comprehensive regulatory framework that will drive even more dynamic growth of renewable energy sources in the Republic of Serbia, the reform of legislation in this field and the preparation of the first special Law on Renewable Energy Sources has already begun. The need for reform also stemmed from the need for the Republic of Serbia to harmonise its policy in the European integration process with the new regulations of the European Union in the field of renewable energy sources and its ambitious goals.