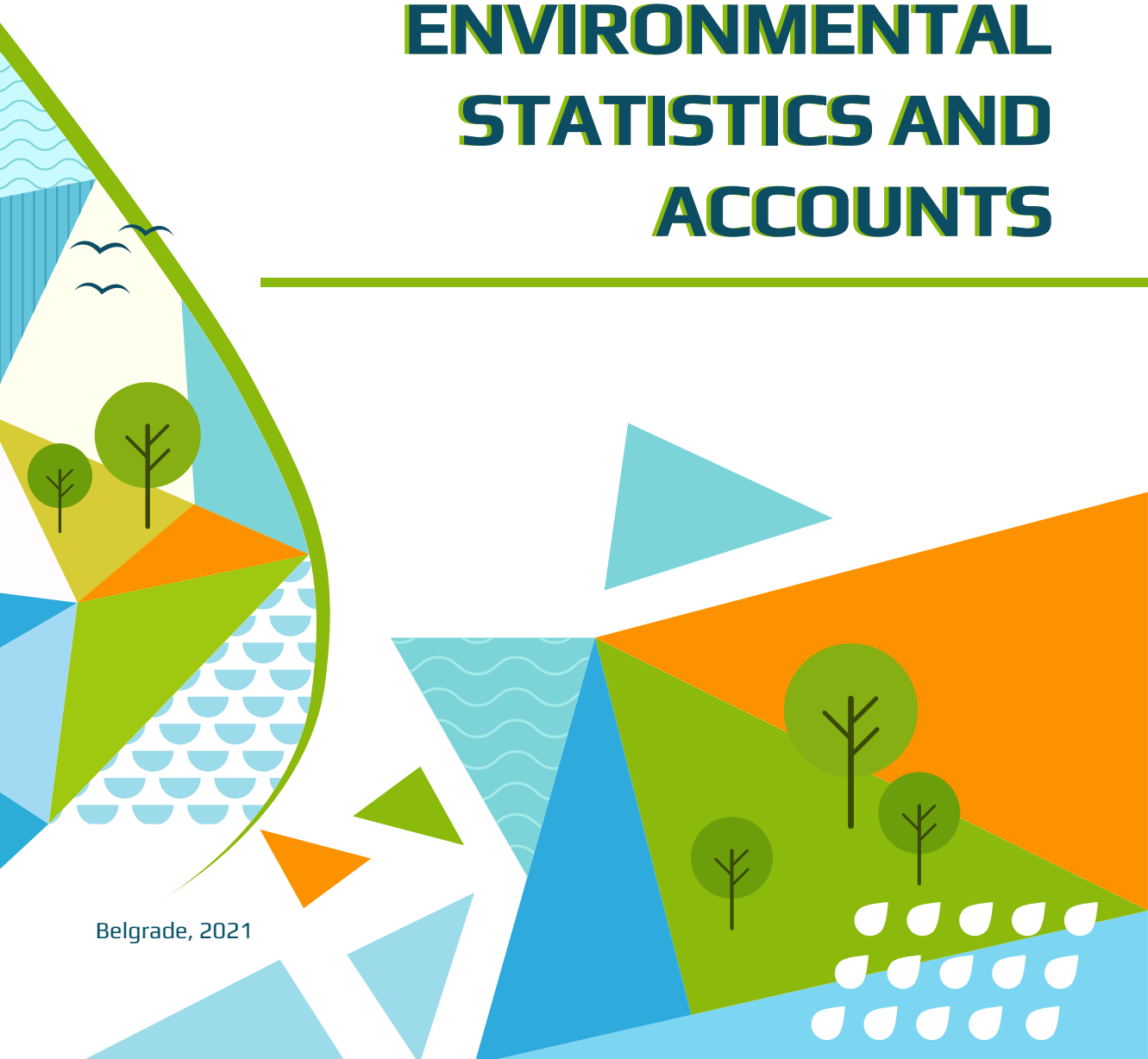
Statistical Office of the Republic of Serbia

ENVIRONMENTAL STATISTICS AND ACCOUNTS



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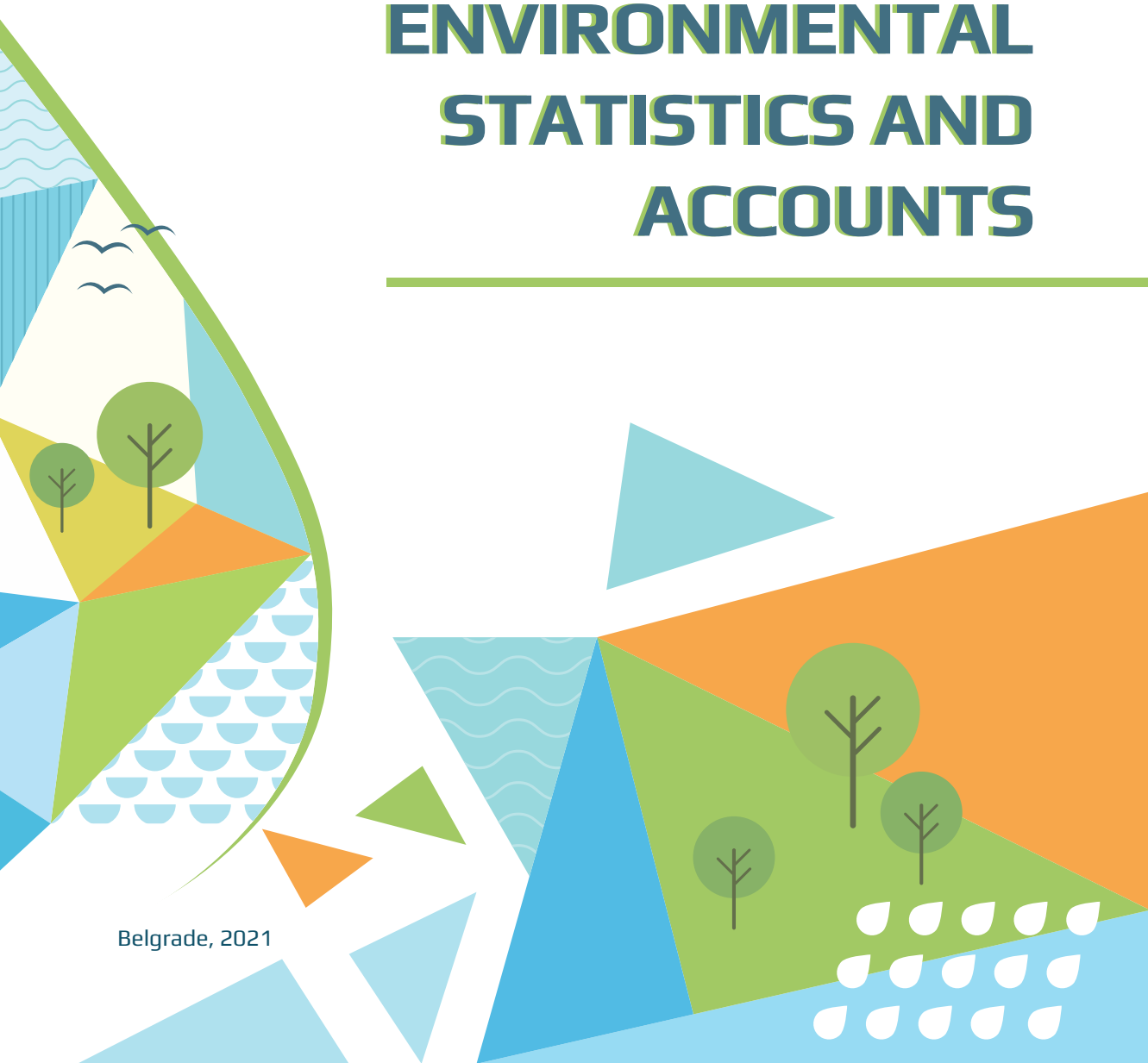

Belgrade, 2021

ENVIRONMENTAL STATISTICS AND ACCOUNTS

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PREFACE

This publication was created as a result of the activities of the Statistical Office of the Republic of Serbia within the implementation of IPA 2017 component of the Environmental Accounts project, supported by Eurostat. The main goal of the project was to develop the missing module for Physical energy flows accounts from the Regulation on European Environmental Economic Accounts, and then to prepare a special publication presenting the SORS results in the domain of statistics and environmental accounts. Environmental accounts are a system that provides a link between the environment and the economy and enables monitoring of the contribution of the environment to the economy (use of raw materials, water, energy) and the impact that the economy has on the environment (waste, water emissions, air).

The areas of statistics and environmental accounts have been intensively developed in SORS in the last ten years. Most of the activities were realized within the projects financed by Eurostat and Swedish International Development Agency. The most important results of this activities are the implementation of the Regulation on Waste Statistics and Regulation on European Environmental Economic Accounts in the statistical system of the Republic of Serbia, production of internationally comparable statistics and established regular reporting to Eurostat in the fields of waste statistics, water statistics and environmental accounts.

This publication presents the most significant results and indicators by areas of the environment, with a special focus on the international comparison of the Republic of Serbia and selected countries in the region. As a separate area, selected indicators of the circular economy are presented due to the special importance of this area in the future European agenda for sustainable growth (European Green Deal), according to which the transition to a circular economy should reduce pressure on natural resources and achieve sustainable progress and create new jobs.

The publication was prepared by the Division of Statistics and Environmental Accounts of the Statistical Office of the Republic of Serbia.

Belgrade, September 2021

Director

Dr Miladin Kovačević

CONTENTS

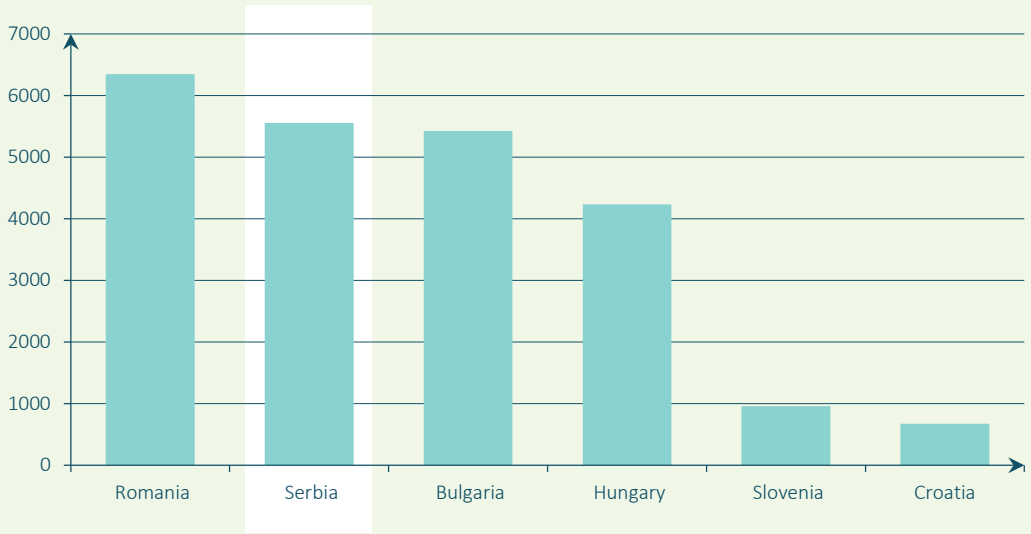
Water statistics monitors the abstracted, used and discharged water quantities by sections of economic activities, water supply and sewerage network, number of connected inhabitants, irrigation, drainage, protection against harmful effects of water, as well as the most important indicators.

WATER STATISTICS

INTERNATIONAL COMPARISON

There are significant differences in the quantities of abstracted waters for the selected countries in the region, and the consequence is differences in the size of the observed countries, available and abstracted water resources, climate, industrial and agricultural structure of each country. In 2018, Serbia was, with 5 557 million m^3, on the second place in terms of the amount of water abstracted, following Romania (6 349 million m^3), and above Bulgaria (5 425 million m^3), Hungary (4 232 million m^3), Slovenia (957 million m^3) and Croatia (673 million m^3).

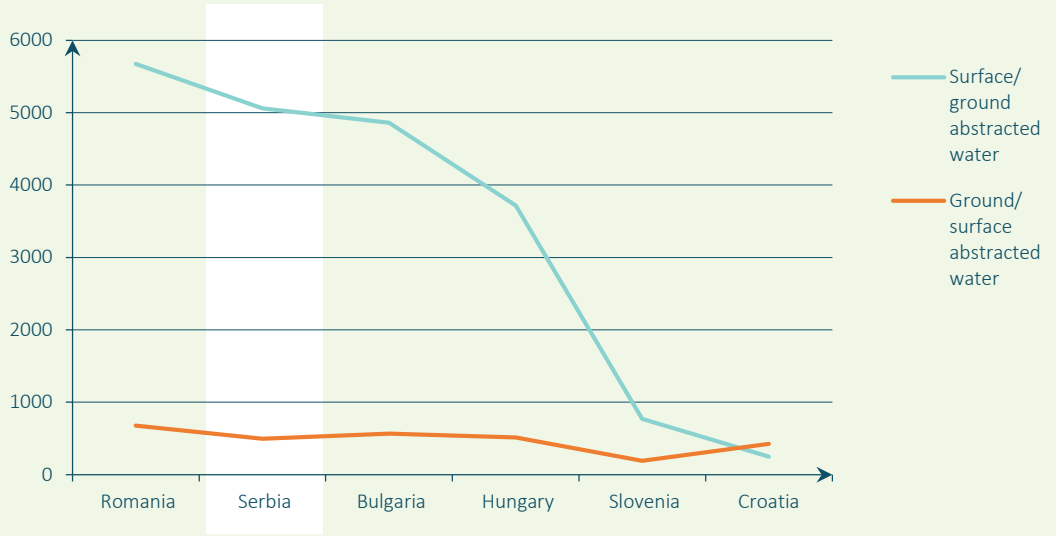
Graph 1 Total abstracted waters, 2018 (mil. m^3)



Source: Eurostat.

If observing the ratio of abstracted ground and surface water, in 2018, Serbia had the highest share of abstracted surface water in relation to groundwater - even 10 times higher. This difference arises due to the use of large quantities of surface water for the production of electricity in thermal and hydro power plants, as a source of cooling water in the chemical industry, as well as for the metals manufacturing, etc. Observed by countries in the region, behind Serbia are Bulgaria and Romania with about eight times higher surface water abstraction than groundwater, then Hungary (seven times), Slovenia (four times), and the least Croatia (0.6) times.

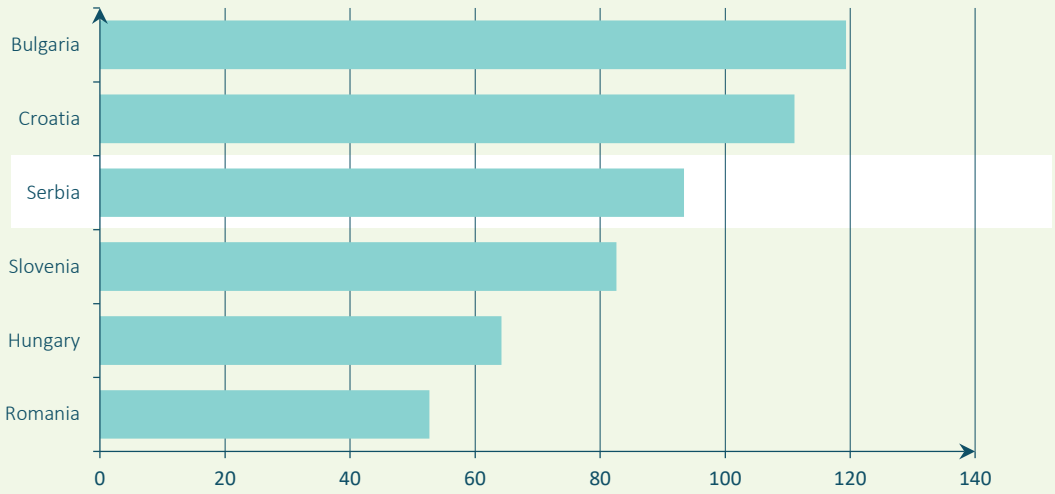
Graph 2 Ratio of abstracted surface and groundwater, 2018 (mil. m^3)



Source: Eurostat.

Observed by countries of the region, Serbia is, with 93.4 m^3 of abstracted water for public water supply per capita, on the third place, behind Bulgaria (119.3 m^3 per capita), Croatia (111.1 m^3 per capita), and ahead of Slovenia 82.6 m^3 per capita), Hungary (64.2 m^3 per capita) and Romania (52.7 m^3 per capita). Depending on the availability of water resources (drinking water), the supply of households in the observed countries (population connected to public water supply), as well as losses on the water supply network, we notice differences in the countries of the region.

Graph 3 Abstracted water for public water supply, 2018 (m^3 per capita)



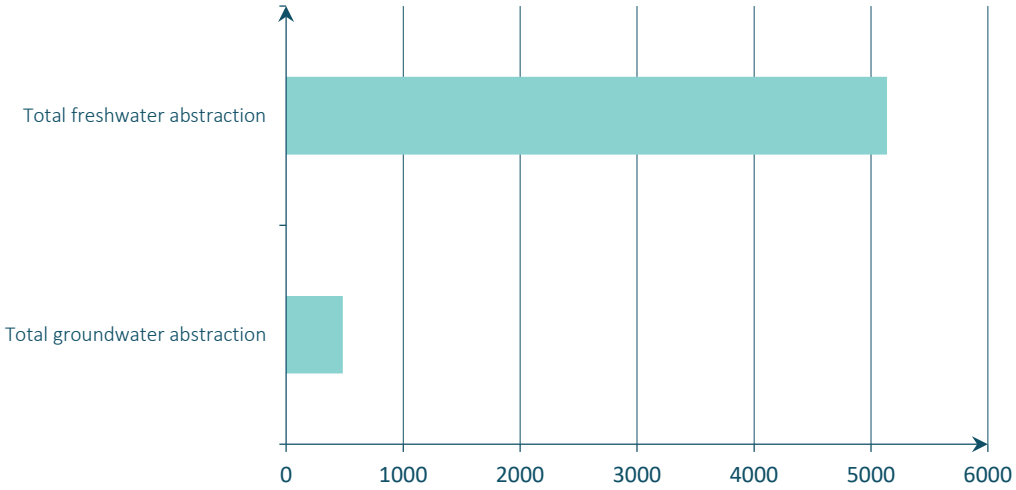
Source: Eurostat.

WATERS IN THE REPUBLIC OF SERBIA

In 2019, a total of 5 619 million m^3 of water was abstracted from all sections of economic activities and households. Of the total abstracted waters, 91.4% was from surface sources and 8.6% from groundwater sources. Abstracted surface waters are mostly abstracted in the section Electricity, gas, steam and air conditioning supply (4 080 million m^3), then in the section Agriculture, forestry and fishing (706 million m^3), for the needs of public water supply (247 million m^3), in the section of Manufacturing (45 million m^3), the section of Mining and quarrying (8 million m^3) and in other sections of economic activities (48 million m^3).

Regarding groundwater, the largest quantity is taken for the needs of public water supply (422 million m^3), then in the section Manufacturing (27 million m^3), in the section of Mining and quarrying (5 million m^3), in the section Agriculture, forestry and fishing (3 million m^3), and in other sections of economic activities (28 million m^3).

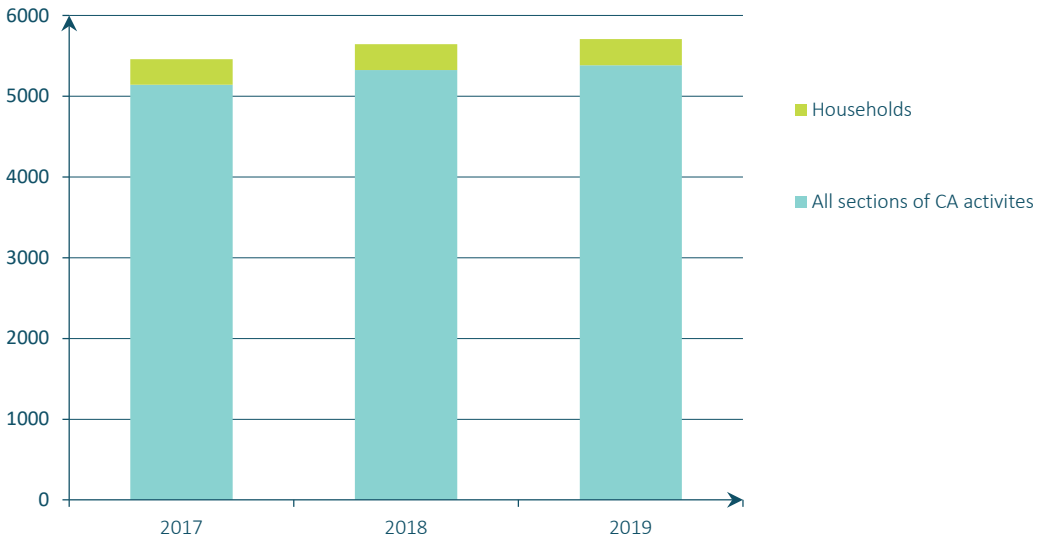
Graph 4 Surface and groundwater abstracted, 2019 (million m^3)



Source: Statistical Office of the Republic of Serbia.

The total water used from all sections of economic activities and households was 5 386 mil. m^3, while total losses amounted to 233 mil. m^3. The largest amount of water is used as water for electricity production and as cooling water in thermal power plants in the section of Electricity, gas, steam and air conditioning supply - 76.8%. In the section Agriculture, forestry and fishing, water is used for trout and carp ponds - 11.3%, 6.0% was used in households, in the section of Manufacturing 1.6% and in other sections of economic activities 4.3%.

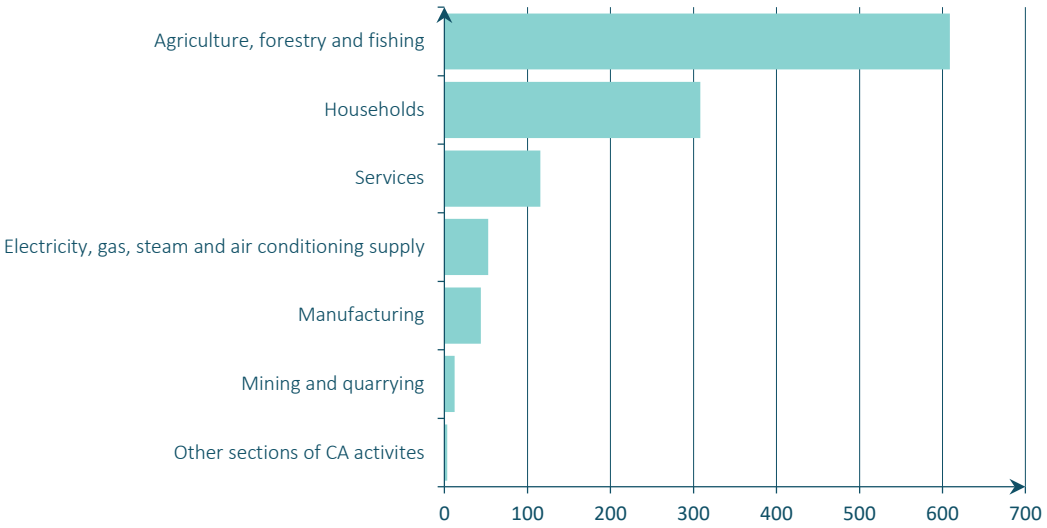
Graph 5 Total used water from all sections of economic activities and households, 2017–2019 (million m^3)



Source: Statistical Office of the Republic of Serbia.

Wastewater discharged from all sections of economic activities and households in 2019 amounted to 1 145 mil. m^3, of which 7.1% was treated in wastewater treatment systems. The most common type of treatment from total treated water from all sections of economic activities and households was secondary, with 48.1% of treated water, then primary, with 33.7%, and tertiary, with 18.2%.

Graph 6 Total discharged waters by sections of economic activities and households, 2019 (million m^3)



Source: Statistical Office of the Republic of Serbia.

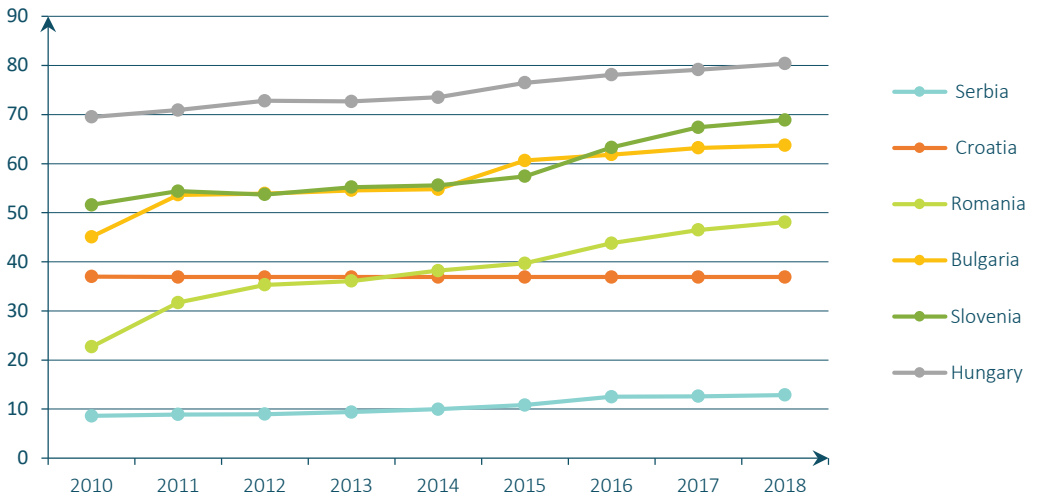
Indicators Sustainable Development Goals
SDG indicators

Population connected to urban wastewater treatment with at least secondary treatment.

The indicator represents the percentage of population connected to urban wastewater treatment with at least secondary treatment. Secondary wastewater treatment includes biological treatment with secondary collection or other processes, resulting in a biological oxygen demand (BOD) elimination of at least 70% and a chemical oxygen demand (COD) of at least 75%. Tertiary treatment is a continuation of the secondary treatment of nitrogen and / or phosphorus and / or any other pollutant that has an impact on the quality and specific water use: microbiological pollution, colour, etc. The minimum efficiency levels that define tertiary treatment are: organic pollution reduced to at least 95% for BOD and 85% for COD, namely: nitrogen removal of at least 70%, phosphorus removal of at least 80% and microbiological removal of coliforms to less than 1000 in 100 ml.

In the countries of the region (for 2018), Hungary is, with 80.4% of the population connected to the wastewater treatment system with at least secondary treatment, convincingly on the first place, followed by Slovenia (68.9%), Bulgaria (63.7%), Romania (48.1%), Croatia (36.9%) and Serbia, with only 12.9%. Unlike the EU countries, large cities in Serbia, such as Belgrade, Novi Sad and Nis, plan to build a wastewater treatment plant, for the financing of which Serbia needed the support of the European Union.

Graph 7 Population connected to urban wastewater treatment with at least secondary treatment, 2010–2018 (%)



Source: Eurostat.

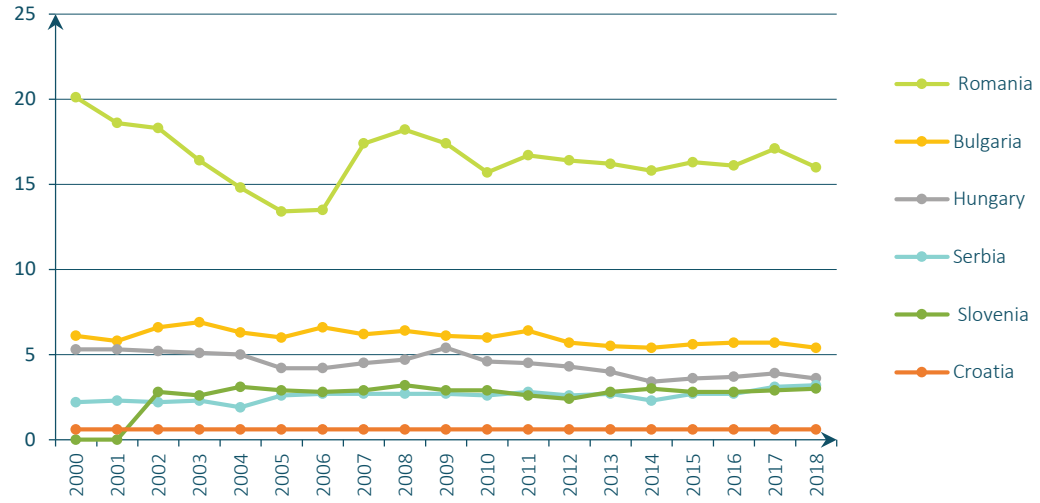
Water exploitation index

The indicator water exploitation index presents the ratio of the total annual amount of abstracted water resources and renewable water resources. It is an indicator of the pressure of abstracted water resources on the sustainable use of renewable water resources at the national level. This value of the index indicates a serious problem (water stress) that can occur if the index exceeds 20%, and it is considered that the limit is above 40% of zones with extreme water stress.

The water exploitation index in Serbia in 2018 was 3.2% and it is on the fourth place, behind Romania - 16.0%, Bulgaria - 5.4%, Hungary - 3.6%, and ahead of Slovenia - 3.0%, and Croatia - 1%. Based on the data, it can be concluded that Serbia is in a safe zone in terms of water stress, unlike Romania, whose value of the water exploitation index is approaching the limit of 20%, meaning the occurrence of high pressure of abstracted water resources in relation to renewable ones.

Stable water exploitation index (about 3%) in the period from 2000 to 2018.

Graph 8 Water exploitation index, 2000–2018 (%)



Source: Eurostat.

Waste statistics monitor the amount of generated and treated waste in a country, as well as major indicators. Waste statistics data are indicative of the method of natural resource management. By definition, waste is any substance of object which the holder discards or intends to or is required to discard" but also a natural resource which need to be recovered as much as possible.

WASTE STATISTICS

INTERNATIONAL COMPARISON

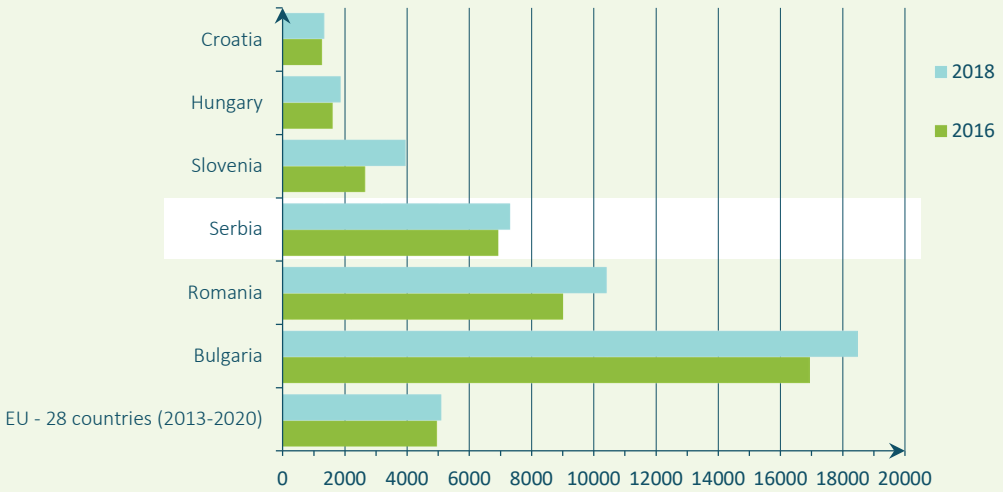
EU countries (EU-28) generated, on average, about 5.1 t of waste per inhabitant. There is a large difference in waste generated per inhabitant in selected countries of the region.

Serbia, with 7.3 t of waste generated per inhabitant, was above the European average (5.1 t per inhabitant) but also under the average of Bulgaria (18.5 t per inhabitant) and Romania (10.4 t per inhabitant). The other three countries of the region generated less waste per inhabitant, compared with the European average: Slovenia 4.0 t; Hungary 1.9 t; and Croatia 1.4 t per inhabitant.

The largest increase in the amount of waste generated in 2018 to 2016 was recorded in Slovenia, by about 49%, followed by Romania and Hungary with an increase of 15.7%, Bulgaria with 9.2%, and finally Serbia with 5.5% and Croatia with 5.4% had the smallest increase in waste generated.

Mineral waste from the section Mining and quarrying prevailed in the amount of waste generated.

Graph 9 Generation of waste from economic sectors and from households, 2016 and 2018 (kg per inhabitant)



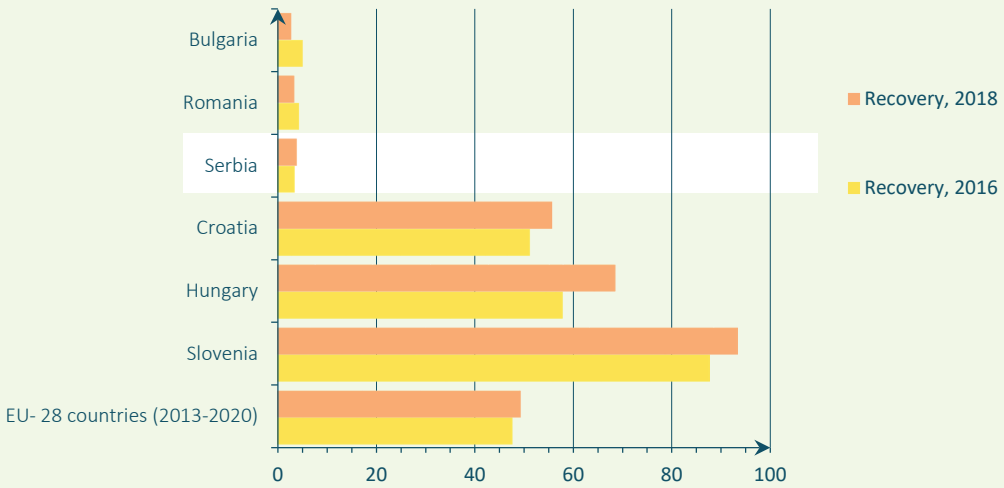
Source: Eurostat.

The amount of waste treated in 28 countries of the EU in 2018 amounted to about 4.9 t per inhabitant. In the total amount of waste treated, 49.4% were recovered and the remaining 50.6% were disposed of.

Graph 10 shows that the share of recovered waste in total treated waste saw an increase in 2018 to 2016, in most of the countries of the region.

Slovenia, with a share of 93% of waste recovered is by far above the European average, as well as Hungary with about 69%. Croatia, with approximately 56%, is slightly above the European average. As to the share of recovered waste in total treated waste in 2018, the Republic of Serbia, with about 4%, is by far under the European average, but Romania, with 3.5% and Bulgaria with 2.9% recorded slightly smaller shares than Serbia.

Graph 10 Share of recovered waste, 2016 and 2018 (%)



Source: Eurostat.

WASTE GENERATION IN THE REPUBLIC OF SERBIA

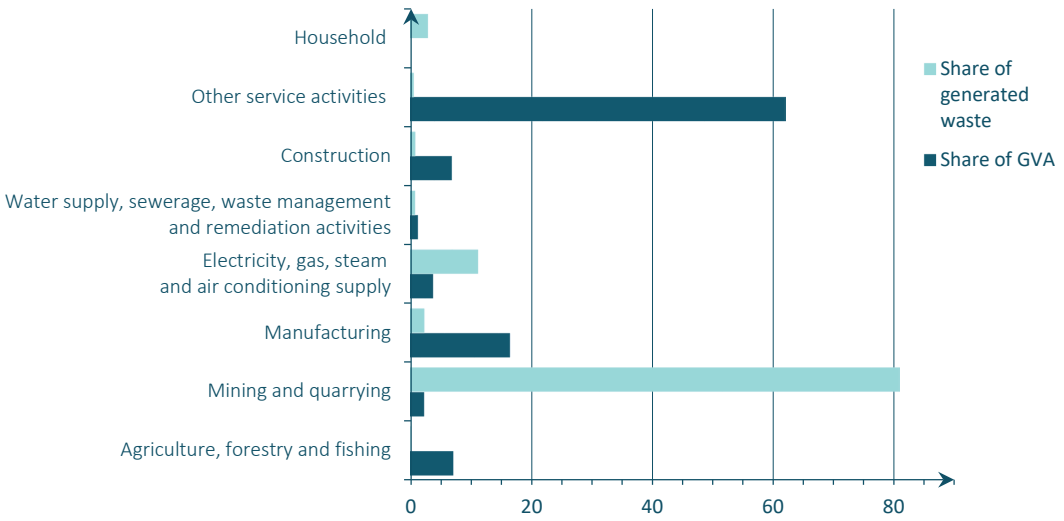
All economic sectors and households generated 66.6 million tons of waste in 2019. The largest amount (53.8 million tons) arose from the Mining and quarrying. The amount of household waste was estimated at about 2.0 million tons or 284.6 kg per inhabitant.

The section of Mining and quarrying, with 80.8%, recorded the largest share in the total amount of waste generated, while this section contributed to the gross value added by only 2.3% in 2019. The section of Electricity, gas, steam and air conditioning supply, the second largest share in the amount of waste generated (11.3%) contributed to GDP with 3.8%.

On the other hand, the sections of Service activities accounted for 0.6% in the total amount of waste generated and contributed to GDP with 61.9%. The sections of Manufacturing (with 2.4%) and Construction (with 0.9%) recorded also small shares in total waste generated, while their contribution to GVA was 1.5% and 6.9%, respectively.

The share of recovered waste in 2018 increased by 14.3% relative to 2016.

Graph 11 Share of waste generated in the Republic of Serbia and gross value added, by CA section, 2019 (%)



Source: Statistical Office of the Republic of Serbia.

HAZARDOUS CHEMICALS

The Statistical Office of the Republic of Serbia calculates indicators of amounts of industrial chemicals produced and consumed by toxicity class according to Eurostat methodology. The indicators are calculated once a year and are available for the period from 2010 to 2019.

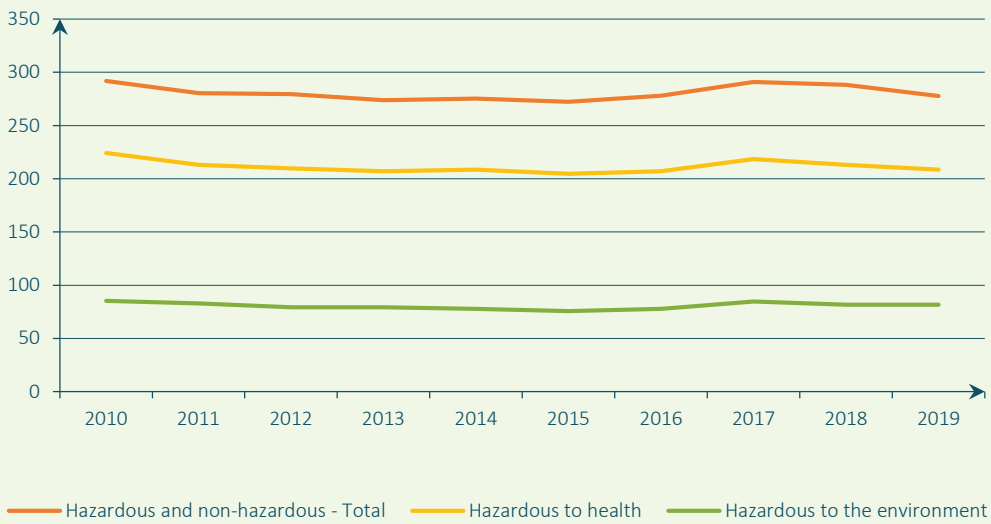
Monitoring the amounts of produced chemicals hazardous to health and the environment can help reorienting the produced amounts of chemicals from lower hazard classes and reduce the risk they involve.

INTERNATIONAL COMPARISON

The production of industrial chemicals in EU-28 in 2019 amounted to 277,8 million tons and saw a fall of 14.1% relative to 2010. Slight oscillations occurred in the observed period so that the production in 2017 was almost at the same level as in 2010 (291,0 million tons), but afterwards it was on the decrease the next two years. The production of chemicals hazardous to health in 2019 amounted to 208,6 million tons, while the production of chemicals hazardous to the environment was 81,8 million tons.

Larger decrease in production in 2019 to 2010 was recorded with chemicals hazardous to health (15.6%) i.e. (3.5%) with chemicals hazardous to the environment.

Graph 12 Production of chemicals in EU-28, 2010–2019 (mill. t)

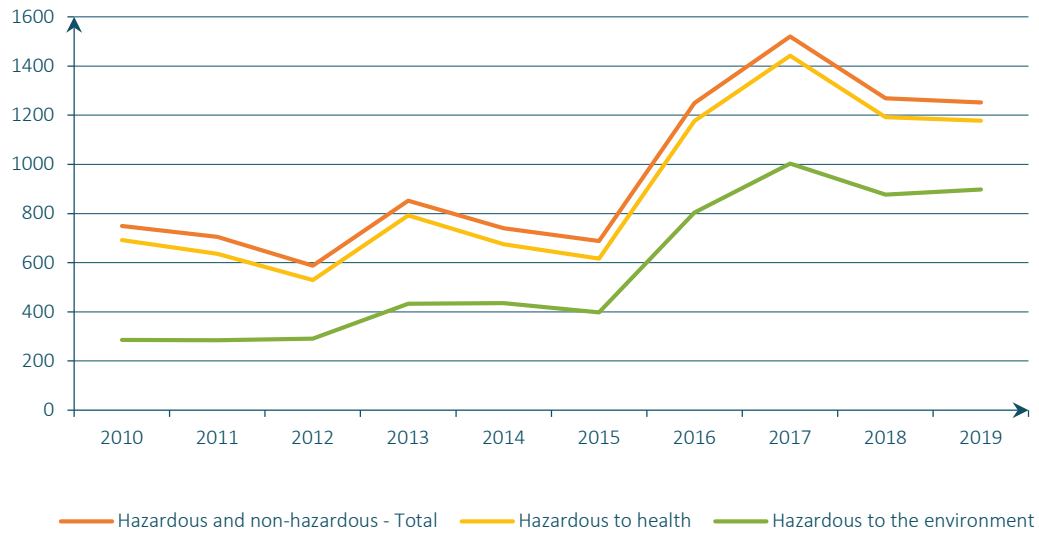


Source: Eurostat.

PRODUCTION OF INDUSTRIAL CHEMICALS IN THE REPUBLIC OF SERBIA

The production of chemicals in the Republic of Serbia in 2019 amounted to 1,25 million tons. Slight oscillations in the production of industrial chemicals were present from 2010 to 2015, and afterwards in 2016 the production almost doubled. It continued to increase till 2019. The period from 2010 to 2015 was critical for the basic chemical industry so that production fell, and since 2016 it has started operating in full capacity.

Graph 13 Production of chemicals in the Republic of Serbia, 2010–2019 (thous. t)

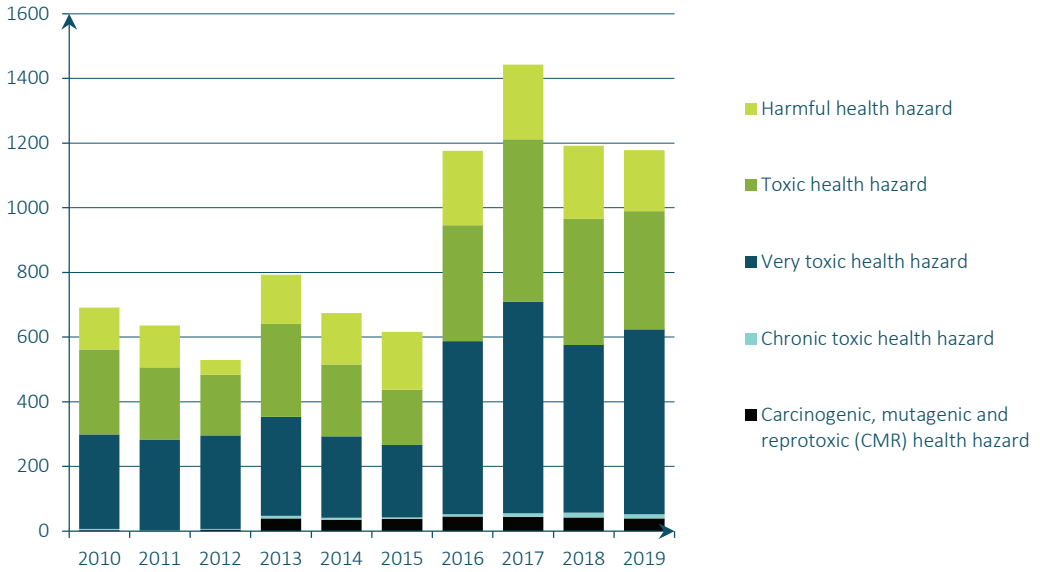


Source: Statistical Office of the Republic of Serbia.

Production of chemicals hazardous to health

In the group of chemicals hazardous to health, chemicals of the class "very toxic health hazard" are mostly produced in the Republic of Serbia. In 2017, the production of industrial chemicals of this class amounted even to 654 thousand tons, the next, by the amount produced, being those of the classes "toxic health hazard" and "harmful health hazard". All three classes recorded a fall after 2017. The first two classes of chemicals with the highest level of hazard (carcinogenic, mutagenic and reprotoxic (CMR) health hazard; Chronic toxic health hazard) were produced in considerably smaller quantities.

Graph 14 Production of chemicals hazardous to human health, 2010–2019 (thous. t)



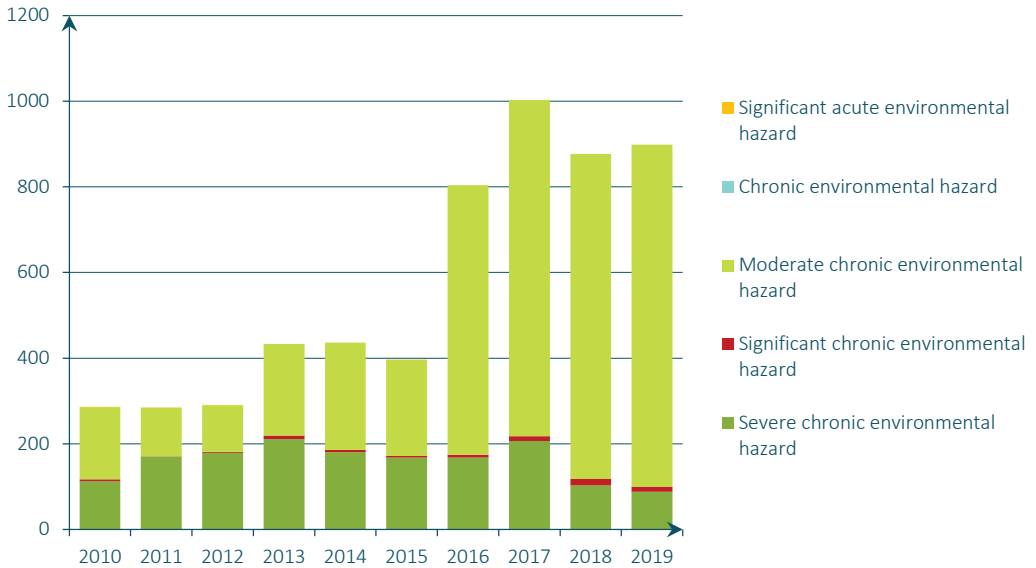
Source: Statistical Office of the Republic of Serbia.

Note: The different classes of chemicals are ranked according to their toxicity from the most dangerous (bottom class) up to the least dangerous (top class).

Production of chemicals hazardous to the environment

As for the production of chemicals hazardous to the environment, the class “moderate chronic environmental hazard” recorded the largest production of 798 thousand tons in 2019. It is followed by the class “severe chronic environmental hazard” with considerably smaller production, which had a production maximum of 207 thousand tons in 2017. Then the production fell abruptly as production had ceased and one of the largest chemical industry plant in the Republic of Serbia had closed down its operations.

Graph 15 Production of chemicals hazardous to the environment, 2010–2019 (thous. t)



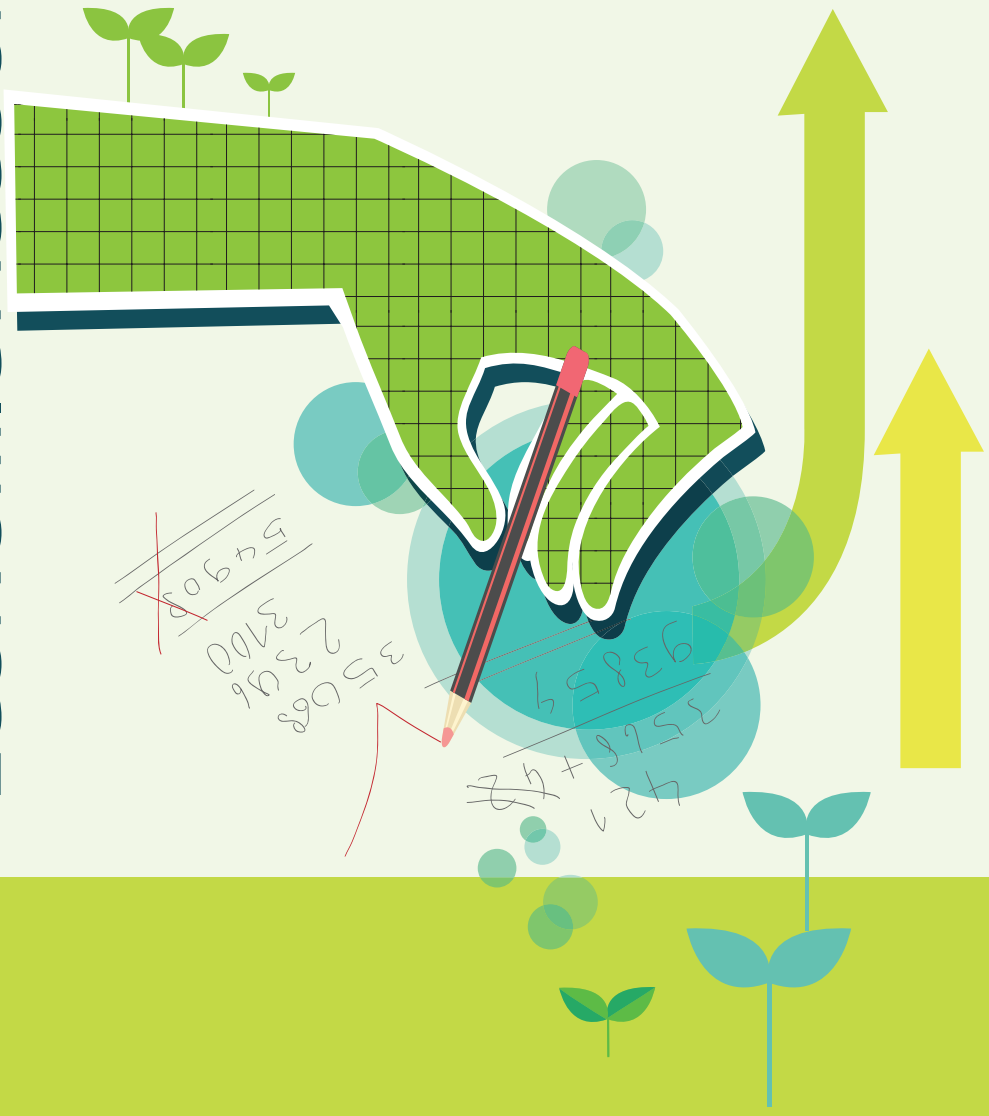
Source: Statistical Office of the Republic of Serbia.

Note: The different classes of chemicals are ranked according to their toxicity from the most dangerous (bottom class) up to the least dangerous (top class).

Environmental accounts are satellite accounts that link environmental data to the System of National Accounts. They complement environmental statistics by presenting environmental variables in a way that is consistent with the concepts and definitions of national accounts.

This publication will present the all six implemented physical and monetary environmental accounts according to the Regulation (EU) 691/2011 on European environmental economic accounts in the Republic of Serbia.

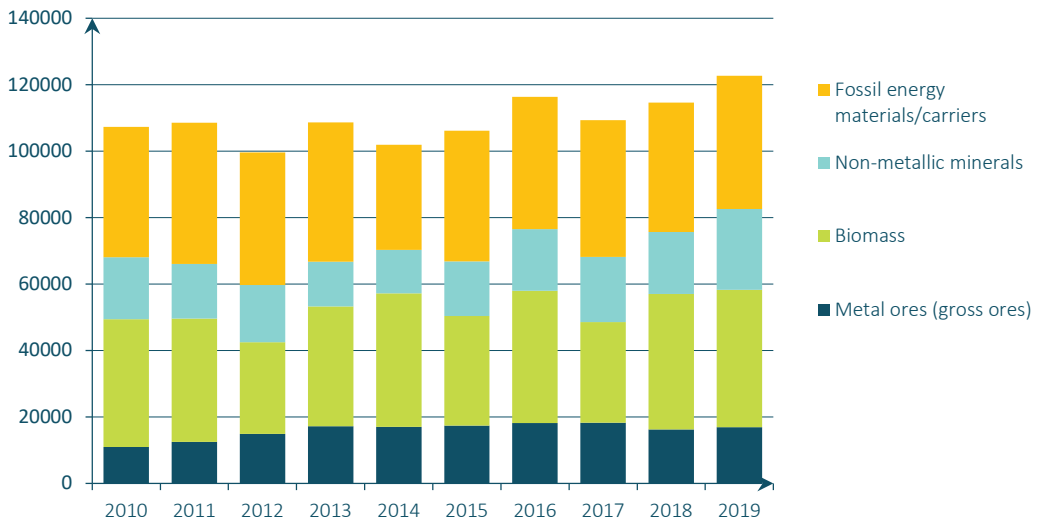
ECONOMIC ACCOUNTS



MATERIAL FLOW ACCOUNTS

Material flows are material flows between an economy and the natural environment, covering extraction of raw materials and other primary materials from the natural environment, and their discharge into the natural environment as well as material flows between an economy and abroad (imports and exports).

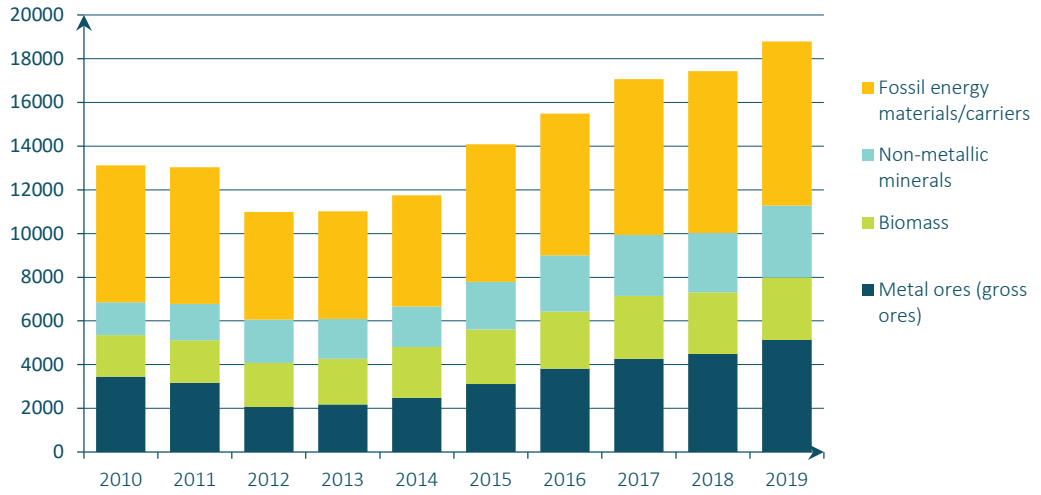
Graph 16 Domestic extraction in the Republic of Serbia, by material category, (thous. tons)



Source: Statistical Office of the Republic of Serbia.

The volume of domestic extraction recorded a slight growth in the period from 2010 to 2019. In 2019, it amounted to 122 687 thous. tons, by 14.4% more than in 2010. Observed by material categories, the largest volume in domestic extraction was that of biomass (41 381 thous. tons) and fossil fuels (40 112 thous. tons).

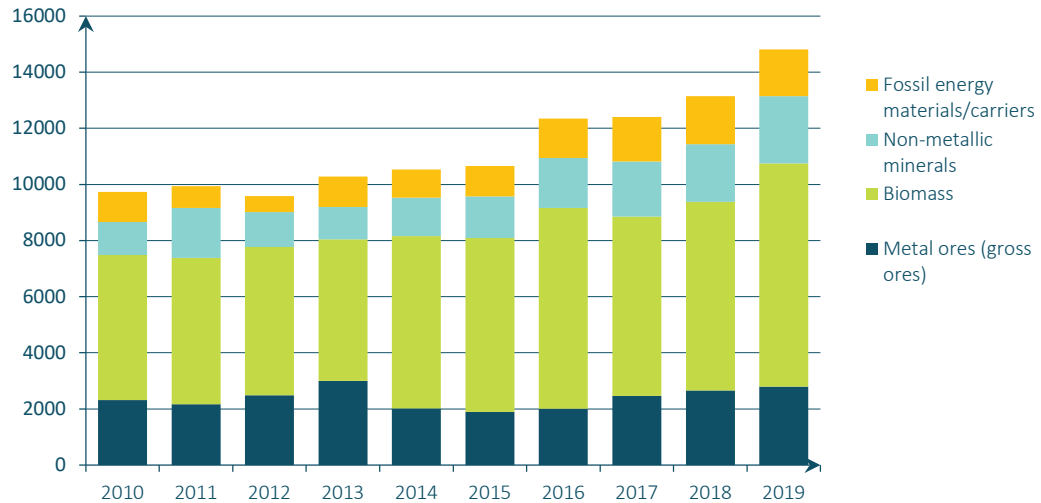
Graph 17 Import in the Republic of Serbia, by material category, (thous. tons)



Source: Statistical Office of the Republic of Serbia.

Material imports in 2019 amounted to 19 991 thous. tons, namely 52.3% more than in 2010. Material categories mostly imported were fossil fuels (37.6%) and non-metallic minerals (25.7%).

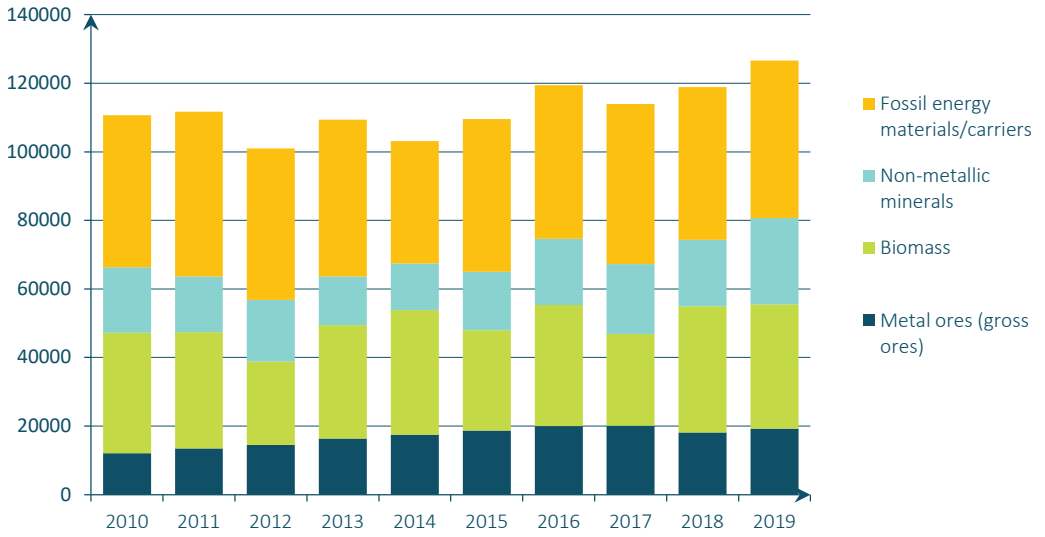
Graph 18 Exports, by material category, (thous. tons)



Source: Statistical Office of the Republic of Serbia.

Material exports in 2019 amounted to 16 053 thous. tons, by 64.80% more than in 2010. Biomass and metal ores were the most exported, accounting for 49.6% and 17.4%, respectively of the total volume of exported materials.

Graph 19 Domestic material consumption, by material category, (thous. tons)



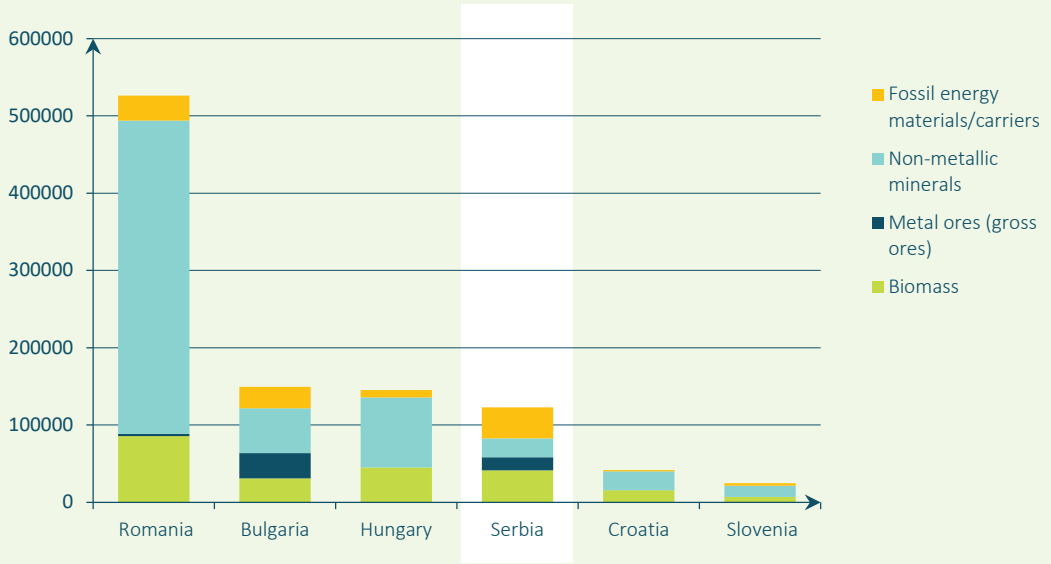
Source: Statistical Office of the Republic of Serbia.

Domestic material consumption in 2019 amounted to 126 625 thousand tons, by 14.4% more than in 2010. Observed by categories of materials, the consumption of fossil fuels (45 958 thous. t) biomass (36 290 thous. t) was the larget.

INTERNATIONAL COMPARISON

In 2019, domestic extraction in the Republic of Serbia amounted to 122 687 thousand tons, thereby ranked fourth in relation to the other countries of the regions, behind Romania, Bulgaria and Hungary.

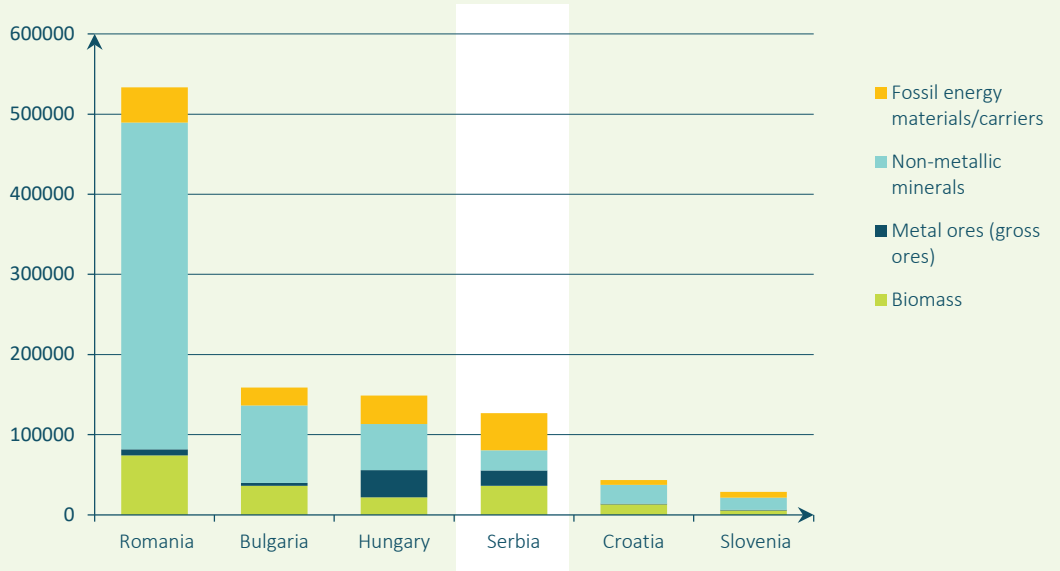
Graph 20 Domestic extraction, 2019 (thous. t)



Source: Eurostat.

Domestic material consumption in 2019 in the Republic of Serbia amounted to 126 625 thousand tons and is also ranked fourth, compared with the countries of the region, behind Romania, Bulgaria and Hungary.

Graph 21 Domestic material consumption, 2019 (thous. t)



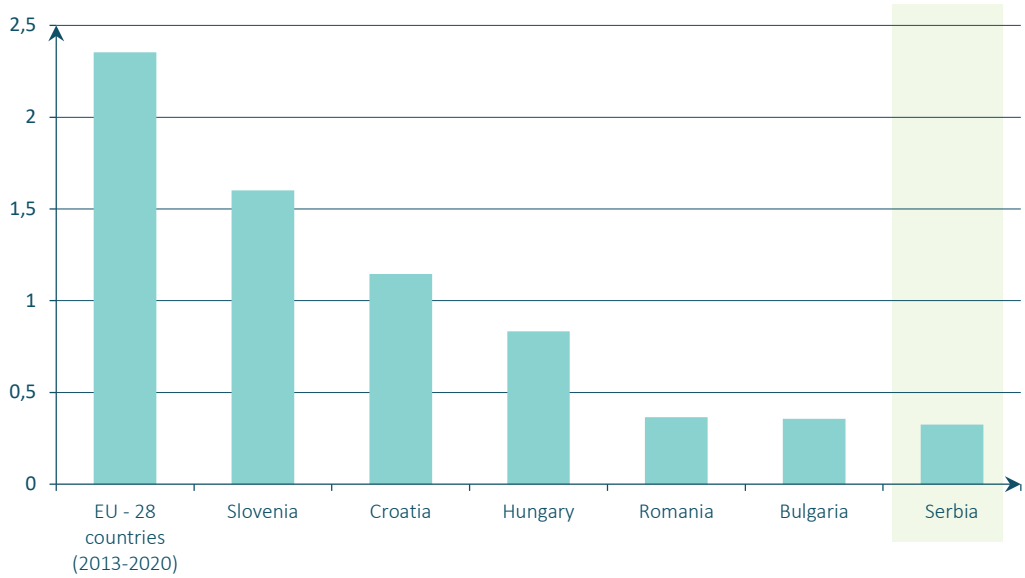
Source: Eurostat.

Resource productivity and domestic material consumption

The indicator presents the gross domestic product (GDP) divided by domestic material consumption. Domestic material consumption measures the total quantity of materials directly used by an economy. It is defined as the annual quantity of raw materials extracted from the domestic territory, plus all imports minus all exports. It is worth mentioning that the term "consumption", as used in domestic material consumption, denotes apparent consumption and not final consumption. Domestic material consumption does not include upstream flows related to imports and exports of raw materials and products originating outside the focal economy. As nominator for the calculation of resource productivity, Eurostat uses GDP in unit "EUR in chain-linked volumes" (to the reference 2015 at 2015 exchange rate). Consequently, the indicator is expressed in euros (chain-linked volumes) per kg, for comparing changes in a country over time.

Domestic material consumption in the Republic of Serbia recorded an annual growth rate of 1.5 % in the period from 2010 to 2019.

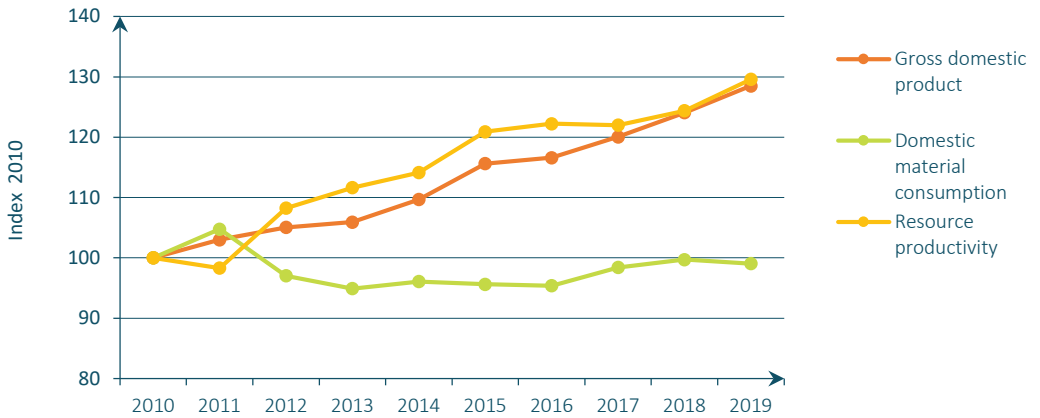
Graph 22 Resource productivity, EUR per kg, chain-linked volumes (2015), 2019



Source: Eurostat.

Over 2010 and 2019, the EU 28 succeeded to absolutely separate economic growth from natural resource use, while the Republic of Serbia in the same period was able only to partially separate economic growth from natural resource use.

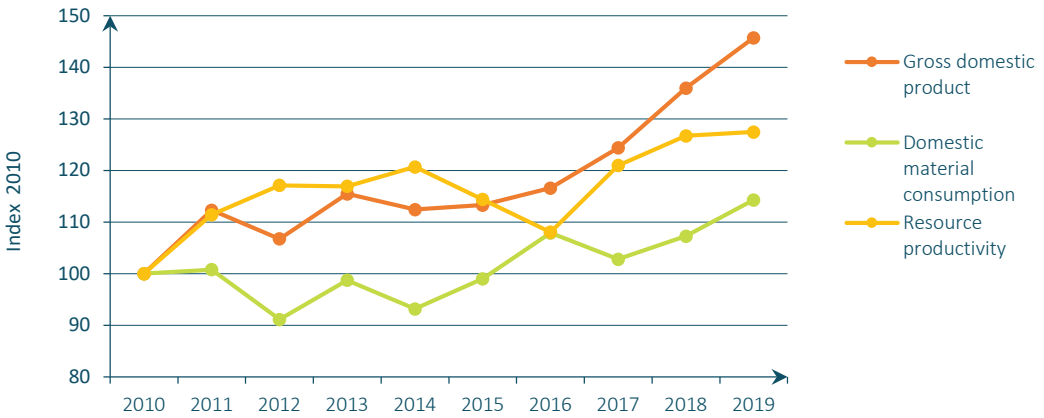
Graph 23 Resource productivity in the EU28, 2010–2019



Source: Eurostat.

Resource productivity in the Republic of Serbia recorded an annual growth rate of 0.49 % in the period from 2010 to 2019.

Graph 24 Resource productivity in the Republic of Serbia, 2010–2019



Source: Eurostat.

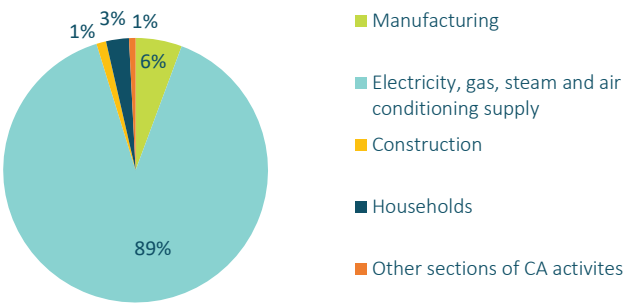
AIR EMISSION ACCOUNTS

Air emission accounts aim at presenting data on gaseous and particulate matter flows in the air as the result of economic activities of an national economy, i.e. the industry and households. Data for calculating air emissions have been established according to the Convention on Long-range Transboundary Air Pollution (CRLTAP) and according to the United Nations Framework Convention on Climate Change (UNFCCC). The Environmental Protection Agency calculates the emissions according to the aforesaid conventions, from which the SORS takes over data and calculates air emission accounts by section of economic activities and for households.

Pollutant emissions into the air monitor the following emissions: nitrous oxide (NO_X), sulphur oxide (SO_X), particulate matters ($PM_{2.5}$ and PM_{10}), non-methane volatile organic compounds (NMVOC), ammonia (NH_3) and carbon monoxide (CO).

The highest pollutant emissions into the air in the Republic of Serbia originated from sulphur oxide (SO_2) emissions. SO_2 emissions from all economic sectors and households amounted to 345.5 Gg in 2018. Electricity, gas, steam and air conditioning supply was the largest pollutant-emitting section of activities, 309.5 Gg, followed by Manufacturing, 19.6 Gg, households, 9.6 Gg, Construction, 4.1 Gg, and other sections of activities, 6.9 Gg.

Graph 25 Share of SO_2 emission by source, 2018 (%)

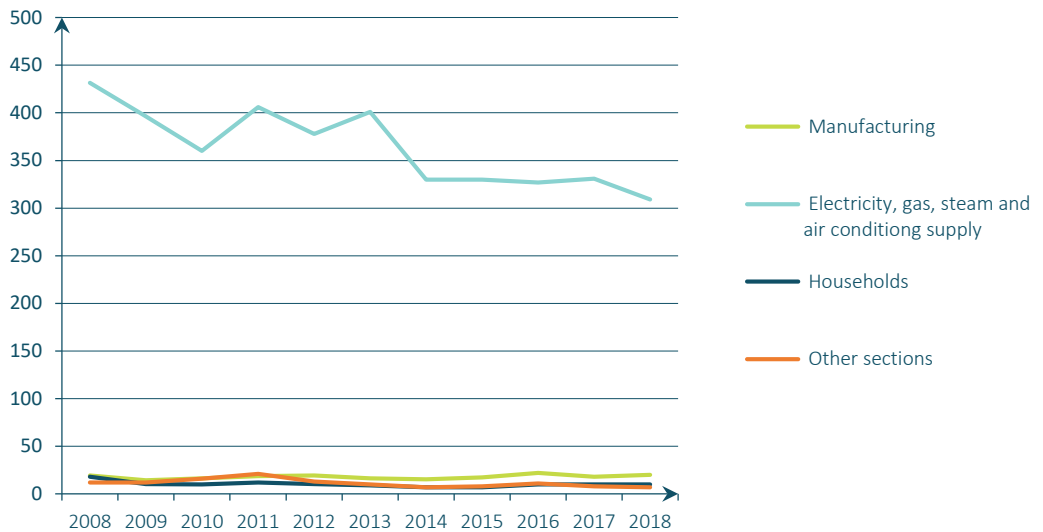


Source: Statistical Office of the Republic of Serbia.

Coal-fired (lignite) power plants generating electricity are the largest emitting source of SO_2. In the period from 2008 to 2018, SO_2 emissions fell in the section Electricity, gas, steam and air conditioning supply, and such trend will continue because of the ongoing thermal power plant projects. Last year, the construction of a desulphurisation system in one of the biggest thermal power plant in Serbia was finalized. The construction of another one in another thermal power plant in Serbia is in the course of process and falls into the largest environmental projects, which will considerably reduce sulphur dioxide emissions up to 2023.

Sulphur dioxide emissions in the Republic of Serbia saw a fall of about 28% from 2008 to 2018.

Graph 26 SO_2 emissions by source, 2008–2018 kt (Gg)



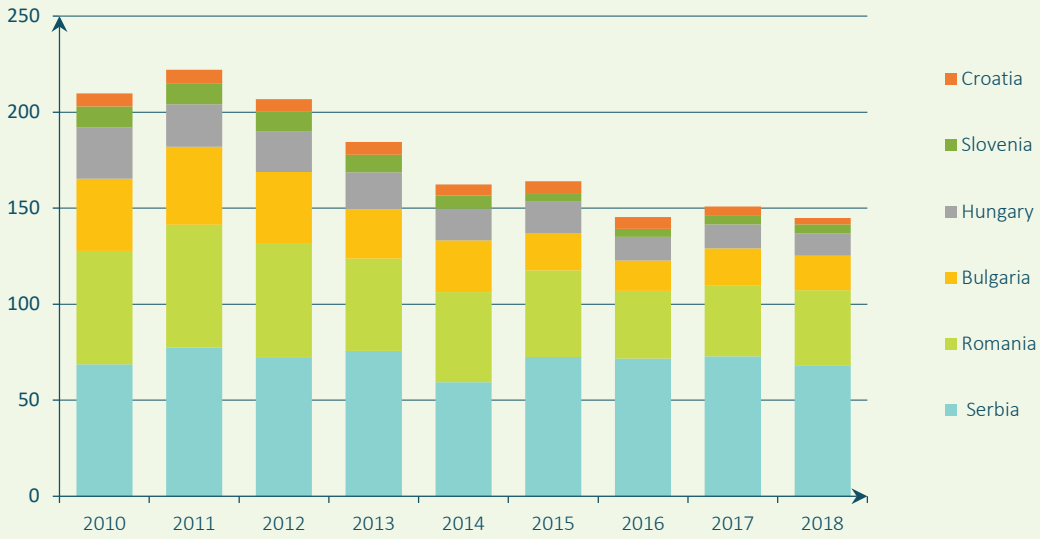
Source: Statistical Office of the Republic of Serbia.

INTERNATIONAL COMPARISON

Considerable pollutant emissions into the air in Serbia originated from nitrous oxide (NO_x), amounting to 127.1 Gg in 2018, from all economic sectors and households. Compared with the countries of the regions, higher NO_x emissions than in Serbia were recorded in Romania, 250.4 Gg, and Hungary, 132.8 Gg, while lower were registered in Bulgaria, 96.9 Gg, Croatia, 52.8 Gg, and Slovenia, 38.6 Gg.

The highest NO_x emissions in Serbia originated from Electricity, gas, steam and air conditioning supply, 68.2 Gg. Emissions from this section of activities in Serbia exceed those in Romania, 39.1 Gg, Bulgaria, 17.9 Gg, Hungary, 11.7 Gg, Slovenia, 4.8 Gg, and Croatia, 3.3 Gg. High NO_x emissions in Serbia came from thermal power plants using coal for electricity generation. Serbia will be able to reduce NO_x emissions by closing certain thermal power plants and by transiting to renewable energy sources (wind, sun, biogas).

Graph 27 NO_x emissions from the section of activities Electricity, steam and air conditioning supply, 2010–2018 (Gg)

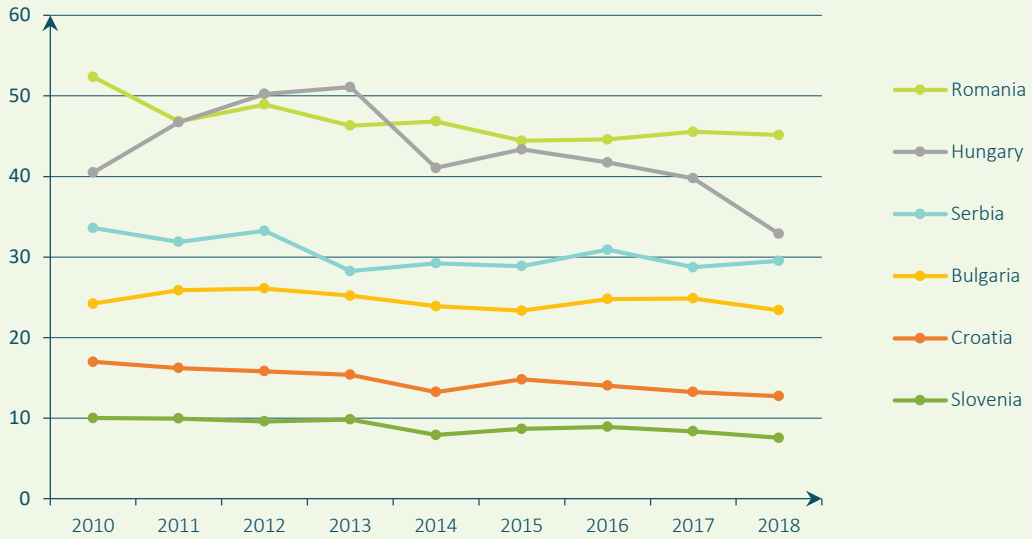


Source: Eurostat.

Total $PM_{2.5}$ emissions from all economic sectors and households in Serbia amounted to 38.6 Gg in 2018. Looking at $PM_{2.5}$ emissions from households originating from heating in Serbia, in 2018 they reached 29.5 Gg, and higher ones were recorded in Romania, 45.1 Gg, Hungary, 32.9 Gg, and lower in Bulgaria, 23.3 Gg, Croatia, 12.7 Gg, and Slovenia, 7.5 Gg.

Particulate matters are the result of fossil fuels combustion, car exhaust gases, firewood and coal heating. As they are very small and light, they tend to remain longer in the air than heavier particles, thereby augmenting the risk of inhalation into human lungs, and even entering the bloodstream, which may cause respiratory disorders or aggravate chronic diseases. $PM_{2.5}$ emissions can be reduced by decreasing the number of vehicles in towns and transiting to electrical vehicles, then by connecting households to heating plants, closing boiler rooms in schools, hospitals, etc.

Graph 28 $PM_{2.5}$ emissions from households, originating from heating, 2010–2018 (Gg)



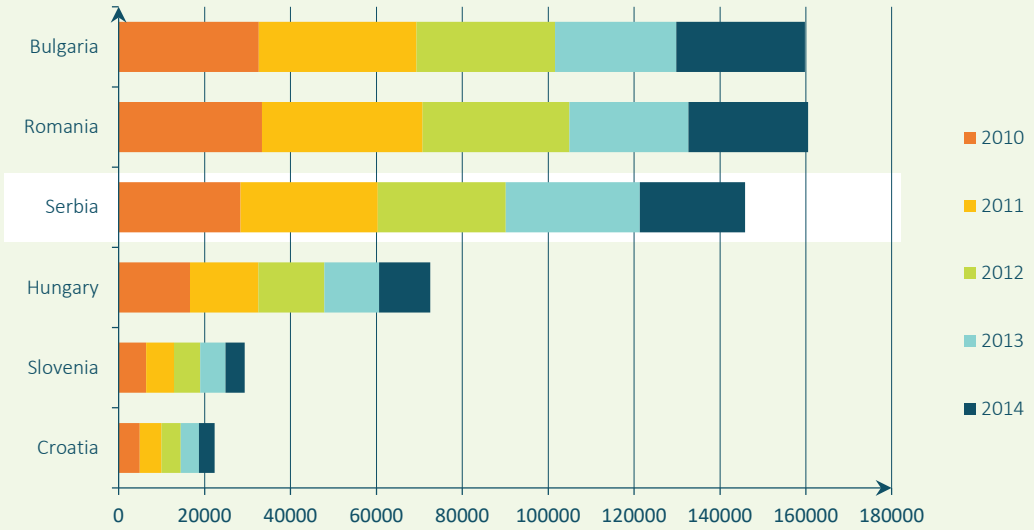
Source: Eurostat.

Greenhouse gas emissions (GHG) monitor the following emissions: carbon dioxide (CO_2), CO_2 from biomass, nitrous oxide (N_2O), methane (CH_4), perfluorocarbons (PFCs), hydrofluorocarbons (HFCs), sulfur hexafluoride (SF_6), nitrogen trifluoride (NF_3).

From the GHG group only data for the most important gas CO_2 are presented for the period from 2010 to 2014 as those for 2015 are not available.

CO_2 emissions from all economic sectors and households in 2014 in Serbia amounted to 40 411.99 Gg. The highest CO_2 emissions originated from Electricity, gas, steam and air conditioning supply – 24 511. 983 Gg. Looking at the countries of the region, higher emissions were recorded in Bulgaria, 29 925.5 Gg, Romania, 27 854.4 Gg, and lower in Hungary, 11 929.2 Gg, Slovenia, 4 489.0 Gg and Croatia, 3 677.1 Gg. Serbia tries to reduce CO_2 emissions as well as EU countries.

Graph 29 CO_2 emissions from the section Electricity, gas, steam and air conditioning, 2010–2014 (Gg)



Source: Eurostat.

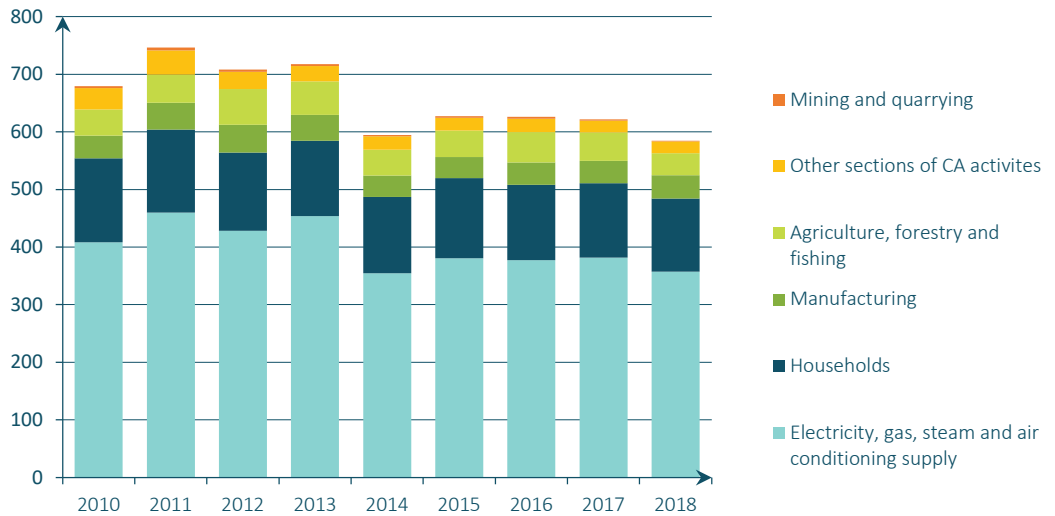
Acidifying gas emissions (NO_X, NH_3 and SO_2)

According to Eurostat calculations for 2018, acidifying gas emissions[1] in Serbia amounted to 584.6 Gg. Observing the period from 2010 to 2018, acidifying gas emissions fell by 23.8%, compared to 2010. The section of Electricity, gas, steam and air conditioning supply was the largest acidifying gas emitting source, with 357.2 Gg, followed by hourseholds, 127.1 Gg, Agriculture, forestry and fishery, 37.7 Gg, Manufacturing, 40.7 Gg, Construction, 5.7 Gg, Mining and quarrying, 1.4 Gg, and the other sections of activities, 14.8 Gg.

Acidifying gas emissions are monitored because they proved having harmful effect to forests, freshwater and soil, killing insects and water living things, causing colour peeling, corrosion of steel structures such as bridges and damages to stone buildings and statues. It has also a negative impact on human health (causing asthma, pulmonary and cardiovascular diseases, etc.).

The main acidifying gas sources are thermal power plants, households (smoke as a result of heating) and traffic exhaust gases.

Graph 30 Acidifying gas emissions, 2010–2018 (Gg)



Source: Eurostat.

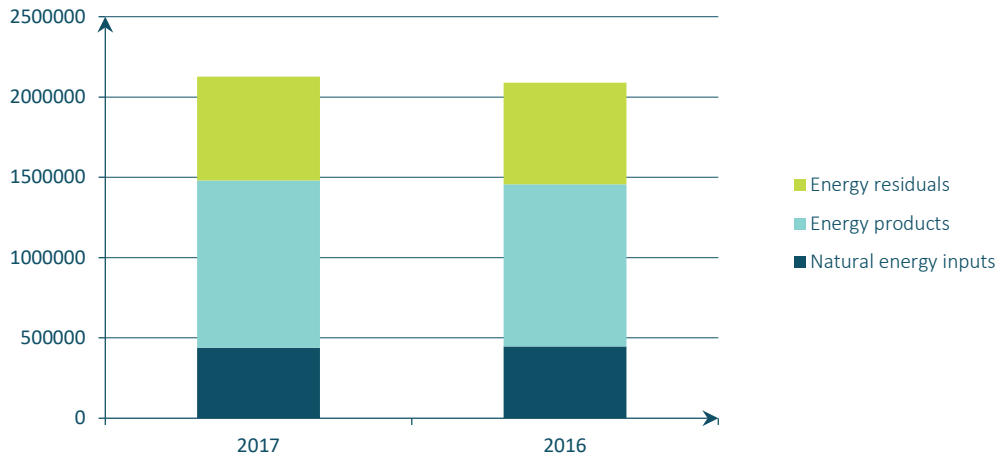
[1] Acidifying gases cover emissions of the following gases: SO_x expressed in SO_2 equivalent, NOx expressed in SO_2 equivalent, NH_3 expressed in SO_2 equivalent.

PHYSICAL ENERGY FLOW ACCOUNTS

Physical energy flow accounts record energy flows, in tera joules (TJ), from the environment to the economy (natural energy inputs), within the economy (energy products), and from the economy back to the environment (residuals). Physical energy flow accounts provide information on energy flows distributed in a way that is fully compatible with the concepts, principles and classifications of national accounts - thus enabling integrated analysis of environmental, energy and economic issues.

Total physical energy flows grouped into three categories (natural energy inputs, energy products and residuals) in 2017 amounted to 2 126 423 TJ, i.e. 2 089 742 TJ in 2016. The total supply and use of energy in the observed years recorded a slight increase of 1.8%.

Graph 31 Total available energy (TJ)



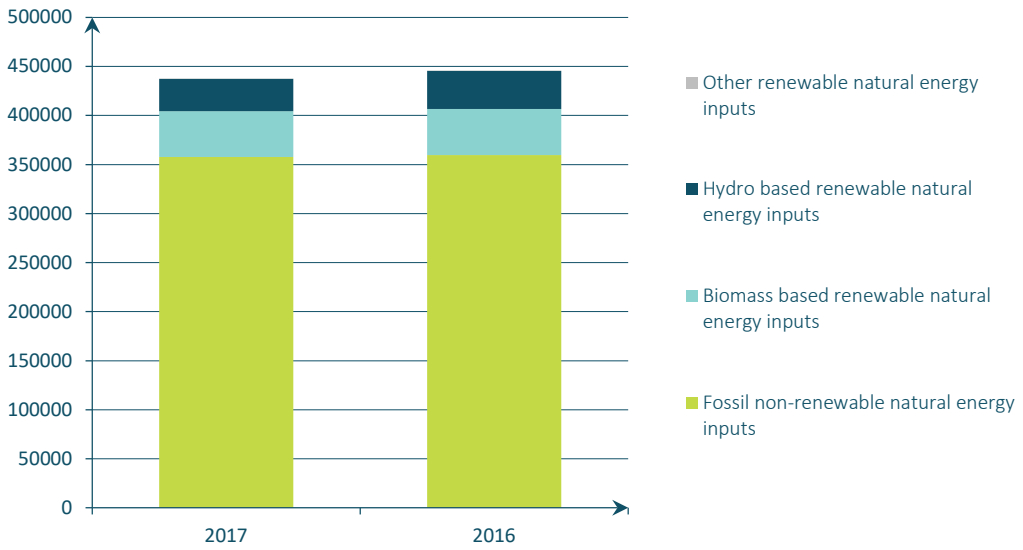
Source: Statistical Office of the Republic of Serbia.

Total inputs of natural energy in the Republic of Serbia in 2016 were 445 963 TJ i.e. 437 653 TJ in 2017.

The share of renewable energy inputs in total natural energy was 19.3% (86 190 TJ) in 2016 and 18.3% (79 957 TJ) in 2017. In 2017, the amount of energy obtained from renewable sources decreased (hydropower, by 15.2% less) compared to 2016. Inputs based on solar (43 TJ in 2016; 47 TJ in 2017) and wind energy (94 TJ in 2016; 174 TJ in 2017) are increasing but are still negligible small relative to total natural sources.

Import of energy products increased in 2017, compared to 2016, by 12.3%, and export increased by 1.3%.

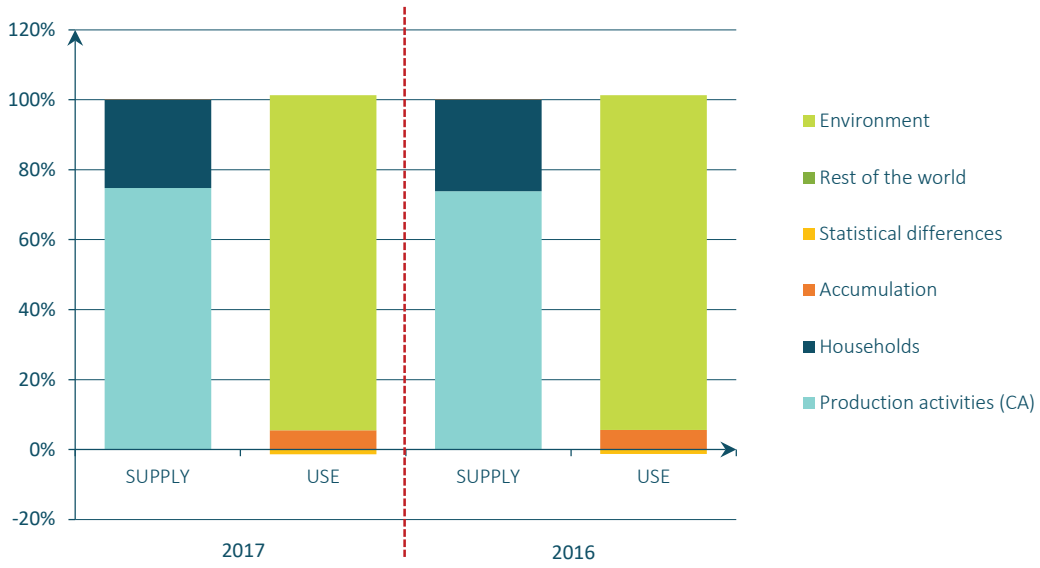
Graph 32 Energy supply from natural sources (TJ)



Source: Statistical Office of the Republic of Serbia.

Total supply and use of energy residuals amounted to 633 816 TJ in 2016 and 646 564 TJ in 2017. The sectors of economic activities have the largest share in the production of energy residuals (73.8% and 74.8%), followed by households with 26.2% and 25.2%. On the other hand, in the use of energy residuals, the sectors of economic activities have a negligible share, while the largest amount of energy residuals ends in the environment and its share is 95.7% and 95.8%.

Graph 33 Supply and use of energy residuals (%)



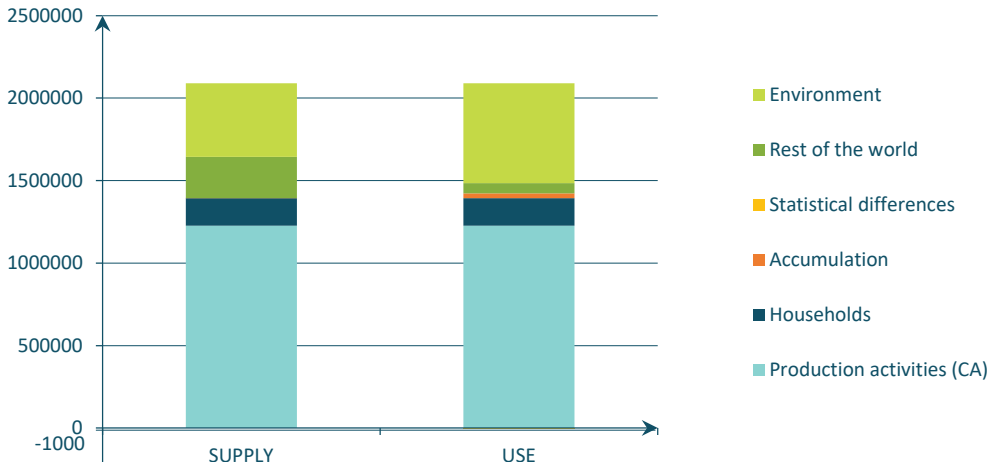
Source: Statistical Office of the Republic of Serbia.

The origin and destination of physical energy flows are grouped into five categories: production - industries (NACE Rev 2), consumption (households), accumulation, rest of the world and environment.

According to the categories of origin and destination of physical energy flows in 2016, the sectors of economic activities and households had a share in the flows of energy supply and use 58.7% (1 227 440 TJ) and 7.9% (165 903) TJ, the rest of the world (import) had a share of 12.0% (250 413 TJ) but in the flows of use the rest of the world (exports) had a share of 3.0% (62 072 TJ). The category of environment had a share in energy supply flows in 2016 of 21.3% (445 963 TJ) while the share in use flows was 29.0% (606 421 TJ).

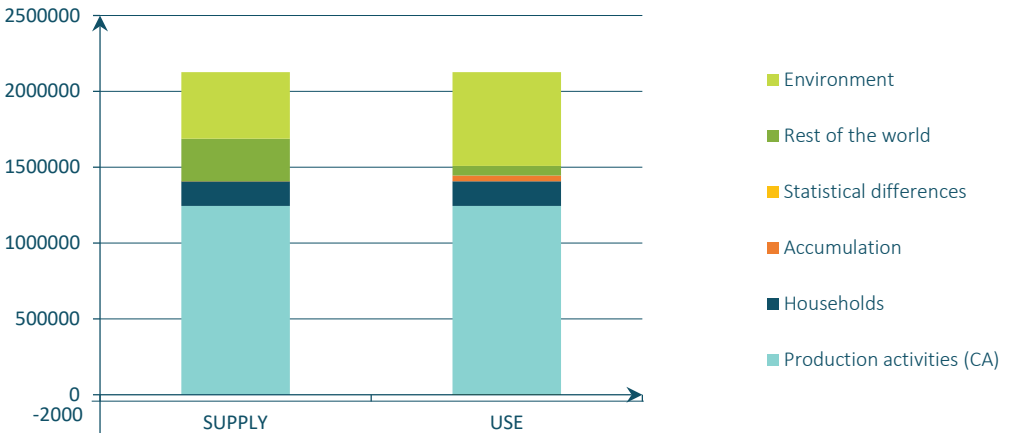
According to the categories of supply flows and energy use flows in 2017, the sectors of economic activities and households had a share in energy supply and use flows 58.5% (1 244 512 TJ) and 7.7% (162 989 TJ) the rest of the world (imports) had a share of 13.2% (281 145 TJ) but in the flows of use the rest of the world (exports) had a share of 3.0% (62 866 TJ). The category of environment had a share in energy supply flows in 2017 of 20.6% (437 653 TJ), while the share in use flows was 29.1% (619 309 TJ).

Graph 34 Total supply and use of energy by categories, 2016 (TJ)



Source: Statistical Office of the Republic of Serbia.

Graph 35 Total supply and use of energy by categories, 2017 (TJ)



Source: Statistical Office of the Republic of Serbia.

Net domestic energy use

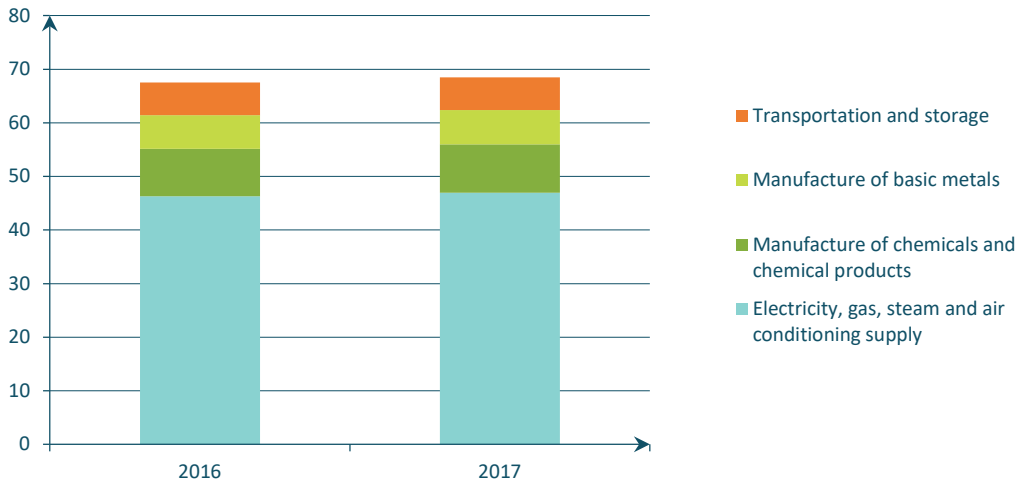
Net domestic energy use in the economy of the Republic of Serbia amounted to 641 967 TJ in 2016, i.e. 655 128 TJ in 2017, and includes energy use in households and sectors of economic activities.

Households used 165 903 TJ of energy in 2016, i.e. 162 989 TJ in 2017. The total energy used by households accounted for 25.8% in 2016 and 24.9% in 2017.

The sectors of economic activities used 467 890 TJ of energy in 2016, or 483 451 TJ of energy in 2017. Net domestic energy use in both observed years is the highest in the sector of Electricity, gas, steam and air conditioning supply (with shares of 46.3% and 46.9%, respectively). Manufacture of chemicals and chemical products, with shares of 8.9% and 9.0% is on the second place in terms of energy use, followed by Manufacture of basic metals (with shares of 6.3% and 6.4%) and Transportation and storage (with a share of 6.1% in both years).

Only four economic activities use over 65% of energy in the Republic of Serbia.

Graph 36 Net domestic energy use by economic activities (%)



Source: Statistical Office of the Republic of Serbia.

ENVIRONMENTAL TAX ACCOUNTS

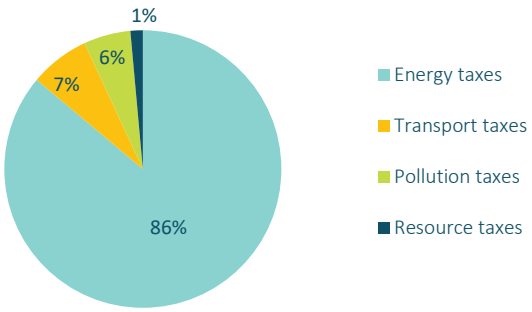
Revenue from environmental taxes aim at influencing the use of goods an services that are taxable so to have a positive impact on the environment. Environmental taxes are outlays having a visible impact on the environment. Those revenues have two effects; firstly - they influence our use of products to which prices taxes are added, and secondly - the increased prices result in larger revenues for the government.

The share of environmental taxes in GDP amounted to 4.2% (2018).

Environmental taxes can be broken down in four areas: energy taxes, resources taxes, pollution taxes and transport taxes. Energy taxes are prevailing and account for 86% of all environmental taxes, by about RSD 182 389,8 million.

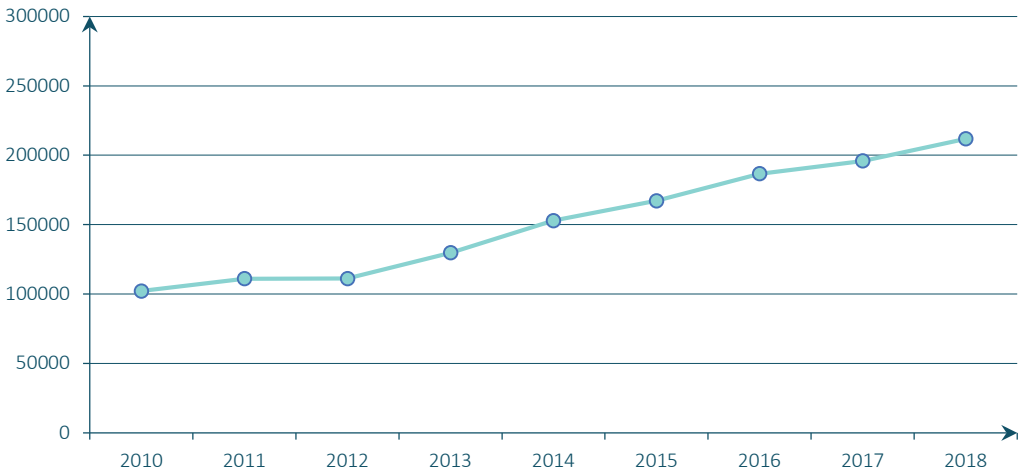
Environmental taxes in Serbia grew over time. In 2010, they amounted to slightly more than RSD 102 157,6 million, compared with RSD 211 825,5 million in 2018. The average annual growth of environmental taxes over 2010-2018 was 7.7%, and 3.2% as to the share of environmental taxes in total taxes and social contributions over 2010-2018. The average annual share of environmental taxes in the gross domestic product (GDP) amounted to 3.7% over 2010-2018.

Graph 37 Share of environmental taxes by types in Serbia, 2018 (%)



Source: Statistical Office of the Republic of Serbia.

Graph 38 Environmental taxes, 2010–2018. (RSD mill.)



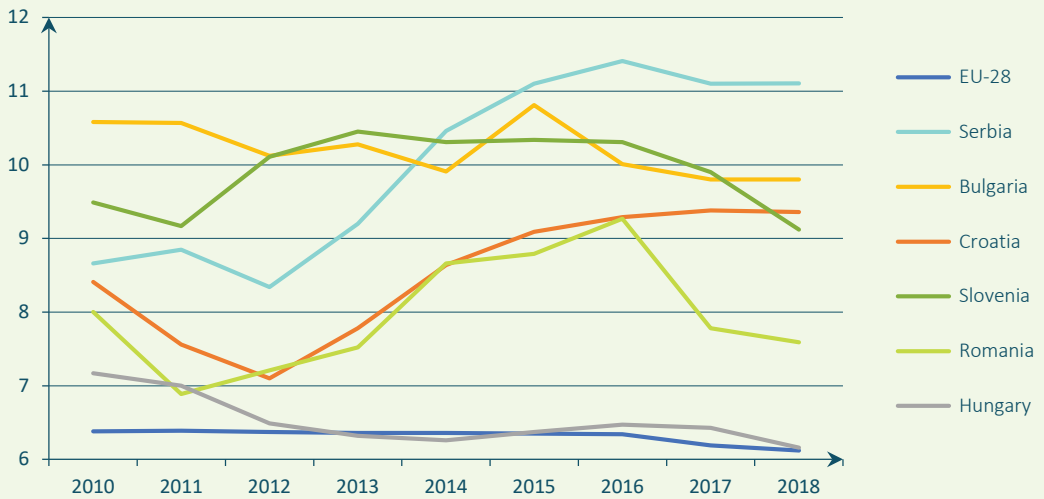
Source: Statistical Office of the Republic of Serbia.

INTERNATIONAL COMPARISON

Comparison between Serbia and selected neighbouring EU countries is presented below. The amount of environmental taxes are rather different in EU countries. Certain amount of precaution should be taken when making the comparison as it is not possible to determine whether environmental tax revenues are actually used for environmental protection or for financing other government activities.

According to Eurostat data in 2018, environmental taxes in the Republic of Serbia are estimated at EUR 1 791,01 million, representing 11.1% of total taxes and social contributions. The share in total taxes and social contributions amounted to 6.12% in EU-28, in Hungary to 6.16%, in Slovenia to 9.12% and in Croatia to 9.36%.

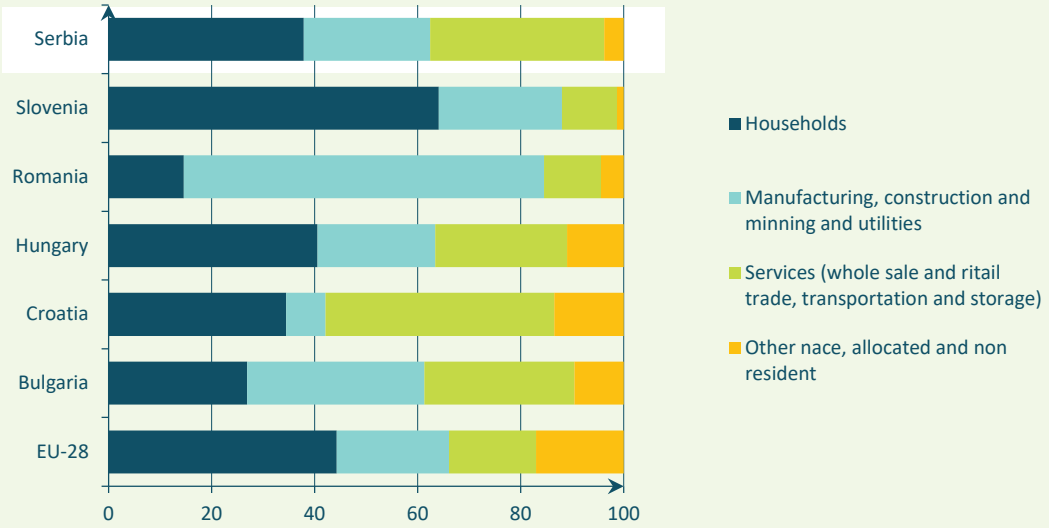
Graph 39 Share of environmental tax in total taxes and social contributions, 2010–2018 (%)



Source: Eurostat.

Energy taxes are paid mostly by households located in Slovenia (64.1%), Hungary (40.6%) and Serbia (37.9%), while the average in the EU is 44.3%. Energy taxes are chiefly paid by Manufacturing in Romania (69.9%) and Bulgaria (34.4%). The main payer of energy taxes in Croatia (44.4%) is the section of Services (including trade, transport and storage).

Graph 40 Energy taxes by by paying sector, 2018 (%)



Source: Eurostat.

ENVIRONMENTAL GOODS AND SERVICES SECTOR ACCOUNTS

Environmental goods and services sector is part of an economy composed of a heterogeneous set of producers of goods and services, which objective is environmental protection and natural resource management. The environmental products produced or services provided for environmental protection are aimed at: preventing or minimizing pollution, degradation or depletion of natural resources; repairing caused damages; reducing, eliminating, treating and managing pollution, degradation and depletion of natural resources; as well as at undertaking other activities such as monitoring, control, R&D, education, training, information and communications related to environmental protection or resource management.

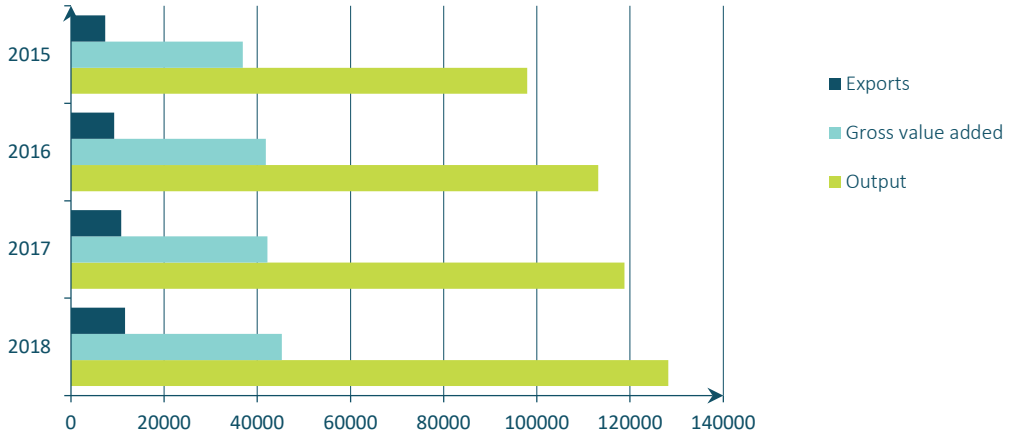
GVA of the environmental goods and services sector amounted to 1.1% of GDP, in 2018.

The total Output in the environmental goods and services sector in 2018 amounted to RSD 128 197 million. The average annual growth of Output between 2015 and 2018 in this sector was 10.2%.

In 2018, GVA in the environmental goods and services sector was estimated at RSD 45 261 million. The average annual growth between 2015 and 2018 in this sector as to GVA amounted to 7.8%. GVA for the environmental goods and services sector accounted for 1.1% of GDP of the Republic of Serbia in 2018.

The total number of employees in the environmental goods and services sector in 2018 was 41 860, expressed in full-time equivalent, of which 31 800 employees in the section Water supply; sewerage, water supply and waste management were engaged in activities of management of minerals and waste management.

Graph 41 Output, GVA and export in the environmental goods and services sector, 2015–2018 (RSD mill.)

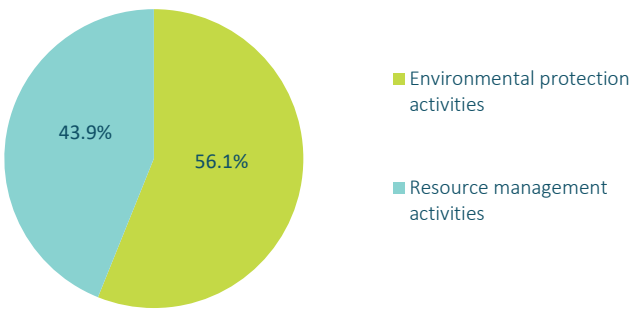


Source: Statistical Office of the Republic of Serbia.

Variables in the environmental goods and services sector can be shown separately by environmental protection activities and resource management activities. Environmental protection activities are aimed at preventing, reducing and eliminating pollution and any other degradation of the environment. They include all the measures taken to restore degraded environment to its original state. The goal of resource management activities is to protect stocks of natural resources from depletion.

The Output in 2018 was higher in environmental protection activities, participating with 56.1%.

Graph 42 Share of activities by environmental domain, 2018 (%)



Source: Statistical Office of the Republic of Serbia.

The Output in the environmental goods and services sector, by environmental activities, was RSD 71 864 million and the highest for waste management activities (RSD 40 554 million), followed by wastewater management (RSD 15 901 million) protection of ambient air and climate (RSD 8 142 million) in 2018.

The Output in the environmental goods and services sector, by resource management activities, was RSD 56 332 million and the highest for management of minerals (RSD 42 132 million) and management of energy resources (RSD 12 130 million).

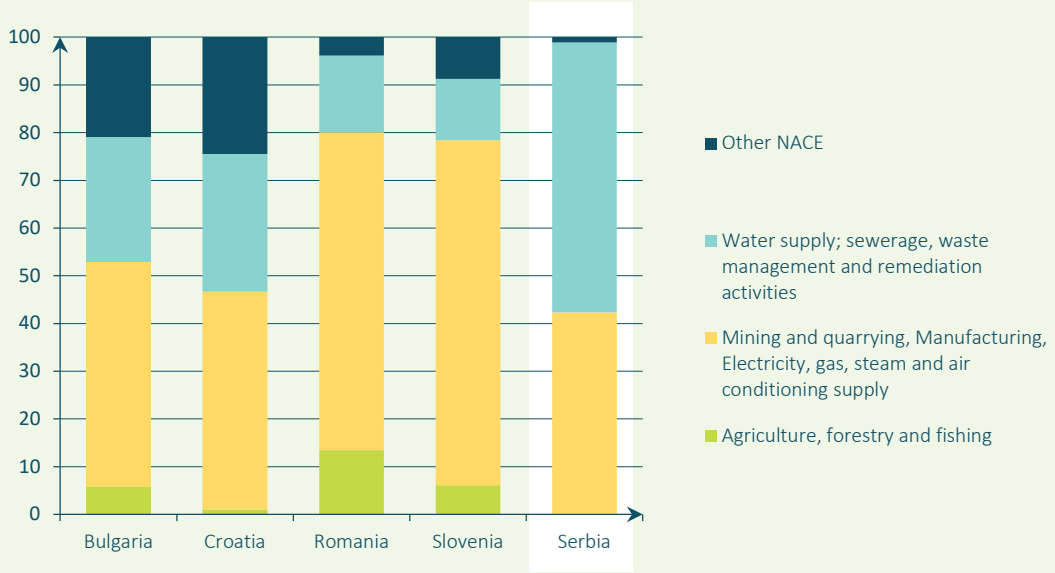
Graph 43 Output by environmental domains, 2015–2018 (RSD mill.)

Source: Statistical Office of the Republic of Serbia.

INTERNATIONAL COMPARISON

The section of Water supply; sewerage, waste management and remediation activities accounted for 55.6% in the Output of the environmental goods and services sector, being the largest share. The situation is considerably different from that in neighbouring countries where the sections of industry (Mining and quarrying, Manufacturing, Electricity, gas, steam and air conditioning supply) participated the most in Output of the environmental goods and services sector. In Slovenia this share was 72.2%, in Romania 66.7%, in Bulgaria 47.1% and in Croatia 45.7%. Serbia, with a share of 42.2%, ranks the lowest among the countries in the region.

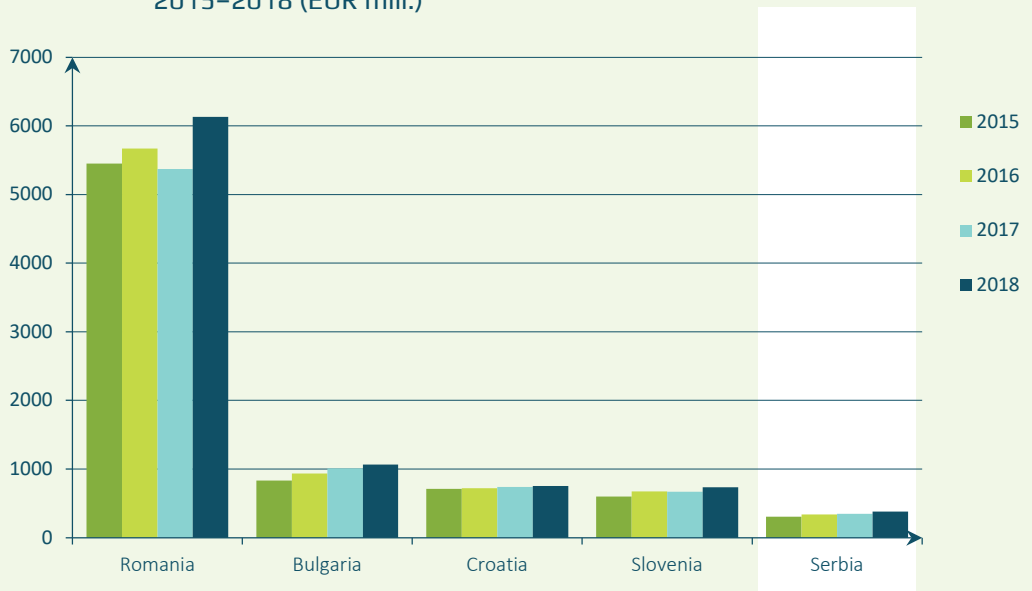
Graph 44 Output of the environmental goods and services sector by economic activities, 2018 (%)



Source: Eurostat.

Observing the neighbouring countries, in 2018 the largest GVA in the environmental goods and services sector was recorded in Romania, EUR 6 132,5 million, while the other countries in the region had considerably lower values. Bulgaria with EUR 1 064,9 million takes the second place behind Romania, followed by Croatia with EUR 752,8 million, Slovenia with EUR 733,1 million, and Serbia with EUR 382,7 million. Even though Serbia had the lowest GVA in the environmental goods and services sector, it has been recording a slight increase the last four year.

Graph 45 GVA in the environmental goods and services sector, 2015–2018 (EUR mill.)



Source: Eurostat.

ENVIRONMENTAL PROTECTION EXPENDITURE ACCOUNTS

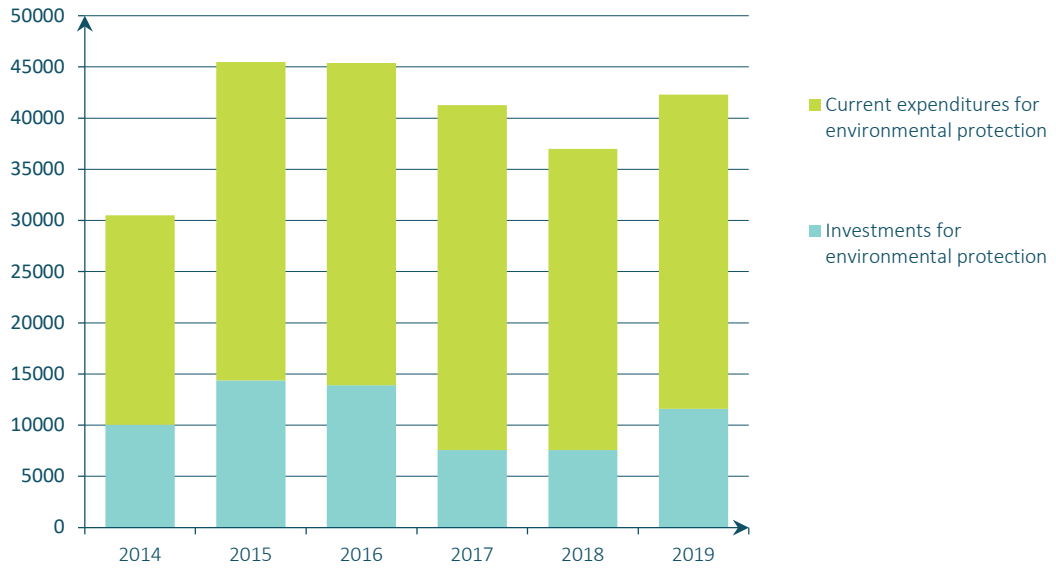
The Statistical Office of the Republic of Serbia publishes the data on environmental protection expenditures from the results of the survey on investments and current expenditures for environmental protection and revenues from activities related to environmental protection. The data of the Republic of Serbia on the environmental protection expenditures accounts are not fully comparable for all institutional sectors with the countries of the European Union. Work on improving the data quality and increasing the number of variables required for reporting on this account will be in focus during 2022 and 2023.

The share of environmental protection expenditures in gross domestic product was 0.8% in 2019.

Environmental protection includes all activities whose main purpose is the prevention, reduction and elimination of pollution or any other environmental degradation. These activities include all measures taken to restore the degraded environment to its original condition.

Total environmental protection expenditures in 2019 amounted to RSD 42 367.8 mil., which is by 10.7% more than in the previous year. In the structure of total environmental protection expenditures, the share of investments for environmental protection amounted to 27.4%, while current expenditures had a share of 72.6%.

Graph 46 Expenditures for environmental protection, 2014–2019 (RSD million)



Source: Statistical Office of the Republic of Serbia.

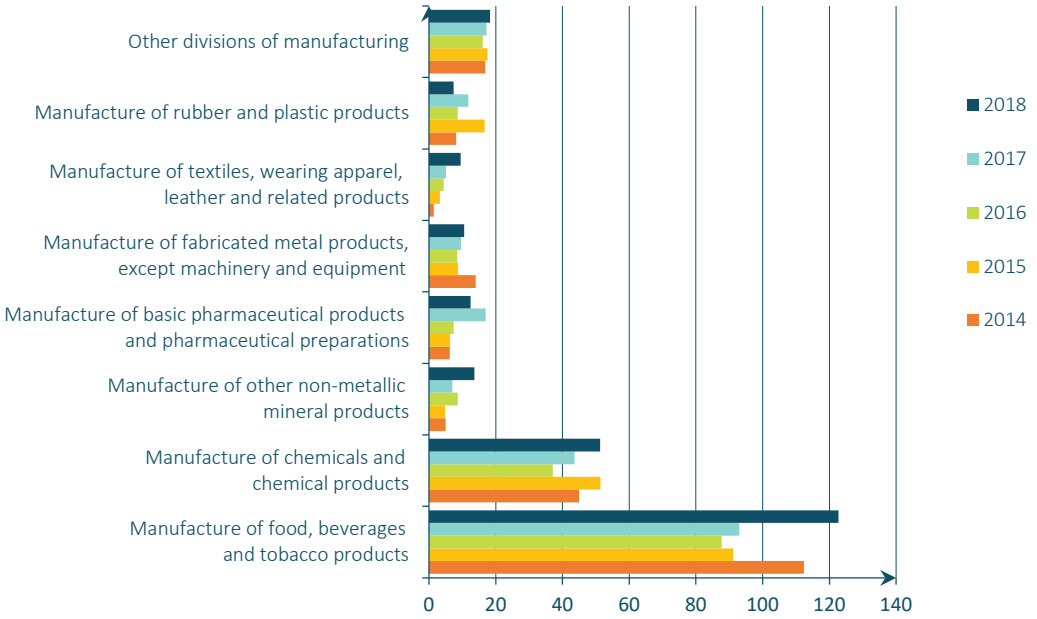
The largest share in the structure of environmental protection investments in 2019 related to waste management and amounted to 37.0% (RSD 4 292.2 million).

Current expenditures for environmental protection in 2019 amounted to RSD 30 761.5 mil., i.e. RSD 67.5 mil. less than in the previous year.

Ancillary environmental protection activities are especially important because they directly serve the environmental purpose. Current expenditures incurred in the company (internal current expenditures) arise from ancillary activities. Internal current expenditures refer to the operation and maintenance of environmental protection equipment (material and energy expenditures), labour costs (only employees in environmental protection) and other internal current expenditures (education, information, administrative affairs related to environmental protection, etc.).

The divisions of Manufacture of food products, beverages and tobacco products and Manufacture of chemicals and chemical products had the largest internal current expenditures (Graph 47) in the period from 2014 to 2018 in the Republic of Serbia. All other divisions of manufacturing industry had significantly lower internal current expenditures for environmental protection.

Graph 47 Internal current expeditiose by divisions of Manufacturing, 2014-2018 (RSD mill.)



Source: Statistical Office of the Republic of Serbia.

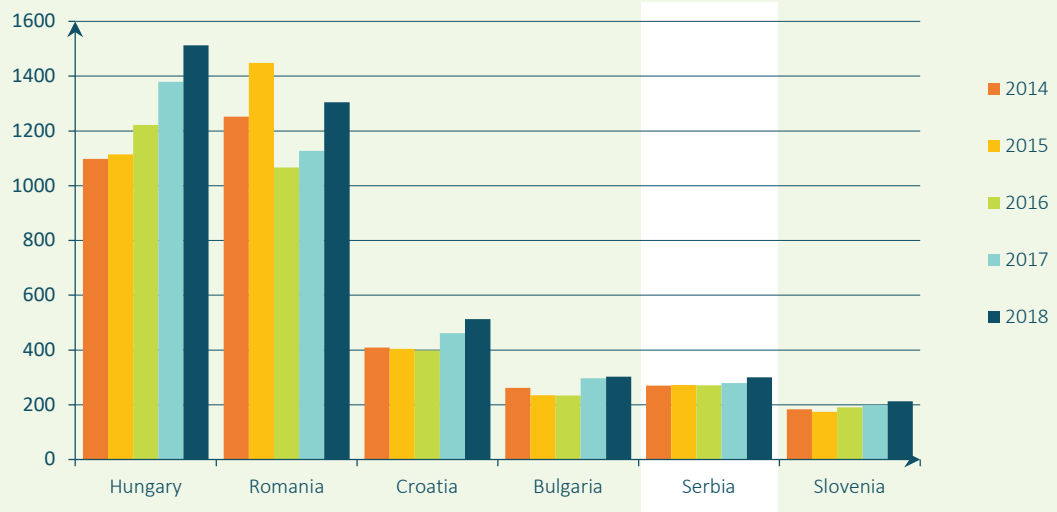
INTERNATIONAL COMPARISON

In the section international comparison for the environmental protection expenditure account for the Republic of Serbia, presented are only data comparable with the surrounding countries.

The most important service providers in the field of environmental protection are corporations (specialist producers), from the institutional sector of non-financial and financial corporations, whose main activity is, according to the Classification of Activities, in division Sewerage; groups – Waste collection; treatment and disposal; and in division Remediation activities and other waste management services.

Production of environmental protection services of corporations as specialist producers in the countries of the region, with slight oscillations, increased in the period from 2014 to 2018. In 2018, Hungary and Romania recorded the highest production of such services from specialist producers (EUR 1 512 and EUR 1 304 million, respectively), followed by Croatia (EUR 513 million). Bulgaria and Serbia had significantly lower approximate production of EUR 303 and 301 million, while the production of specialist producers for the production of environmental protection services in Slovenia (EUR 212 million) were the lowest.

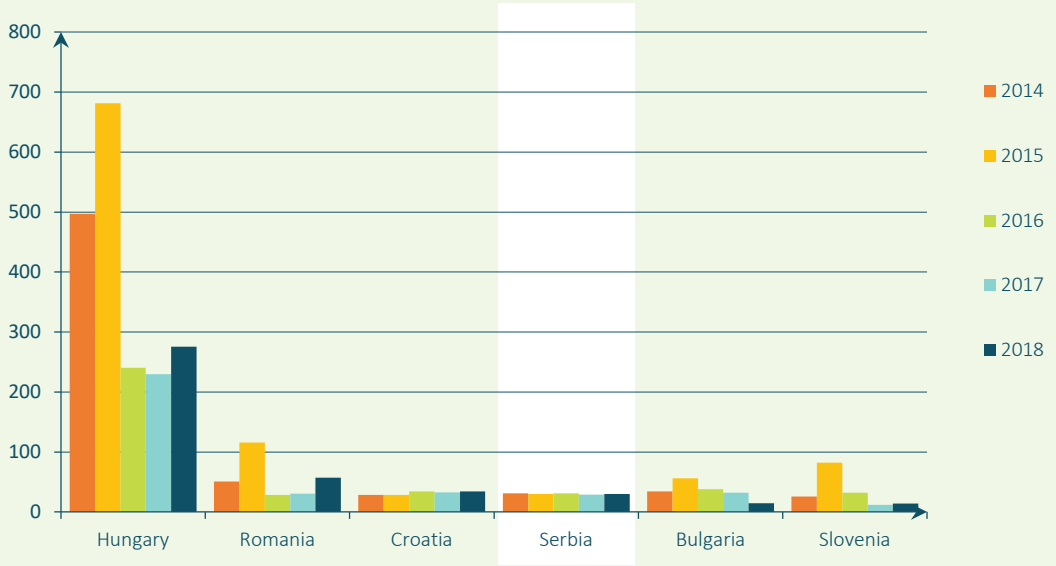
Graph 48 Production of environmental protection services of corporations as specialist producers, 2014-2018 (EUR million)



Source: Eurostat.

Environmental protection investments of corporations as specialist producers in the observed period from 2014 to 2018 in most countries in the region, excluding Croatia and Serbia, recorded large oscillations. Specialist producers in Hungary in 2018 recorded investments for environmental protection in the amount of EUR 276 million, which is the highest amount in the region, followed by Romania with EUR 57 mil. EUR, Croatia and Serbia with (EUR 34 and 30 million) and Bulgaria and Slovenia, which had even lower investments of EUR 15 and 14 million.

Graph 49 Environmental protection investments of corporations as specialist producers, 2014–2018 (EUR million)



Source: Eurostat.

CIRCULAR ECONOMY INDICATORS

Interest for circular economy and its benefit for the community has been growing bigger and bigger every year over the last 20 years. In 2020, the Ministry of Environmental Protection published a document "Roadmap to Circular Economy", providing guidelines for transition to circular economy in the Republic of Serbia. Using Eurostat methodology the Statistical Office of the Republic of Serbia calculated new circular economy indicators, contributing this way to this area.

CIRCULAR ECONOMY INDICATORS

The European Commission, as member of the Circular Economy Action Plan (2015), also adopted the framework for its monitoring, which was published for the first time in 2018. Eurostat developed most of the indicators for its monitoring and has been publishing them on its website.

In the meantime, the European Commission adopted on March 11, 2020 a new Circular Economy Plan, which is one of the major pillars of the European Green Deal. The new action plan announces new initiatives during the entire product life cycle, targeting for example how products are designed, promoting circular economy processes, encouraging sustainable consumption and aiming to ensure that used resources are kept in the EU economy for as long as possible.

There is no unique or internationally agreed definition of the circular economy. There are lot of common elements in definitions being used. The concept of materials circularity is key in all the definitions. The definitions also include decreased demand for certain natural resources and materials and products thereof.

Circular economy and linear economy are different from each other in the way in which value is created and maintained. In the linear economy materials are collected from nature and transformed into products that are used until they become waste. The circular economy tends to use the value of materials, products and other resources (e.g. water, energy) circulating in the economy to the fullest extent by maintaining them in the economy as much as possible.

Besides waste management, circular economy initiatives cover the patterns of production and consumption, eco-design, extended producers' responsibility, market of secondary raw materials (domestic and external), public procurement, innovation and technology development, finances and investments, employment and management of selected types of waste and material flows (e.g. plastics, food waste, construction and demolition waste, biomass).

Surveys on waste generation and treatment have been conducted since 2008 according to the requirements of the Regulation (EC) No 2150/2002 on Waste Statistics, and since 2018 survey coverage has been reduced because the data for large business subjects have been taken over from administrative sources of the Environmental Protection Agency in order to reduce the burden on data providers. The Regulation (EU) No 691/2011 on European Environmental Economic Accounts, Annex III - material flows accounts, was implemented in 2012. The data of waste statistics and material flows enable to calculate selected significant circular economy indicators and for the Republic of Serbia, which are comparable with EU countries.

Indicators taken over and calculated based on data on waste and material flows will be presented hereinafter, from reporting according to the aforesaid regulations.

Eurostat does not still calculate the indicators "Recycling Rate waste Excluding Major Mineral Waste, and the "Circular Material Use Rate" for non-EU countries. The Statistical Office of the Republic of Serbia did experimental calculations for the mentioned indicators at the end of 2020, using available statistical sources.

To have a clearer picture of how Serbia stands in the context of the circular economy a comparison for each indicator is given for the EU average and several countries of the region (Slovenia, Croatia, Romania, Hungary and Bulgaria) for which data are available.

Statistical data on waste and material flows serve as the starting point for measuring the circular economy, but their quality and volume are not sufficient to support circular economy policies. To measure the circular economy share one need additional information that reflects all the aspects of material life cycle such as product design, and production and consumption patterns. Socio-economic information (public procurement, employment, value added) is necessary as well as information about innovation, technology development and international trade, being circular economy dimensions.

Eurostat has divided the monitoring framework for the circular economy in four thematic areas:
a) Production and consumption;
b) waste management;
c) secondary raw materials;
d) competitiveness and innovation.

This publication contains only currently, internationally comparable circular economy indicators for the Republic of Serbia, which are produced by the SORS, but work on developing these indicators in this area will continue.

Generation of waste excluding major mineral waste per GDP unit

The indicator is part of the set of circular economy indicators. It is used to monitor progress toward a circular economy within the thematic area “production and consumption”.

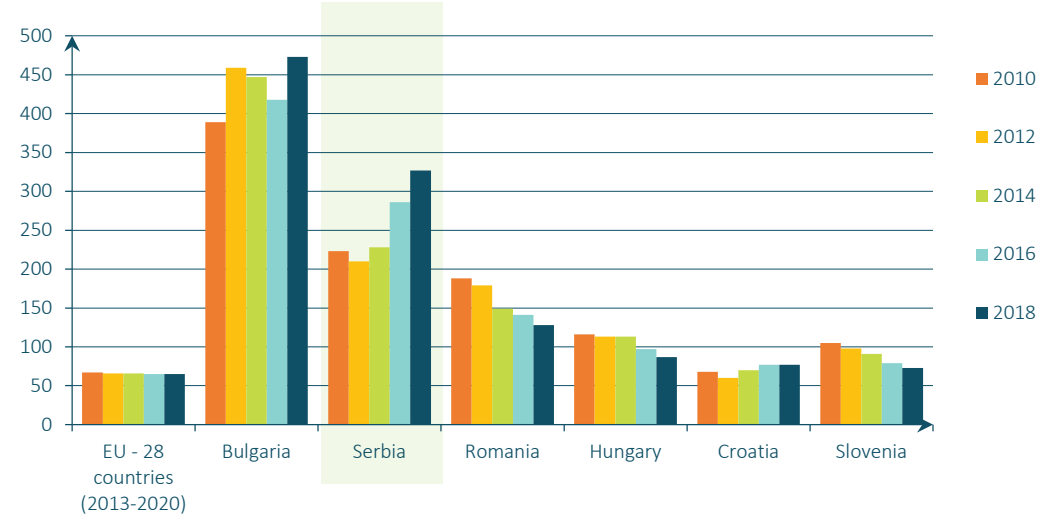
When describing the indicator, Eurostat says that in a circular economy the value of products, materials and resources is maintained for as long as possible and the generation of waste is to be reduced where possible, with attention to prospects for recycling and reduction in biotoxicity. Waste prevention is closely linked with improving manufacturing methods and influencing consumers to demand “greener” products and less packaging. By transitioning to a circular economy the EU aims at decreasing waste generation while maintaining or increasing economic output.

Comparison of waste generation with GDP reflects the intensity of waste in an economy and shows the measure of “eco-efficiency”. Observation of its changes over the years permits to assess whether an economy is capable of producing more wealth while generating at the same time less waste.

The indicator is defined as total waste generation in a country (in weight unit), excluding major mineral waste per GDP unit (in euros, chain linked volumes, 2010). The ratio is expressed in kg per thousand EUR.

Data on waste generation excluding major mineral wastes cover hazardous and non-hazardous waste from all economic activities and households, including waste from waste treatment (secondary waste), but excluding major mineral waste. Major mineral waste is excluded because it mainly comes from construction and mining, and has large oscillations in EU member countries. Exclusion of major mineral waste reflects more accurately trends than total waste generation, and improves data comparability across countries.

Graph 50 Waste generation excluding major mineral waste per GDP unit, chain linked volume, 2010. (kg per thousand EUR)



Source: Eurostat.

Data in graph 50 show that Serbia, with its 327 kg of waste per EUR 1 000 of GDP in 2018, is very far from the European average. Although GDP growth in the Republic of Serbia in the previous years was obvious, the economy failed to generate less waste. The share of coal combustion waste from thermo power plants is the largest in the total amount of waste excluding major mineral waste. Only electricity generation from renewable energy sources can lead to reduction of generated amounts of this type of waste and getting closer to the European average for this indicator.

Bulgaria, as EU member country, with 473 kg of waste generated per EUR 1 000 of GDP in 2018 shares a similar problem with Serbia, while the other EU countries (Romania with 128, Hungary with 87, Croatia with 77 and Slovenia with 73 kg of waste per EUR 1 000 of GDP) in 2018 were much closer to the European average

Waste generation excluding major mineral waste by domestic material consumption

The indicator is part of the set of circular economy indicators. It is used to monitor progress toward circular economy within the thematic area “production and consumption”.

When describing the indicator Eurostat indicates that it monitors the efficiency of EU material consumption by comparing the tonnes of waste generated to domestic material consumption (DMC). DMC measures the amount of materials (including water and air) directly and actually used in a national economy.

Both waste generation and DMC - in absolute amounts and per unit of intensities - are important indicators for monitoring the circular economy. Their ratio is relevant as an index of relative intensity of raw material and wastes in an economy, and can be used for cross-country comparisons.

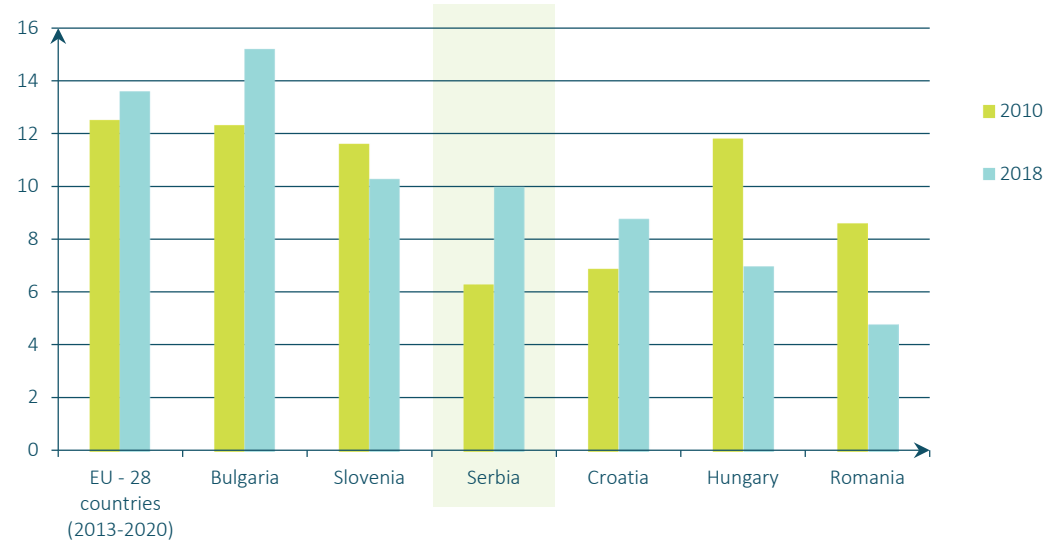
The indicator is defined as total waste generated in a country (in mass unit), excluding major mineral waste, divided by the domestic material consumption (DMC) of a country. The ratio is expressed in percentages (%) as both terms are measured in the same unit, namely tons.

The indicator serves as a material efficiency indicator by comparing the amount of wasted generated to DMC. The smaller the value of the ratio, the better the performance. The ratio is strongly influenced by the non-metallic mineral component of DMC. This indicator may need additional context indicators for interpretation.

Data on generation of waste excluding major mineral waste cover hazardous and non-hazardous waste from all economic activities and households, including waste from waste treatment (secondary waste), but excluding major mineral waste.

DMC does not include additional “hidden” flows related to imports and exports of raw materials and products.

Graph 51 Waste generation excluding major mineral waste by domestic material consumption, 2010 and 2018



Source: Eurostat.

The value for the indicator "Waste generation excluding major mineral waste by domestic material consumption", at EU-28 level, increased from 12.5 (in 2010) to 13.6 (in 2018), hence a more compound annual growth rate of 13.5%.

As smaller value entail means better performance, it can be said that Romania, Hungary and Slovenia achieved better results, which is obvious from the fall of the value of the indicator over the years, while Croatia, Serbia and Bulgaria recorded an increase in the value and need to further work on the efficiency of material consumption.

Recycling rate of all waste excluding major mineral waste

The indicator is part of the set of circular economy indicators. It is used to monitor progress towards a circular economy in the thematic area “waste management”.

The recycling rate of all waste monitors directly the amount of materials fed back into the economy, thereby maintaining the value of materials and reducing losses.

The indicator is calculated as recycled waste divided by total waste treated excluding major mineral waste, multiplied by 100. It is expressed in percentages (%) because both terms are measured in the same unit, namely tonnes.

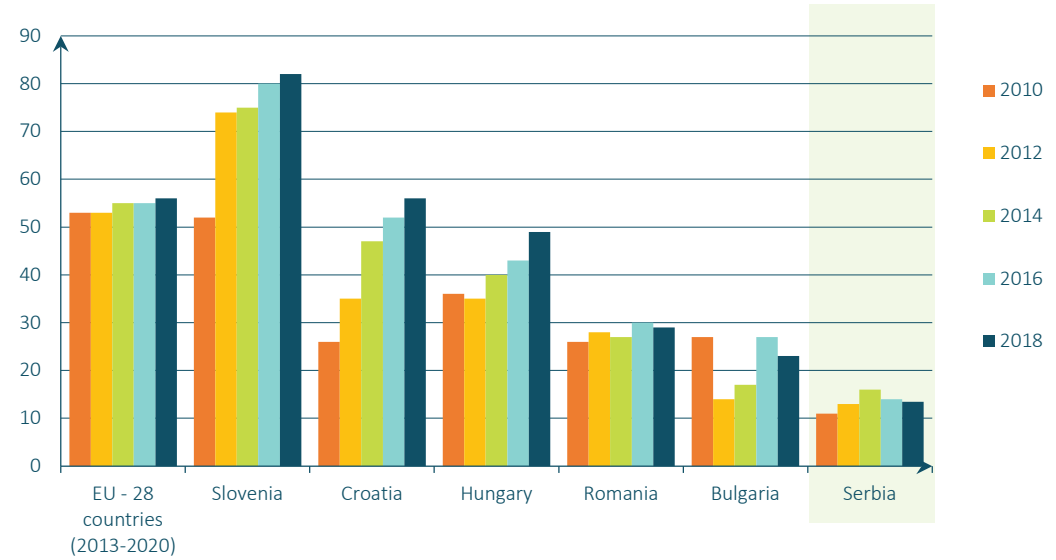
Recycled waste is waste treated, which was sent to recovery, except for energy recovery and back-filling (for simplification the term recycling is used).

Waste data are adjusted for waste collected in one country and recycled in another one. The amount of recycled waste is adjusted as follows: amount of recycled waste plus amount of waste exported for recycling and minus amounts of waste imported and treated in domestic recycling plants.

Data on waste treated are based on reporting according to the Waste Statistics Regulation, and the imports and exports of waste are based on External Trade Statistics.

The indicator covers both hazardous (hz) and non-hazardous (nh) waste from all economic activities and households, including waste from waste treatment (secondary waste, but excluding major mineral waste coming mostly from construction and mining and having big oscillations in EU member countries. Excluding major mineral waste permits to obtain more accurate trends than for total waste generated and improves cross-country comparability.

Graph 52 Recycling rate of all waste excluding major mineral waste, (%)



Source: Eurostat and Statistical Office of the Republic of Serbia.

Graph 52 shows that the values for the indicator "Recycling rate of all waste excluding major mineral waste", on EU-28 level, recorded a slight growth from 2010 to 2018. In 2010, the value amounted to 53% and in 2018 to 56%, hence a more compound annual growth rate of 54%. Serbia, with a value of 13% for this indicator in 2018, is behind both the European average and the countries of the region. Slovenia, with a value of 72% in 2018, is above the European average with the share of recycled waste excluding major mineral waste, followed by Croatia with 42%, Hungary with 40%, Romania with 28% and Bulgaria with 21%.

Circular material use rate

The indicator is part of the set of circular economy indicators. It is used to monitor progress of a circular economy in the thematic area "secondary raw materials".

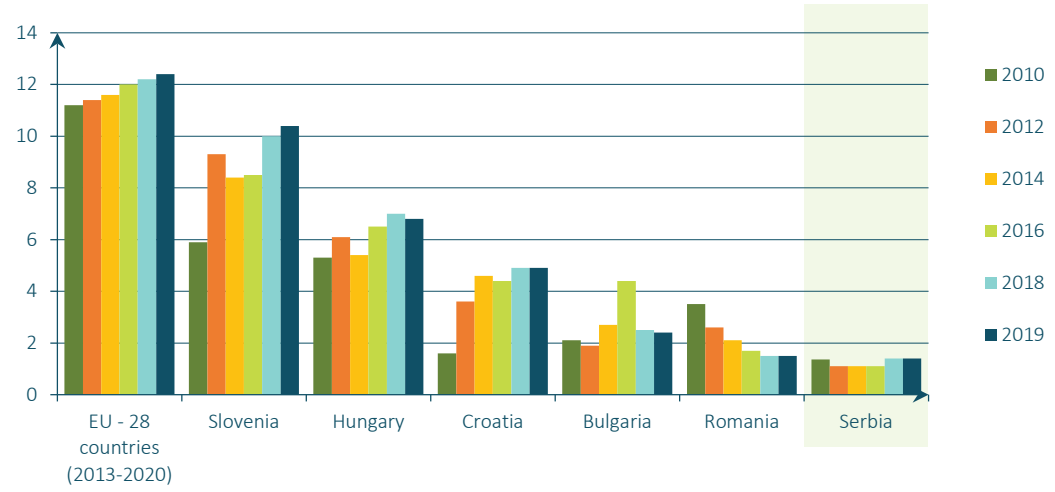
The circular economy aims at increasing the amount of materials recycled and fed back into the economy, therefore reducing waste generation and limiting the extraction of primary raw materials. The circular material rate measures the contribution of recycled materials to the total demand for materials.

The indicator "Circular Material Use Rate" is defined as the ratio of the circular material use and the total material use.

The total material use is measured by summing up the total domestic material consumption (DMC) and the circular material use. The domestic material consumption shows the total amount materials consumed by resident units; the circular material consumption is approximately equal to the amount of waste recycled in domestic recovery plants minus imported waste destined for recovery plus exported waste destined for treatment abroad. Waste recycled in domestic recovery plants covers recovery operations from R2 to R11 - as defined in the Waste Framework Directive 75/442 / EEC. The amount of imported and exported waste destined for recovery is estimated on the basis of External Trade Statistics.

The value for the indicator "Circular Material Use Rate", on EU-28 level, recorded a slight growth from 2010 to 2019. In 2010, the value amounted to 11.2% and in 2019 to 12.4%, hence a compound annual growth rate of 11.7%.

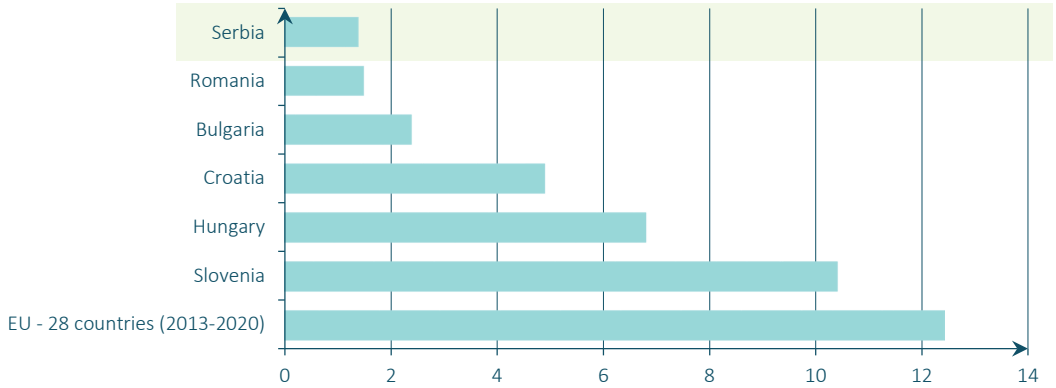
Graph 53 Circular material use rate (%)



Source: Eurostat and Statistical Office of the Republic of Serbia.

The circular material use rate in Slovenia amounted to 10.4% in 2019, being the best ranked country of the region. Then there is Hungary with 6.8%, Croatia with 4.9%, Bulgaria with 2.4%, Romania with the value of 1.5%, and Serbia with 1.4%, taking the last place among the observed countries of the region.

Graph 54 Circular material use rate, 2019 (%)



Source: Eurostat and the Statistical Office of the Republic of Serbia.

The circular material use rate in 2019 in the Republic of Serbia amounted to 1.4%. Observed by type of material, the group of metals had the largest share, 4.1%, meaning that this type of material was mostly recovered. Non-metals are the second category being recovered with a share of 2.5% in the total material use, followed by biomass with 0.6% and fossil fuels with only 0.2%.

The compound annual growth rate is the number used to monitor progess assessment in an area. Progress is monitored in relation to the initial year for which data exist and to see whether progress are moving towards the desire direction.

GROWTH RATE

GROWTH

FALL

GVA IN ENVIRONMENTAL GOODS AND SERVICES SECTION (2015-2018)

7.8%

GENERATION OF WASTE EXCLUDING MAJOR MINERAL WASTES PER GDP UNIT (2010-2018)

10.0%

RECYCLING RATE OF ALL WASTE EXCLUDING MAJOR MINERAL WASTE (2010-2018)

5.2%

DOMESTIC MATERIAL CONSUMPTION (2010-2019)

1.5 %

TOTAL ABSTRACTION OF FRESH PER INHABITABT (2000-2019)

0.8%

OUTPUT IN ENVIRONMENTAL GOODS AND SERVICES SECTION (2015-2018)

10.2%

EMISSION OF THE ACIDIFYING GASES, Gg (2010-2018)

-1.9 %

PRODUCTION OF CHEMICALS, HAZARDOUS AND NON-HAZARDOUS – TOTAL (2010-2019)

5.9%

RESOURCE PRODUCTIVITY (2010-2019)

0.5%

GROWTH RATE

POPULATION CONNECTED TO PUBLIC WATER SUPPLY (2000-2019)

1.7 %

POPULATION CONNECTED TO WASTEWATER TREATMENT (2000-2019)

5.1%

WATER EXPLOATATION INDEX (2000-2019)

2.1%

CIRCULAR MATERIAL USE RATE (2010-2019)

4.6 %

EMISSION OF SO_2 IN SECTION ELECTRICITY, GAS, STEAM AND AIR CONDITIONG SUPPLY (2008-2018)

-3.3%

EMISSION $PM_{2.5}$ FROM HOUSEHOLD HEATING (2010-2018)

-1.6%

GENERATION OF WASTE EXCLUDING MAJOR MINERAL WASTES PER DOMESTIC MATERIAL CONSUMPTION (2010-2018)

-13.6%

THE VALUES FOR THE OBSERVED INDICATORS SHOW THAT ENVIRONMENTAL ACTIVITIES AND RESOURCE MANAGEMENT IN THE REPUBLIC OF SERBIA ARE MOVING TOWARDS THE DESIRED DIRECTION.

METHODOLOGICAL EXPLANATIONS

- **Water statistics:** https://ec.europa.eu/eurostat/ramon/coded_files/OECD_ESTAT_JQ_Manual_version_2_21.pdf
- **Waste statistics:** https://ec.europa.eu/eurostat/documents/ 3859598/5926045/KS-RA-13-015-EN.PDF.pdf/055ad62c-347b-4315-9faa-0a1ebc-b1313e?t=1414782620000
- **Hazardous chemicals:** https://ec.europa.eu/eurostat/documents/3888793/7722994/KS-TC-15-006-EN-N.pdf/b11e51ae-c29c-45e3-a1b1-8ba6583906eb?t=1478622856000
- **Material flow accounts:** https://ec.europa.eu/eurostat/documents/3859598/9117556/KS-GQ-18-006-EN-N.pdf/b621b8ce-2792-47ff-9d10-067d2b8aac4b?t=1537260841000
- **Air emission accounts:** https://ec.europa.eu/eurostat/documents/3859598/7077248/KS-GQ-15-009-EN-N.pdf/ce75a7d2-4f3a-4f04-a4b1-747a6614eeb3?t=1447948110000
- **Physical energy flow accounts:** https://ec.europa.eu/eurostat/documents/1798247/6191537/PEFA-Manual-2014-v20140515.pdf
- **Environmental tax accounts:** https://ec.europa.eu/eurostat/documents/3859598/5936129/KS-GQ-13-005-EN.PDF.pdf/706eda9f-93a8-44ab-900c-ba8c2557ddb0?t=1414782946000
- **Environmental goods and services sector accounts:** https://ec.europa.eu/eurostat/documents/3859598/7700432/KS-GQ-16-008-EN-N.pdf/f4965221-2ef0-4926-b3de-28eb4a5faf47?t=1476868680000
- **Environmental expenditure accounts:** https://ec.europa.eu/eurostat/documents/3859598/7903714/KS-GQ-17-004-EN-N.pdf/7ea9c74b-eda4-4c23-b7bd-897358bfc990?t=1489135578000

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