



Circular economy and efficiency of material resources



**2nd NATIONAL WORKSHOP ON CHEMICALS AND WASTE STATISTICS, Sarajevo, 05-08
February 2019**

EU policy Framework for the circular economy

As part of a change in the circular economy, European Commission has adopted four legislative proposals introducing new waste management objectives related to reuse, recycling and disposal, strengthening the provisions on waste prevention and extended producer responsibilities, as well as streamlining definitions, reporting obligations and calculation methods.

The final acts were signed on May 30, 2018. Member States are required to transpose directives into national law by July 5, 2020.

The circular economy is the answer to the transformation of the current unsustainable linear economic model to "take, use, throw" into a circle model based on sustainable development, which contributes as much as possible to the long-term preservation of the value of products, materials, raw materials and waste generation



The Circular Economy Action Plan, in January 2018, the European Commission adopted a new set of measures, including:

- EU Strategy for Plastics in the Circular Economy
- “Options to address the interface between chemical, product and waste legislation
- “Monitoring Framework on progress towards a circular economy”
- “Report on Critical Raw Materials and the circular economy”

Circular Economy Package 2018 - key documents

- EU Strategy for Plastics in the Circular Economy - communication
- EU Strategy for Plastics in the Circular Economy - staff working document
- EU Strategy for plastics in the Circular Economy - brochure
- Strategy for plastics - press release and questions and answers
- Factsheets on the strategy for plastics in a circular economy
- Factsheet - changing the way we use plastics
- Communication on the Interface between chemicals, products and waste legislation - staff working document and factsheet



EU Framework for monitoring circular economy indicators

No	Indicator	Relevance	EUa Tools
Production and consumption			
1	EU self-sufficiency in raw materials	The circular economy should contribute to addressing risks in terms of supplying raw materials, especially critical raw materials.	Initiative for raw materials; efficient use of resources
2	Green Public Procurement *	Public procurement accounts for a large part of consumption and can be the driving force of a circular economy.	Public procurement strategy; support programs and options for green public procurement
3a-c	Waste generation	In the circular economy, the generation of waste is reduced to the smallest possible extent.	Waste Framework Directive; Council Directive on special waste streams; strategy for plastics
4	Spread of food *	The spread of food has a negative impact on the environment, climate and economy.	Regulation on General Regulations; Waste Framework Directive; various initiatives (eg for food scattering)
Waste management			
5a-b	Total recycling rate	Increasing recycling is part of the transition to a circular economy	Waste Framework Directive
6a-f	Recycling rates for special waste streams	This reflects progress in recycling key waste streams	Waste Framework Directive; Directive; directives on special streams
Secondary raw materials			
7a-b	The share of recycled material in demand for raw materials	In the circular economy, secondary raw materials are often used for new products.	Waste Framework Directive; Ecodesign directive; the EU environmental label; REACH Regulation; initiatives to linkages between policy chemicals, products and waste; strategy for plastics; quality standards for secondary raw materials



8	Trade in recyclable raw materials	Trade in recyclable materials reflects the importance of the internal market and global participation in the circular economy	Internal market policy; De waste shipments; trade polic
Competitiveness and innovation			
9a-c	Private investment, jobs and gross value added	They reflect the contribution of the circular economy to job creation and growth.	an investment plan for European Structural and Inv Funds; InnovFin; a platform for a circular economy; a strate; sustainable financial sector; Employment Initiative; a ne program for Europe; internal policy
10	Patents	Innovative technologies in the field of circular economy increase global competitiveness of the EU.	Horizon 2020

- * **under development**



EU List of Circular Economy Indicators (CE)

PRODUCTION AND CONSUMPTION

1 EU self-sufficiency for raw materials

2 * Green public procurement

3 Production of waste

3A Production of municipal waste per capita

3B Production of waste without mineral waste per unit of GDP

3C Production of waste without mineral waste per unit of consumption of domestic materials

4 * Waste food

WASTE MANAGEMENT

5 Recycling rate

5A Municipal waste recycling rate

5B Waste recycling rate, excluding mineral waste

6 Recycling / Processing for specific waste streams

6A Recycling rate of total packaging waste

6B Recycling rate of plastic packaging waste

6C Recycling rate of wooden packaging

6D Recycling rate of electrical and electronic waste (e-waste)

6E Recycling biotope per capita

6F The rate of processing of construction waste and demolition wastes

* under development



SECONDARY RAW MATERIALS

7 Contribution of recycled materials to the demand of raw materials

7A End-of-life recycling rates

7B The rate of use of the circular material

8 Trade in recyclable raw materials

COMPETITIVENESS AND INNOVATION

9 Private Investments, Jobs and Gross Value Added Related to the Circular Economy Sector

9A Gross investment in material goods

9B Number of employees

9C Value added factor cost factor

10 Number of patents related to recycling and secondary raw materials



Efficiency of material resources

The Europe 2020 agenda is a ten-year EU, with priorities being:

- Smart growth: the development of an economy based on knowledge and innovation;
- Sustainable growth: promoting more efficient resources, a greener and more competitive economy;
- Inclusive growth: strengthening of economy, employment, social and territorial cohesion.



Efficiency of material resources

The European Commission uses " Resources Productivity " as a leading indicator. Productivity of the resource is currently the leading indicator of sustainable consumption and production.

It is calculated by dividing gross domestic product (GDP) with domestic consumption (DMC). The advantages of the DMC are to a large extent related to the fact that a method of collecting data sets (official statistics) has been established.

The efficiency of material resources, the circular economy and the supply of raw materials are still not determined in Bosnia and Herzegovina, activities are mainly concentrated on some topics that are important factors in environmental issues, such as waste management, energy use and energy efficiency issues.



DMC - dangerous substances

Monitoring of hazardous substances in chemicals and other products is of ecological significance, their impact **CAN BE UNDERSTOOD** using EW-MFA statistics (material flow accounts).

Material flows are material flows between the economy and the natural environment, which includes **extracted** raw materials and other primary materials from the natural environment and their release into the natural environment, as well as the flows of materials between the economy and abroad (**import and export**).

Domestic material consumption – DMC is the total amount of material resources used in the national economy. Given that accumulated materials (inventories) will once be converted into emissions and waste, the value of DMC also indicates potential environmental burdens in the process of exploitation or processing of raw materials.



DMC - dangerous substances

DMC data are organized into groups of material flows; Biomass and biomass products, Metallic ores and concentrates, Non-metallic minerals, primary and processed; Petroleum resources, Other products; and Waste. **Dangerous substances are included in some of these groups of material flows**, but they are not specifically shown because statistics are displayed at the aggregated level.

DMC account is possible account by groups of hazardous chemicals, using the available foreign trade statistics. To calculate the DMC (domestic consumption of materials) by groups of hazardous substances, the data on chemicals in the CN classification are considered.

However, another source of information is the official foreign trade statistics based on the combined nomenclature of 8-digit CN codes for the grouping of chemicals. Each CN code for chemicals is linked to a specific CAS (Chemical Abstract Services), which provide a unique identifier for a particular component (ECICS 2007).



DMC - dangerous substances

The Case Study Statistics Sweden shows the assessment of the use of external trade statistics and the assessment of toxicity for the assessment of chemical substances.

Clean chemicals are found in chapters **28** and **29** of the CN structure.

Chemicals in Chapters 28 and 29 are mixtures of hazardous and non-hazardous substances.

In Chapter 28, inorganic chemicals are included in chapter 29 of organic chemicals.

All chemicals in Chapters 28 and 29 CN are aligned with the corresponding CAS number.

From chapter 29, 100 compounds took the highest place in terms of potential environmental impact.



- $\text{TPR} = \text{half-time (period) decay in the atmosphere(days)} / \text{LC50 (mg L}^{-1}\text{)}$
 - TPR- toxicity assessment
 - half-time decay (flag $T_{1/2}$)
 - Basic toxicity - expressed as a mean lethal concentration (in water) (LC50)

Two structurally-active relation, for base toxicity and constant rate of reaction of hydroxyl radicals, are form the basis for TPR calculations .



The 100 compound (CAS) with highest TPR-ranking

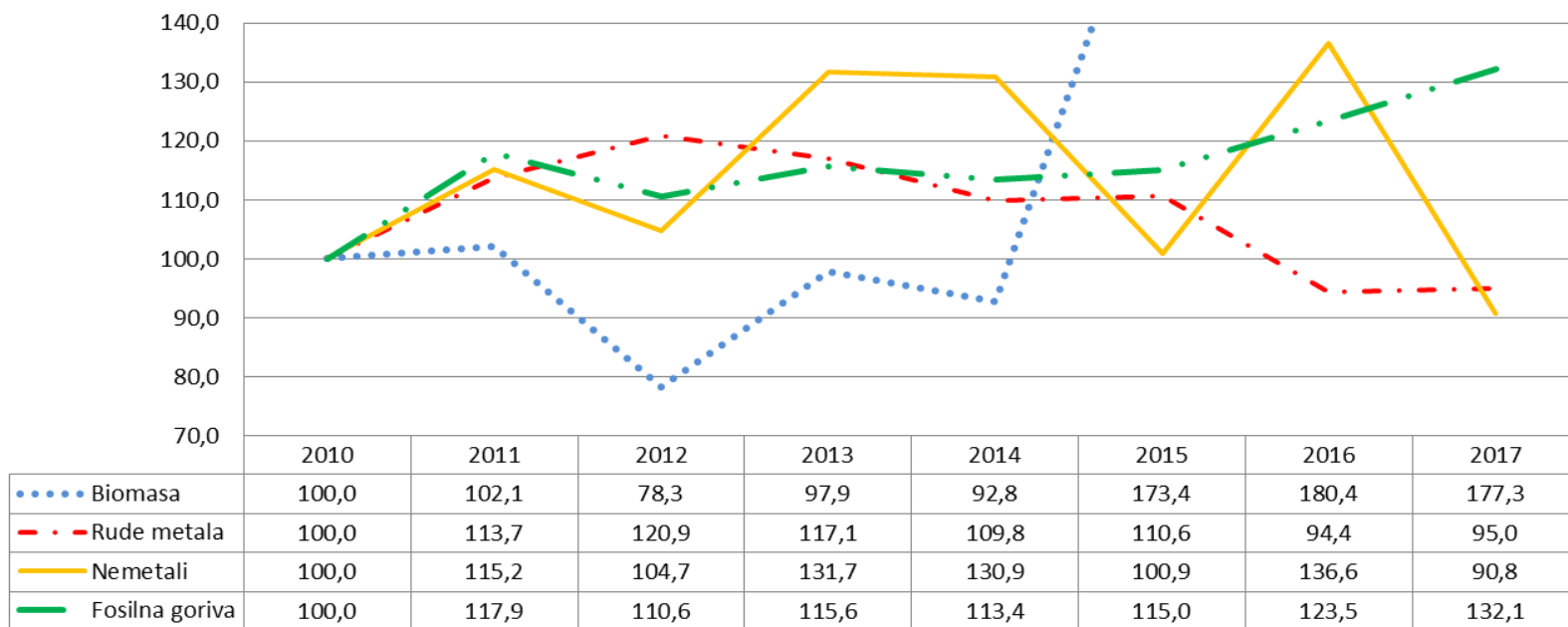
Chemical name	CAS	CN	t½ (day)	LC ₅₀ (mg/L)	TPR
Dichloro((dichlorophenyl)methyl)-methylbenzene	76253-60-6	29036990	13.2	0.0317	417
2,4,2',4'-Tetrachlorobiphenyl	2437-79-8	29036990	28.9	0.106	273
Polychlorinated biphenyls	1336-36-3	29036990	28.9	0.106	273
DDE	72-55-9	29036990	15.0	0.0585	257
2,2-(2-Chlorophenyl-4'-chlorophenyl)-1,1-dichloroethene	3424-82-6	29036990	11.9	0.0618	193
DFTD	475-26-3	29036990	20.8	0.152	137
TDE	72-54-8	29036990	11.6	0.0874	132
Mitotane	53-19-0	29036990	9.29	0.0914	102
2-Butenoic acid, 2,3,4,4,4-pentachloro-, butyl ester	21824-93-1	29161980	35.9	0.447	80.3
Perthane	72-56-0	29036990	2.19	0.0298	73.6
HCFC 222	422-49-1	29034910	405	6.58	61.5
4-(Trifluoromethyl)benzophenone	728-86-9	29147000	23.5	0.389	60.4
PCB 28	7012-37-5	29036990	13.2	0.234	56.6
Decane, 1,10-dibromo-	4101-68-2	29033036	6.29	0.143	44.1
HCFC 231	421-94-3	29034910	358	8.41	42.5
2,3,4,5,6-Pentafluorobenzophenone	1536-23-8	29147000	30.1	0.776	38.8
Nonane, 1,9-dibromo-	4549-33-1	29033036	8.12	0.221	36.7
2,4,5,6-Tetrachloro-m-xylene	877-09-8	29036990	15.4	0.453	33.9
alpha,alpha,alpha-Trichloro-4-chlorotoluene	5216-25-1	29036990	25.3	0.789	32.0
Propyl 2,4,5-trichlorophenoxyacetate	1928-40-1	29189090	8.32	0.264	31.5
Sebacoyl chloride	111-19-3	29171990	6.44	0.208	31.0
2,3,4,5-Tetrachloronitrobenzene	879-39-0	29049085	55.7	1.83	30.4
1,2,3,5-Tetrachlorobenzene	634-90-2	29036990	28.6	0.940	30.4
Benzonitrile, 2,3,4,5,6-pentafluoro-	773-82-0	29269095	695	22.9	30.3
1,2,3,4-Tetrachlorobenzene	634-66-2	29036990	37.1	1.23	30.3
Propane, 2,2,3-trichloro-1,1,1,3-tetrafluoro-	139754-75-9	29034910	662	22.0	30.1
1,2,4,5-Tetrachlorobenzene	95-94-3	29036990	30.9	1.08	28.7
3,5-Dinitro-4-chloroalpha,alpha-trifluorotoluene	393-75-9	29049085	252	9.04	27.9
2,3,5,6-Tetrachloro-p-xylene	877-10-1	29036990	15.1	0.558	27.1



DMC and RP in Bosnia and Herzegovina

Domestic material consumption (DMC) in Bosnia and Herzegovina recorded a slight increase in period 2010-2017.

Domestic material consumption in 2017 was 37 620 598 tones, which was by 4% less than in previous year.



DMC and RP in Bosnia and Herzegovina

Productivity of the resource, as a ratio of gross domestic product and consumption of domestic materials, is an indicator that points to the efficiency of resources where production is desirable with as little possible consumption of material resources as possible.

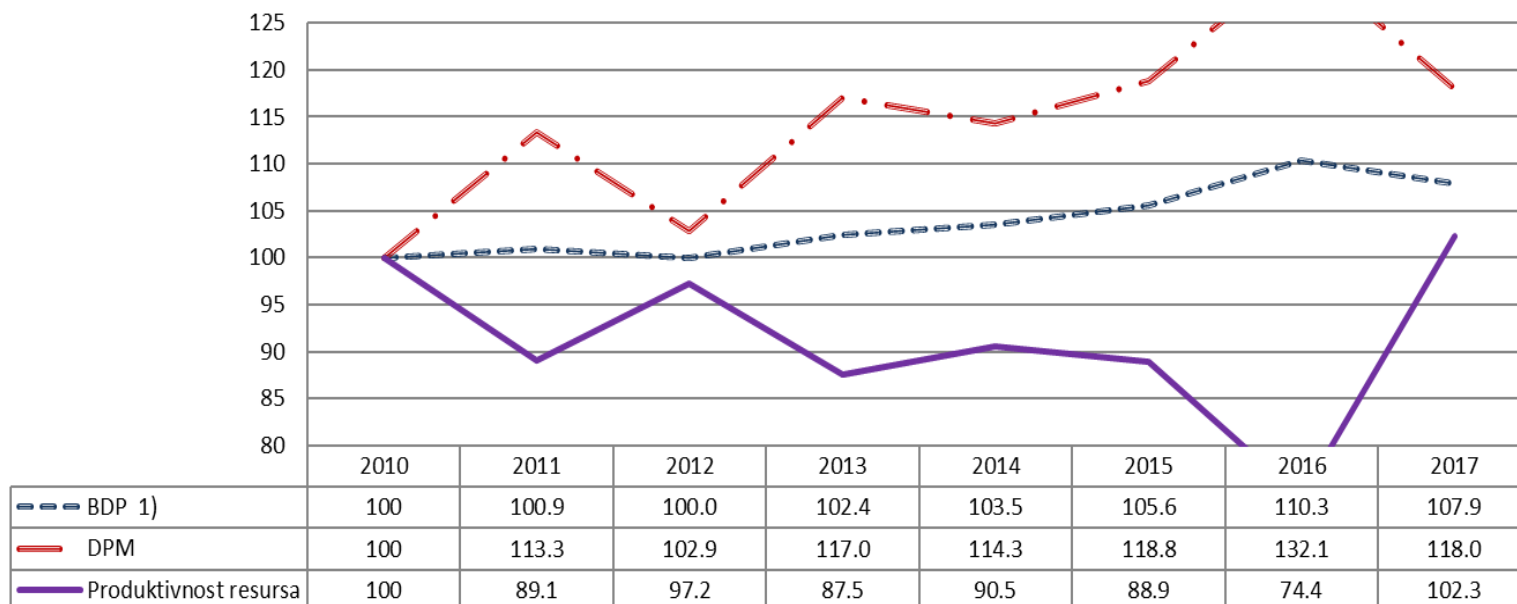
The indicator shows the progress achieved in the realization of one of the goals of the policy of sustainable production and consumption, i.e.. sustainable development in general.

The level of resource productivity depends on the potential of resources, the diversity of industrial activities, the role of the service sector and construction, the volume and structure of consumption and the different sources of energy.



DMC and RP in Bosnia and Herzegovina

Productivity of Bosnia and Herzegovina's resources in the economy is rather low compared to the average of the European Union. It was 0.8 KM per kilogram, the reference 2017.



Thank you for your attention

Agency for Statistics of Bosnia and Herzegovina
Transport, Energy, Environment Statistic Department

www.bhas.gov.ba

Tamara Supic, tamara.supic@bhas.gov.ba

