UN environment programme

Circular Economy:
from Indicators and Data to Policy-making

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Annexes

Annex I. List of Geographic Regions and Sub-Regions

The country groupings are based on the geographic regions defined under the Standard Country or Area Codes for Statistical Use (known as M49) of the United Nations Statistics Division (UNSD 1999). A complete list of countries included in each region and subregion and country group is available from the United Nations Statistics Division (UNSD 2023c).

M49 code	Region and subregions name
1	World
2	Africa
5	South America (M49)
9	Oceania
11	Western Africa (M49)
13	Central America (M49)
14	Eastern Africa (M49)
15	Northern Africa
17	Middle Africa (M49)
18	Southern Africa (M49)
19	Americas
21	Northern America
29	Caribbean (M49)
30	Eastern Asia
34	Southern Asia
35	South-eastern Asia
39	Southern Europe (M49)
53	Australia and New Zealand
54	Melanesia (M49)

M49 code	Region and subregions name
57	Micronesia (M49)
61	Polynesia (M49)
62	Central Asia and Southern Asia
142	Asia
143	Central Asia
145	Western Asia
150	Europe
151	Eastern Europe (M49)
154	Northern Europe (M49)
155	Western Europe (M49)
199	Least Developed Countries (LDCs)
202	Sub-Saharan Africa
419	Latin America and the Caribbean
432	Landlocked Developing Countries (LLDCs)
513	Northern America and Europe
543	Oceania excluding Australia and New Zealand
722	Small Island Developing States (SIDS)
747	Western Asia and Northern Africa
753	Eastern Asia and South-eastern Asia

Table of Content

Annex II. List of Available Variables Related to Circular Economy Core Indicators

Indicators are highlighted in green when they have a positive trend to circular economy and in red when the relation is negative (more explanations in section 5.2).

Material Life-cycle and Value Chain

Theme	Proposed core indicator	Disaggregated indicator	Selected variable	Source	Unit	Serie
The material basis of the economy	Material consumption and productivity	Production-based domestic material consumption (DMC)	Production-based domestic material consumption (DMC)	(UNSD 2023d)	Tonnes	2000 - 2019
			Production-based DMC by type of raw material	(UNSD 2023d)	Tonnes	2000 - 2019
		Demand-based raw material consumption (RMC) (material footprint)	Demand-based raw material consumption (RMC) (material footprint)	(UNSD 2023d)	Tonnes	2000 - 2019
		Production-based material productivity (GDP/DMC)	Production-based material intensity (DMC/ GDP)	(UNSD 2023d)	Kilograms per constant 2015 United States dollars	2000 - 2019
			Production-based material intensity by raw material (DMC by raw material /GDP)	(UNSD 2023d)	Kilograms per constant 2015 United States dollars	2000 - 2019
		Demand-based raw material productivity (GDP/ RMC)	Demand-based raw material intensity (RMC/ GDP)	(UNSD 2023d)	Kilograms per constant 2015 United States dollars	2000 - 2019
The circularity of material flows and the management efficiency of materials and waste	Total waste generation	Total waste generation	Total waste generation	(UNSD 2023d)	Tonnes	2000-2021
			Total waste generation by sector	(UNSD 2023d)	Tonnes	2000-2021
		Municipal waste generation (proxy)	Municipal waste generation	(UNSD 2023d)	Tonnes	2000-2021
	Circular material use rate	Share of recycled materials in material consumption	Circular material use rate	(Eurostat 2023a)	Percentage (%)	2010-2021
	National recycling rate	National recycling rate	Recycling rate of all waste excluding major mineral waste	(Eurostat 2023a)	Percentage (%)	2010-2020
		Municipal waste recycling rate (proxy)	Municipal waste recycling rate (proxy)	(UNSD 2023d)	Percentage (%)	2010-2019
	Waste going to final disposal		Waste (excluding major mineral waste) going to landfill final disposal (D1, D5, D12)	(Eurostat 2023a)	Tonnes	2010-2020
			Waste (excluding major mineral waste) going to incineration without energy recovery (D10)	(Eurostat 2023a)	Tonnes	2010-2020

Interactions with the Environment

Theme	Proposed core indicator	Disaggregated indicator	Selected variable	Source	Unit	Serie
Natural resource implications	Intensity of use of renewable freshwater resources		Water stress	(UNSD 2023d)	Percentage (%)	2000-2020
			Water stress by sector	(UNSD 2023d)	Percentage (%)	2000-2020
Environmental quality implications	GHG emissions from production activities	GHG emissions from production activities		No data		
		Total GHG emissions (proxy)	Total GHG emissions	(WB 2023)	Kilo-tonnes CO_2 equivalent	2000-2020
	Pollutant discharges from material extraction and processing to water bodies and share safely treated	Pollutant discharges from production activities to water bodies	Industrial discharges to water bodies	(OECD 2023)	Million m^3/year	2000-2021
			Agricultural discharges to water bodies	(OECD 2023)	Million m^3/year	2000-2021
			Industrial BOD discharged	(OECD 2023)	1000 Kg O_2/day	2005-2021
			Industrial COD discharged	(OECD 2023)	1000 Kg O_2/day	2005-2020
			Industrial N discharged	(OECD 2023)	1000 Kg/day	2010-2020
			Industrial P discharged	(OECD 2023)	1000 Kg/day	2010-2020
			Industrial SS discharged	(OECD 2023)	1000 Kg/day	2010-2020
			Agricultural BOD discharged	(OECD 2023)	1000 Kg O_2/day	2000-2021
			Agricultural COD discharged	(OECD 2023)	1000 Kg O_2/day	2000-2021
			Agricultural N discharged	(OECD 2023)	1000 Kg/day	2000-2021
			Agricultural P discharged	(OECD 2023)	1000 Kg/day	2000-2021
			Agricultural SS discharged	(OECD 2023)	1000 Kg/day	2000-2021
		Percentage of discharges safely treated (proxy)	Proportion of total discharges to water bodies safely treated (proxy)	(UNSD 2023d)	Percentage (%)	2015
			Proportion of industrial discharges to water bodies safely treated (proxy)	(UNSD 2023d)	Percentage (%)	2015

Responses and Actions

Theme	Proposed core indicator	Disaggregated indicator	Selected variable	Source	Unit	Serie
Support circular use of materials, promote recycling markets and optimize design	Taxes and government support for circular business models			No data		
Improve the efficiency of waste management and close leakage pathways	Investments in waste management, waste collection and sorting		Investments in waste management by general governments	(Eurostat 2023a)	Millions constant 2015 United States dollars	2014-2021
			Investments in waste management by corporations as specialist and secondary producers	(Eurostat 2023a)	Millions constant 2015 United States dollars	2014-2021
Boost innovation and orient technological change for more circular material lifecycles	Government and business R&D expenditure on CE technologies			No data		
Strengthen financial flows for a circular economy and reduced leakage	Business investment on CE activities		Business investment in circular economy activities as percentage of the GDP	(Eurostat 2023a)	Percentage (%)	2005-2021
			Business investment in circular economy activities	(Eurostat 2023a)	Millions constant 2015 United States dollars	2005-2021

Socio-economic Opportunities for A Just Transition

Theme	Proposed core indicator	Disaggregated indicator	Selected variable	Source	Unit	Serie
Market developments and new business models	Gross value added related to circular economy sectors		Gross value added to circular economy sectors as percentage of the GDP	(Eurostat 2023a)	Percentage (%)	2005-2021
			Gross value added to circular economy sectors	(Eurostat 2023a)	Millions constant 2015 United States dollars	2005-2021
	Jobs in circular economy sectors		Jobs in circular economy sectors	(Eurostat 2023a)	Full-time equivalent	2005-2021
			Proportion of jobs in circular economy sectors in total employment	(Eurostat 2023a)	Percentage (%) in full-time equivalent	2005-2021

Annex III. Circular Economy Core Indicators Metadata (At Variable Level)

This Annex presents the content of the circular economy dataset, including an explanation about its structure, the steps followed at the dataset consolidation and the metadata information for each variable.

III.1 Dataset structure

The dataset is divided into two parts. The first one includes general information for each variable, containing 7 items as shown in the Table III. 1.

Table III. 1 Variable information

Categories	Description
Variable	Variable name
Unit	Unit of measurement
Data source	Institution where the data are extracted from.
Date of data extraction	Date when the data were extracted, or data will be updated.
Nature	Information on the classification used regarding the nature of the data. The possible categories are: E: estimated data N: non-relevant C: country data G: global monitoring data CA: country adjusted data. The category N (non-relevant) includes the regional data calculated according to the UN methodology.
Type of product	If applicable, the type of product lists the categories of products used.
Sector	If applicable, this refers to the different categories of sectors used.

After the presentation of the variable, the second part of the dataset contains the series of data according to structure presented in Table III. 2.

Table III. 2 Items of the data series

Items	Description
GeoAreaName	Corresponds to the name of the country or the region.
GeoAreaCode	Corresponds to the classification of the United Nations for countries and regions.
Unit	Unit of measurement
Year	Year of measurement
Sector	If applicable, corresponds to the activity sector
Nature	The nature of the data is classified as follows: E: estimated data N: non-relevant C: country data G: global monitoring data CA: country adjusted data. The category N (non-relevant) includes the regional data calculated according to the UN methodology.
Notes	Additional information about data when available. For example, break in time series or information about the classification used.

III.2 Dataset consolidation steps

Once data are extracted from the original dataset, the consolidation of the CE dataset is made as follows:

1. As a first step, the dataset starts in the year 2000, so data available before this year are not included. Data before the year 2000 can be consulted in the original dataset.
2. Secondly, when a cell is empty in the dataset, it means that there is no data available for the country for this year.
3. When the value of the variable is zero, it is represented by "0".
4. Data flags are separated into information about the nature of the data and additional information (notes).
5. To harmonize the unit of measurement, monetary data are presented in constant 2015 United States dollars. The exchange rates used to convert euros to constant 2015 United States dollar are the period average exchange rates, and they are presented in the following Table III. 3. The exchange rates were taken from the International Monetary Fund (International Monetary Fund [IMF] 2023).

Table III. 3 Period average exchanges rates

Year	Exchange rate (period average) Euros to US dollar
2005	1.25
2006	1.25
2007	1.37
2008	1.47
2009	1.39
2010	1.33
2011	1.39
2012	1.28

6. At the next step, countries are identified by the GeoArea Code (M49 code) according to United Nations methodology "Standard Country or Area Codes for Statistical Use" (UNSD 1999).
7. Finally, country data are aggregated following the UNEP aggregation methodology. This aggregation is calculated at sub-regional, regional, and global level and for special countries groups. Aggregates calculation is done by sum or average and only when more than 55 per cent of the data are available.
8. Calculated regional aggregates are assigned with N (non-relevant) nature, according to the United Nations methodology.

III.3 Circular economy variables metadata

This section presents the metadata information for each variable:

1. Production-based domestic material consumption (DMC)
2. Production-based domestic material consumption (DMC) by type of raw material
3. Demand-based raw material consumption (RMC) (material footprint)
4. Production-based material intensity (Domestic Material Consumption DMC /GDP)
5. Production-based material intensity by raw material (Domestic Material Consumption by raw material/GDP) DMC by raw material/GDP
6. Demand-based raw material intensity (RMP/GDP)
7. Total waste generation
8. Total waste generation by sector
9. Municipal waste generation
10. Circular material use rate
11. Recycling rate of all waste excluding major mineral waste
12. Municipal waste recycling rate
13. Waste (excluding major mineral waste) going to landfill final disposal (D1, D5, D12)
14. Waste (excluding major mineral waste) going to incineration without energy recovery (D10)
15. Water stress: Intensity of use of renewable freshwater resources (abstraction over available renewable stocks)
16. Water stress by sectors

17. Total GHG emissions
18. Industrial discharges to water bodies
19. Agricultural discharges to water bodies
20. Industrial BOD discharged to water bodies
21. Industrial COD discharged to water bodies
22. Industrial N discharged to water bodies
23. Industrial P discharged to water bodies
24. Industrial SS discharged to water bodies
25. Agricultural BOD discharged to water bodies
26. Agricultural COD discharged to water bodies
27. Agricultural N discharged to water bodies
28. Agricultural P discharged to water bodies
29. Agricultural SS discharged to water bodies
30. Proportion of total discharges to water bodies safely treated
31. Proportion of industrial discharges to water bodies safely treated
32. Investments in waste management by general governments
33. Investments in waste management by corporations as specialists and secondary producers
34. Business investment in circular economy activities (percentage of GDP)
35. Business investment in circular economy activities (Millions constant 2015 United States dollars)
36. Gross value added to circular economy sector as percentage of the GDP
37. Gross value added to circular economy sector
38. Jobs in circular economy sectors
39. Proportion of jobs in circular economy sectors in total employment

1. Production-based domestic material consumption (DMC)

Data source: UNSD – SDG 8.4.2 – SDG 12.2.2
Date of data extraction: 12/09/2023
Link: https://unstats.un.org/sdgs/dataportal/database
Link to metadata: https://unstats.un.org/sdgs/metadata/files/Metadata-08-04-02.pdf
https://unstats.un.org/sdgs/metadata/files/Metadata-12-02-02.pdf
Serie: 2000-2019
Unit: Tonnes

Data providers: National Statistical Offices
Data compilers: UNEP, OECD and EUROSTAT.

Definition, concepts, and calculation *(according to United Nations methodology)*:

"Domestic Material Consumption (DMC) is a standard material flow accounting (MFA) indicator and reports the apparent consumption of materials in a national economy" (UNSD 2023d).

"DMC measures the amount of materials that are used in economic processes. It does not include materials that are mobilized for the process of domestic extraction but do not enter the economic process. It measures the total amount of material (biomass, fossil fuels, metal ores and non-metallic minerals) directly used in an economy and based on accounts of direct material flows, i.e., domestic material extraction and physical imports and exports" (United Nations Statistics Division (UNSD), 2023).

"Domestic Material Consumption (DMC) reports the amount of materials that are used in a national economy. It is a territorial (production-side) indicator. DMC also presents the amount of material that needs to be handled within an economy, which is either added to material stocks of buildings and transport infrastructure or used to fuel the economy as material throughput. It describes the physical dimension of economic processes and interactions. It can also be interpreted as long-term waste equivalent" (UNSD 2023d).

Domestic Material Consumption (DMC) is calculated as:

DMC =DE + IM - EX,

Where:

DMC – domestic material consumption;
DE – domestic extraction of materials;
IM – direct imports;
EX – direct exports

2. Production-based domestic material consumption (DMC) by type of raw material

Data source: UNSD - SDG 8.4.2 SDG 12.2.2
Date of data extraction: 25/09/2023
Link: https://unstats.un.org/sdgs/dataportal/database
Link to metadata: https://unstats.un.org/sdgs/metadata/files/Metadata-08-04-02.pdf
https://unstats.un.org/sdgs/metadata/files/Metadata-12-02-02.pdf
Serie: 2000-2019
Unit: Tonnes of raw material
Data providers: National Statistical Offices
Data compilers: UNEP, OECD and EUROSTAT.

Definition, concepts, and calculation *(according to United Nations methodology):*

"Domestic Material Consumption (DMC) is a standard material flow accounting (MFA) indicator and reports the apparent consumption of materials in a national economy" (UNSD 2023d).

"DMC measures the amount of materials that are used in economic processes. It does not include materials that are mobilized for the process of domestic extraction but do not enter the economic process. It measures the total amount of material (biomass, fossil fuels, metal ores and non-metallic minerals) directly used in an economy and based on accounts of direct material flows, i.e., domestic material extraction and physical imports and exports" (UNSD 2023d).

"Domestic Material Consumption (DMC) reports the amount of materials that are used in a national economy. It is a territorial (production-side) indicator. DMC also presents the amount of material that needs to be handled within an economy, which is either added to material stocks of buildings and transport infrastructure or used to fuel the economy as material throughput. It describes the physical dimension of economic processes and interactions. It can also be interpreted as long-term waste equivalent" (UNSD 2023d).

"Domestic Material Consumption (DMC) is calculated as:

DMC =DE + IM - EX,

Where:

DMC – domestic material consumption;
DE – domestic extraction of materials;
IM – direct imports;
EX – direct exports" (UNSD 2023d).

The categories used to calculate DMC by type of raw materials for SDG 8.4.2 and 12.2.2 are (UNSD 2023d):

ALP	Total or no breakdown
BIM	Biomass
COL	Coal
CPR	Crop residues
CRO	Crops
FEO	Ferrous ores
FOF	Fossil fuels
GAS	Natural gas
GBO	Grazed biomass and fodder crops
MEO	Metal ores
NFO	Non-ferrous ores
NMA	Non-metallic minerals: industrial or agricultural dominant
NMC	Non-metallic minerals: construction dominant
NMM	Non-metallic minerals
ONT	Oil shale and tar sands
PET	Petroleum
WCH	Wild catch and harvest
WOD	Wood

3. Demand-based raw material consumption (RMC) (material footprint)

Data source: UNSD - SDG 8.4.1 SDG 12.2.1
Date of data extraction: 9/09/2023
Link: https://unstats.un.org/sdgs/dataportal/database
Link to metadata: https://unstats.un.org/sdgs/metadata/files/Metadata-08-04-01.pdf
https://unstats.un.org/sdgs/metadata/files/Metadata-12-02-01.pdf
Serie: 2000-2019
Unit: Tonnes
Data providers: National Statistical Offices
Data compilers: UNEP, OECD and EUROSTAT.

Definitions, concepts and calculation *(according to United Nations methodology):*

"Material Footprint (MF) is the attribution of global material extraction to domestic final demand of a country. The total material footprint is the sum of the material footprint for biomass, fossil fuels, metal ores and non-metallic minerals" (UNSD 2023d).

"Material footprint of consumption reports the amount of primary materials required to serve final demand of a country and can be interpreted as an indicator of the material standard of living/level of capitalization of an economy" (UNSD 2023d).

Material footprint by type of raw material (tonnes) is calculated as:

MF= DE+ RMEIM – RMEEX

Where:

MF – material footprint;
DE – domestic extraction of materials;
RMEIM – raw material equivalent of imports;
RMEEX – raw material equivalents of exports

"Domestic Material Consumption (DMC) and Material Footprint (MF) need to be looked at in combination, as they cover the two aspects of the economy, production and consumption. The DMC reports the actual amount of material in an economy, MF the virtual amount required across the whole supply chain to service final demand. A country can, for instance, have a very high DMC because it has a large primary production sector for export or a very low DMC because it has outsourced most of the material intensive industrial process to other countries. The material footprint corrects for both phenomena" (UNSD 2023d).

4. Production-based material intensity (Domestic Material Consumption DMC /GDP)

Data source: UNSD - SDG 8.4.2 SDG 12.2.2
Date of data extraction: 10/09/2023
Link: https://unstats.un.org/sdgs/dataportal/database
Link to metadata: https://unstats.un.org/sdgs/metadata/files/Metadata-08-04-02.pdf
https://unstats.un.org/sdgs/metadata/files/Metadata-12-02-02.pdf
Serie: 2000-2019
Unit: Kilograms per constant 2015 United States dollars
Data providers: National Statistical Offices
Data compilers: UNEP, OECD and EUROSTAT.

Definition, concepts and calculation *(according to United Nations methodology)*:

"Domestic Material Consumption (DMC) is a standard material flow accounting (MFA) indicator and reports the apparent consumption of materials in a national economy" (UNSD 2023d).

"DMC measures the amount of materials that are used in economic processes. It does not include materials that are mobilized for the process of domestic extraction but do not enter the economic process. It measures the total amount of material (biomass, fossil fuels, metal ores and non-metallic minerals) directly used in an economy and based on accounts of direct material flows, i.e., domestic material extraction and physical imports and exports" (UNSD 2023d).

"Domestic Material Consumption (DMC) reports the amount of materials that are used in a national economy. It is a territorial (production-side) indicator. DMC also presents the amount of material that needs to be handled within an economy, which is either added to material stocks of buildings and transport infrastructure or used to fuel the economy as material throughput. It describes the physical dimension of economic processes and interactions. It can also be interpreted as long-term waste equivalent" (UNSD 2023d).

Domestic Material Consumption (DMC) is calculated as:

DMC =DE + IM - EX,

Where:

DMC – domestic material consumption;
DE – domestic extraction of materials;
IM – direct imports;
EX – direct exports

Domestic material consumption per unit of GDP is calculated as:

DMC per GDP = DMC / GDP in constant 2015 United States Dollars

As per the Joint UNECE/OECD Guidelines for measuring circular economy part A: conceptual framework, statistical framework and indicators, the core indicator is **material productivity** and it can be calculated as:

Material productivity = GDP in constant 2015 United States Dollars / DMC = 1 / Material intensity

5. Production-based material intensity by raw material (Domestic Material Consumption by raw material/GDP) DMC by raw material/ GDP

Data source: UNSD - SDG 8.4.2 SDG 12.2.2
Date of data extraction: 10/09/2023
Link: https://unstats.un.org/sdgs/dataportal/database
Link to metadata: https://unstats.un.org/sdgs/metadata/files/Metadata-08-04-02.pdf
https://unstats.un.org/sdgs/metadata/files/Metadata-12-02-02.pdf
Serie: 2000-2019
Unit: Kilograms per constant 2015 United States dollars
Data providers: National Statistical Offices
Data compilers: UNEP, OECD and EUROSTAT.

Definition, concepts and calculation ***(according to United Nations methodology):***

"Domestic Material Consumption (DMC) is a standard material flow accounting (MFA) indicator and reports the apparent consumption of materials in a national economy" (UNSD 2023d).

"DMC measures the amount of materials that are used in economic processes. It does not include materials that are mobilized for the process of domestic extraction but do not enter the economic process. It measures the total amount of material (biomass, fossil fuels, metal ores and non-metallic minerals) directly used in an economy and based on accounts of direct material flows, i.e., domestic material extraction and physical imports and exports" (UNSD 2023d).

"Domestic Material Consumption (DMC) reports the amount of materials that are used in a national economy. It is a territorial (production-side) indicator. DMC also presents the amount of material that needs to be handled within an economy, which is either added to material stocks of buildings and transport infrastructure or used to fuel the economy as material throughput. It describes the physical dimension of economic processes and interactions. It can also be interpreted as long-term waste equivalent" (UNSD 2023d).

Domestic Material Consumption (DMC) is calculated as:

DMC =DE + IM - EX

Where:

DMC – domestic material consumption;
DE – domestic extraction of materials;
IM – direct imports;
EX – direct exports

The categories used to calculate DMC by type of raw materials for SDG 8.4.2 and 12.2.2 are (UNSD 2023d):

ALP	Total or no breakdown
BIM	Biomass
COL	Coal
CPR	Crop residues
CRO	Crops
FEO	Ferrous ores
FOF	Fossil fuels
GAS	Natural gas
GBO	Grazed biomass and fodder crops
MEO	Metal ores
NFO	Non-ferrous ores
NMA	Non-metallic minerals: industrial or agricultural dominant
NMC	Non-metallic minerals: construction dominant
NMM	Non-metallic minerals
ONT	Oil shale and tar sands
PET	Petroleum
WCH	Wild catch and harvest
WOD	Wood

Domestic material consumption by raw material per unit of GDP is calculated as:

DMC by raw material per GDP = DMC by raw material / GDP in constant 2015 United States Dollars

As per the Joint UNECE/OECD Guidelines for measuring circular economy part A: conceptual framework, statistical framework and indicators, the core indicator is material productivity by raw material and it can be calculated as:

Material productivity by raw material = GDP in constant 2015 United States Dollars/ DMC by raw material = 1 / Material intensity by raw material

6. Demand-based raw material intensity (RMP/GDP)

According to the Joint UNECE/OECD report "Guidelines for measuring circular economy part A: conceptual framework, statistical framework and indicators", in the absence of reliable data on net or gross national income, GDP can be used as a proxy for calculating the demand-based indicator.

Data source: UNSD - SDG 8.4.1 SDG 12.2.1
Date of data extraction: 12/09/2023)
Link: https://unstats.un.org/sdgs/dataportal/database
Link to metadata: https://unstats.un.org/sdgs/metadata/files/Metadata-08-04-01.pdf
https://unstats.un.org/sdgs/metadata/files/Metadata-12-02-01.pdf
Serie: 2000-2019
Unit: Kilograms per constant 2015 United States dollars
Data providers: National Statistical Offices
Data compilers: UNEP, OECD and EUROSTAT.

Definition, concepts and calculation *(according to United Nations methodology):*

"Material Footprint (MF) is the attribution of global material extraction to domestic final demand of a country. The total material footprint is the sum of the material footprint for biomass, fossil fuels, metal ores and non-metallic minerals" (UNSD 2023d).

"Material footprint of consumption reports the amount of primary materials required to serve final demand of a country and can be interpreted as an indicator of the material standard of living/level of capitalization of an economy" (UNSD 2023d).

Material footprint by type of raw material (tonnes) is calculated as:

MF= DE+ RMEIM – RMEEX

Where:

MF – material footprint;
DE – domestic extraction of materials;
RMEIM – raw material equivalent of imports;
RMEEX – raw material equivalents of exports

Material footprint per unit of GDP is calculated as:

MF per GDP = MF / GDP in constant 2015 United States Dollars

As per the Joint UNECE/OECD Guidelines for measuring circular economy part A: conceptual framework, statistical framework and indicators, the core indicator is raw material productivity and it can be calculated as:

Raw material productivity = GDP in constant 2015 United States Dollars / Material footprint = 1 / Raw material intensity

7. Total waste generation

Data source: UNSD – SDG 12.4.2
Date of data extraction: 14/12/2023
Link: https://unstats.un.org/sdgs/dataportal/database
Link to metadata: https://unstats.un.org/sdgs/metadata/files/Metadata-12-04-02.pdf
A full methodology for this indicator is available in the document "Global Chemicals and Waste Indicator Review Document" (UNEP, 2021) https://www.unep.org/resources/publication/global-chemicals-and-waste-indicator-review-document
Serie: 2000-2021
Unit: Tonnes
Data providers: National Statistical Systems and relevant ministries.
Data compilers: UNSD, UNEP, OECD and EUROSTAT.

Definition and concepts *(according to United Nations methodology):*

"**Total waste generated** is the total amount of waste (both hazardous and non-hazardous) generated in the country during the year" (UNSD 2023d).

8. Total waste generation by sector

Data source: UNSD – SDG 12.4.2
Date of data extraction: 14/12/2023
Link: https://unstats.un.org/sdgs/dataportal/database
Link to metadata: https://unstats.un.org/sdgs/metadata/files/Metadata-12-04-02.pdf
A full methodology for this indicator is available in the document "Global Chemicals and Waste Indicator Review Document" (UNEP, 2021) https://www.unep.org/resources/publication/global-chemicals-and-waste-indicator-review-document
Serie: 2000-2021
Unit: Tonnes
Data providers: National Statistical Systems and relevant ministries.
Data compilers: UNSD, UNEP, OECD and EUROSTAT.

Definition and concepts *(according to United Nations methodology):*

"**Total waste generated** is the total amount of waste (both hazardous and non-hazardous) generated in the country during the year" (UNSD 2023d).

Disaggregation by sectors: Sectorial disaggregated data are provided to show the respective contribution of the different sectors to waste generation, and therefore the relative importance of actions needed to contain waste generation in the different sectors.

Sectors are defined following the International Standard Industrial Classification of All Economic Activities (ISIC), Rev.4. coding:

ISIC4_A	Agriculture, forestry and fishing
ISIC4_B	Mining and quarrying
ISIC_C	Manufacturing
ISIC_D	Electricity, gas, steam and air conditioning supply
ISIC_F	Construction
ISIC4_S	Other service activities
ISIC4_T	Activities of households as employers, undifferentiated goods- and services-producing activities of households for own use.

9. Municipal waste generation

Data source: UNSD – SDG 12.4.2
Date of data extraction: 14/12/2023
Link: https://unstats.un.org/sdgs/dataportal/database
Link to metadata: https://unstats.un.org/sdgs/metadata/files/Metadata-12-04-02.pdf
A full methodology for this indicator is available in the document "Global Chemicals and Waste Indicator Review Document" (UNEP, 2021) https://www.unep.org/resources/publication/global-chemicals-and-waste-indicator-review-document
Serie: 2000-2021
Unit: Tonnes
Data providers: National Statistical Systems and relevant ministries.
Data compilers: UNSD, UNEP, OECD and EUROSTAT.

Definition and concepts *(according to United Nations methodology):*

"**Municipal waste or municipal solid waste (MSW)** includes waste originating from households, commerce, commerce and trade, small businesses, office buildings and institutions (schools, hospitals, government buildings). It also includes bulky waste (e.g. waste from parks and gardens maintenance, waste from stress cleaning services (street sweepings, litter containers content, market cleansing waste), if managed as waste" (UNSD 2023d).

10. Circular material use rate

Data source: Eurostat
Date of data extraction: 17/10/2023
Link: https://ec.europa.eu/eurostat/databrowser/view/cei_srm030/default/table?lang=en
Link to metadata: https://ec.europa.eu/eurostat/cache/metadata/en/cei_srm030_esmsip2.htm
Serie: 2010-2021
Unit: Percentage (%)
Data providers: National institutions.
Data compilers: Eurostat

Definitions, concepts and calculation *(according to Eurostat methodology):*

"**The circular material use rate**, also called 'Circularity rate', measures in percentage the share of material recycled and fed back into the economy - thus saving extraction of primary raw materials - in overall material use. The Circularity rate is thus defined as the ratio of the circular use of materials (U) to the overall material use (M)" (Eurostat 2023b).

"**The overall material use** is measured by summing up the aggregate domestic material consumption (DMC) and the circular use of materials (M = DMC + U)" (Eurostat 2023b).

"**Waste recycled in domestic recovery plants** comprises the recovery operations R2 to R11 as defined in the Waste Framework Directive 2008/98/EC" (Eurostat 2023b).

"**The circular use of materials** is approximated by the amount of waste recycled in domestic recovery plants (RCV_R), minus imported waste destined for recycling (IMPw), plus exported waste destined for recycling abroad (EXPw)" (Eurostat 2023b).

The circular material use rate is calculated as follows:

$$CMU = \frac{U}{M} = \frac{(RCV\_R - IMP_w + EXP_w)}{DMC + (RCV\_R - IMP_w + EXP_w)}$$

Where:

CMU: Circular Material Use rate
U: use of materials
M: Overall material use
RCV_R: amount of waste recycled in domestic recovery plants
IMPw: amount of imported waste bound for recycling
EXPw: amount of exported waste bound for recycling
DMC: Domestic Material Consumption

11. Recycling rate of all waste excluding major mineral waste

Data source: Eurostat
Date of data extraction: 19/10/2023
Link: https://ec.europa.eu/eurostat/databrowser/view/cei_wm010/default/table?lang=en
Link to metadata: https://ec.europa.eu/eurostat/cache/metadata/en/cei_wm010_esmsip2.htm
Serie: 2010-2020
Unit: Percentage (%)
Data providers: European Statistical System (ESS)
Data compilers: Eurostat

Definitions, concepts and calculation *(according to Eurostat's methodology):*

"**Recycled waste** is waste treated, which was sent to recovery operation other than energy recovery and backfilling (for simplification referred to as recycling)" (Eurostat 2023b).

"**Waste excluding major mineral waste** covers both hazardous (hz) and non-hazardous (nh) waste from all economic sectors and from households, including waste from waste treatment (secondary waste) but excluding most mineral waste. Major mineral waste is excluded in order to avoid situations where trends in ordinary waste generation can be drowned out by massive fluctuations in the generation of wastes in the mineral extraction and transformation sector. This also permits more meaningful comparison across countries, as mineral waste accounts for very substantial quantities in countries characterized by major mining and construction sectors" (Eurostat 2023b).

"**Recycling rate of all waste** includes waste treated in domestic plants plus waste sent out of the country for recycling minus waste imported and treated in domestic recycling plants. The indicator reflects the treatment of national waste, no matter where it takes place, and it excludes the waste that is imported" (Eurostat 2023b).

Recycling rate of all waste excluding major mineral waste is calculated as follows:

Recycling rate = (RCV_R / TRT) × 100

Where:

RCV_R: Recycled waste
TRT: Total waste treated excluding major mineral waste

12. Municipal waste recycling rate

Data source: UNSD – SDG 12.5.1
Date of data extraction: 14/09/2023)
Link: https://unstats.un.org/sdgs/dataportal/database
Link to metadata: https://unstats.un.org/sdgs/metadata/files/Metadata-12-05-01.pdf
Serie: 2000-2021
Unit: Percentage (%)
Data providers: National Statistical Systems and relevant ministries.
Data compilers: UNSD, UNEP, OECD and Eurostat.

Definitions, concepts and calculation *(according to United Nations methodology):*

Municipal waste recycling rate can be defined as the quantity of municipal waste recycled in the country plus quantities of municipal waste exported for recycling minus municipal waste imported intended for recycling out of total municipal waste generated in the country. Note that recycling includes codigestion/anaerobic digestion and composting/aerobic process, but not controlled combustion (incineration) or land application.

"**Recycling** is defined under the UNSD/UNEP Questionnaire on Environment Statistics and further for the purpose of these indicators as "Any reprocessing of waste material […] that diverts it from the waste stream, except reuse as fuel. Both reprocessing as the same type of product, and for different purposes should be included. Recycling within industrial plants i.e., at the place of generation should be excluded." For the purpose of consistency with the Basel Convention reporting and correspondence with EUROSTAT reporting system, Recovery operations R2 to R12 listed in Basel Convention Annex IV, are to be considered as 'Recycling' under the UNSD reporting for hazardous waste. Total waste generated is the total amount of waste (both hazardous and non-hazardous) generated in the country during the year" (UNSD 2023d).

"**Municipal Solid Waste (MSW)** includes waste originating from households, commerce and trade, small businesses, office buildings and institutions (schools, hospitals, government buildings). It also includes bulky waste (e.g., old furniture, mattresses) and waste from selected municipal services, e.g., waste from park and garden maintenance, waste from street cleaning services (street sweepings, the content of litter containers, market cleansing waste), if managed as waste" (UNSD 2023d).

Municipal waste recycling rate = (Municipal waste recycled + Municipal waste exported intended for recycling – Municipal waste imported intended for recycling) x 100

13. Waste (excluding major mineral waste) going to landfill final disposal (D1, D5, D12)

Data source: Eurostat
Date of data extraction: 5/10/2023
Link: https://ec.europa.eu/eurostat/databrowser/view/env_wasoper/default/table?lang=en
Link to metadata: https://ec.europa.eu/eurostat/cache/metadata/en/env_wasoper_esms.htm
Serie: 2010-2020
Unit: Tonnes
Data providers: National institutions
Data compilers: National institutions

Definitions, concepts and calculation *(according to Eurostat's methodology):*

Waste (excluding major mineral waste) going to landfill final disposal is an indicator that aims at showing how much of a country's own waste (in the following referred to as national waste) excluding major mineral waste is actually landfilled. This means that the indicator should reflect the treatment of national waste, no matter where it takes place, and it should exclude the waste imported.

Waste (excluding major mineral waste) includes "hazardous (hz) and non-hazardous (nh) waste from all economic sectors and from households, including waste from waste treatment (secondary waste) but excluding major mineral wastes and waste going into pre-treatment activities (like sorting, drying). It covers only waste from final treatment.

The indicator covers all wastes except the following waste categories:

- Mineral waste from construction and demolition (EWC-Stat 12.1)
- Other mineral wastes (12.2, 12.3, 12.5)
- Soils (12.6)
- Dredging spoils (12.7)" (Eurostat, 2023b).

"**Waste** is any substance or object which the holder discards or intends or is required to discard" (Eurostat 2023b).

Disposal – landfill (D1, D5, D12) is a category of waste management according to the Directive 2008/98/EC on waste.

14. Waste (excluding major mineral waste) going to incineration without energy recovery (D10)

Data source: Eurostat
Date of data extraction: 5/10/2023
Link: https://ec.europa.eu/eurostat/databrowser/view/env_wasoper/default/table?lang=en
Link to metadata: https://ec.europa.eu/eurostat/cache/metadata/en/env_wasoper_esms.htm
Serie: 2010-2020
Unit: Tonnes
Data providers: National institutions
Data compilers: National institutions

Definitions, concepts and calculation *(according to Eurostat's methodology):*

Waste (excluding major mineral waste) going to incineration without energy recovery is an indicator that aims at showing how much of a country's own waste (in the following referred to as **national waste**) excluding major mineral waste is actually incinerated without energy recovery. This means that the indicator should reflect the treatment of national waste, no matter where it takes place, and it should exclude the waste imported.

Waste (excluding major mineral waste) includes "hazardous (hz) and non-hazardous (nh) waste from all economic sectors and from households, including waste from waste treatment (secondary waste) but excluding major mineral wastes and waste going into pre-treatment activities (like sorting, drying). It covers only waste from final treatment.

The indicator covers all wastes except the following waste categories:

- Mineral waste from construction and demolition (EWC-Stat 12.1)
- Other mineral wastes (12.2,12.3, 12.5)
- Soils (12.6)
- Dredging spoils (12.7)" (Eurostat, 2023b).

"**Waste** is any substance or object which the holder discards or intends or is required to discard" (Eurostat 2023b).

Disposal - incineration (D10) without energy recovery is a category of waste management according to the Directive 2008/98/EC on waste.

15. Water stress: Intensity of use of renewable freshwater resources (abstraction over available renewable stocks)

Data source: UNSD – SDG 6.4.2
Date of data extraction 13/09/2023
Link: https://unstats.un.org/sdgs/dataportal/database
Link to metadata: https://unstats.un.org/sdgs/metadata/files/Metadata-06-04-02.pdf
Serie: 2000-2020
Unit: Percentage (%)
Data providers: Data originate from governmental sources. The institutions responsible for data collection at national level vary according to countries. However, in general data for this indicator are provided by the Ministry of Agriculture, Ministry of Water, Ministry of Environment, and other line Ministries. In many cases, data collection at country level is coordinated by the National Statistics Office (NSO).
Data compilers: National institutions

Definitions, concepts and calculation *(according to United Nations methodology):*

"**The level of water stress or freshwater withdrawal as a proportion of available freshwater resources** is the ratio between total freshwater withdrawn by all major sectors and total renewable freshwater resources, after taking into account environmental flow requirements. Main sectors, as defined by ISIC standards, include agriculture; forestry and fishing; manufacturing; electricity industry; and services. This indicator is also known as water withdrawal intensity.

This indicator provides an estimate of pressure by all sectors on the country's renewable freshwater resources. A low level of water stress indicates a situation where the combined withdrawal by all sectors is marginal in relation to the resources and has therefore little potential impact on the sustainability of the resources or on the potential competition between users. A high level of water stress indicates a situation where the combined withdrawal by all sectors represents a substantial share of the total renewable freshwater resources, with potentially larger impacts on the sustainability of the resources and potential situations of conflicts and competition between users" (UNSD 2023d).

"**Total renewable freshwater resources (TRWR)** are expressed as the sum of internal and external renewable water resources. The terms "water resources" and "water withdrawal" are understood as freshwater resources and freshwater withdrawal" (UNSD 2023d).

"**Internal renewable water resources** are defined as the long-term average annual flow of rivers and recharge of groundwater for a given country generated from endogenous precipitation" (UNSD 2023d).

"**External renewable water resources** refer to the flows of water entering the country, taking into consideration the quantity of flows reserved to upstream and downstream countries through agreements or treaties" (UNSD 2023d).

"**Total freshwater withdrawal (TFWW)** is the volume of freshwater extracted from its source (rivers, lakes, aquifers) for agriculture, industries and services. It is estimated at the country level for the following three main sectors: agriculture, services (including domestic water withdrawal) and industries (including cooling of thermoelectric plants). Freshwater withdrawal includes fossil groundwater. It does not include non-conventional water, i.e. direct use of treated wastewater, direct use of agricultural drainage water and desalinated water" (UNSD 2023d).

"**Environmental flow requirements (EFR)** are defined as the quantity and timing of freshwater flows and levels necessary to sustain aquatic ecosystems, which, in turn, support human cultures, economies, sustainable livelihoods, and wellbeing. Water quality and also the resulting ecosystem services are excluded from this formulation which is confined to water volumes. This does not imply that quality and the support to societies which are dependent on environmental flows are not important and should not be taken care of. Methods of computation of EFR are extremely variable and range from global estimates to comprehensive assessments for river reaches. For the purpose of the SDG indicator, water volumes can be expressed in the same units as the TFWW, and then as percentages of the available water resources" (UNSD 2023d).

The indicator is computed as follows:

Stress (%) = TFWW/(TRWR – EFR) X 100

Where:

TFWW: total freshwater withdrawn
TRWR: total renewable freshwater resources
EFR: environmental flow requirements

To interpret the values of this indicator, four categories are used to identify the levels of stress severity:

NO STRESS <25%
LOW 25% - 50%
MEDIUM 50% - 75%
HIGH 75-100%
CRITICAL >100%

16. Water stress by sectors

Data source: UNSD SDG 6.4.2
Date of data extraction 16/10/2023
Link: https://unstats.un.org/sdgs/dataportal/database
Link to metadata: https://unstats.un.org/sdgs/metadata/files/Metadata-06-04-02.pdf
Serie: 2000-2020
Unit: Percentage (%)
Data providers: Data come from governmental sources. The institutions responsible for data collection at national level vary according to countries. However, in general data for this indicator are provided by the Ministry of Agriculture, Ministry of Water, Ministry of Environment, and other line Ministries. In many cases, data collection at country level is coordinated by the National Statistics Office (NSO).
Data compilers: National institutions.

Definitions, concepts and calculation *(according to United Nations methodology):*

"**The level of water stress or freshwater withdrawal as a proportion of available freshwater resources** is the ratio between total freshwater withdrawn by all major sectors and total renewable freshwater resources, after taking into account environmental flow requirements. Main sectors, as defined by ISIC standards, include agriculture; forestry and fishing; manufacturing; electricity industry; and services. This indicator is also known as water withdrawal intensity.

This indicator provides an estimate of pressure by all sectors on the country's renewable freshwater resources. A low level of water stress indicates a situation where the combined withdrawal by all sectors is marginal in relation to the resources and has therefore little potential impact on the sustainability of the resources or on the potential competition between users. A high level of water stress indicates a situation where the combined withdrawal by all sectors represents a substantial share of the total renewable freshwater resources, with potentially larger impacts on the sustainability of the resources and potential situations of conflicts and competition between users" (UNSD 2023d).

"**Total renewable freshwater resources (TRWR)** are expressed as the sum of internal and external renewable water resources. The terms "water resources" and "water withdrawal" are understood as freshwater resources and freshwater withdrawal" (UNSD 2023d).

"**Internal renewable water resources** are defined as the long-term average annual flow of rivers and recharge of groundwater for a given country generated from endogenous precipitation" (UNSD 2023d).

"**External renewable water resources** refer to the flows of water entering the country, taking into consideration the quantity of flows reserved to upstream and downstream countries through agreements or treaties" (UNSD 2023d).

"**Total freshwater withdrawal (TFWW)** is the volume of freshwater extracted from its source (rivers, lakes, aquifers) for agriculture, industries and services. It is estimated at the country level for the following three main sectors: agriculture, services (including domestic water withdrawal) and industries (including cooling of thermoelectric plants). Freshwater withdrawal includes fossil groundwater. It does not include non-conventional water, i.e. direct use of treated wastewater, direct use of agricultural drainage water and desalinated water" (UNSD 2023d).

"**Environmental flow requirements (EFR)** are defined as the quantity and timing of freshwater flows and levels necessary to sustain aquatic ecosystems, which, in turn, support human cultures, economies, sustainable livelihoods, and wellbeing. Water quality and also the resulting ecosystem services are excluded from this formulation which is confined to water volumes. This does not imply that quality and the support to societies which are dependent on environmental flows are not important and should not be taken care of. Methods of computation of EFR are extremely variable and range from global estimates to comprehensive assessments for river reaches. For the purpose of the SDG indicator, water volumes can be expressed in the same units as the TFWW, and then as percentages of the available water resources" (UNSD 2023d).

"**Disaggregation by sectors:** Sectorial disaggregated data are provided to show the respective contribution of the different sectors to the water stress level, and therefore the relative importance of actions needed to contain water demand in the different sectors (agriculture, services and industry). The contribution of the different sectors to the water stress level is calculated as the proportion of sectoral withdrawals over total freshwater withdrawals, after taking into account the EFR.

Sectors are defined following the United Nations International Standard Industrial Classification of All Economic Activities ISIC 4 coding:

Agriculture, forestry and fishing (ISIC4. A01 A0210 A0322)
Industries
Services (G to T)" (UNSD 2023d).

The indicator is computed as follows:

Stress (%) = TFWW/(TRWR – EFR) X 100

Where:

TFWW: total freshwater withdrawn
TRWR: total renewable freshwater resources
EFR: environmental flow requirements

To interpret the values of this indicator, four categories are used to identify the levels of stress severity:

NO STRESS <25%
LOW 25% - 50%
MEDIUM 50% - 75%
HIGH 75-100%
CRITICAL >100%

17. Total GHG emissions

Data source: The World Bank
Date of data extraction 20/09/2023
Link to data and metadata: https://data.worldbank.org/indicator/EN.ATM.GHGT.KT.CE
Serie: 2000-2020
Unit: Kilo-tonnes CO_2 equivalent

Definitions, concepts and calculation *(according to The World Bank methodology):*

"**Total greenhouse gas emissions** in kt of CO_2 equivalent are composed of CO_2 totals excluding short-cycle biomass burning (such as agricultural waste burning and savanna burning) but including other biomass burning (such as forest fires, post-burn decay, peat fires and decay of drained peatlands), all anthropogenic CH_4 sources, N_2O sources and F-gases (HFCs, PFCs and SF6)" (WB 2023).

"Conversion factors: The GHG totals are expressed in CO_2 equivalent using the GWP100 metric of the Second Assessment Report of IPCC and include CO_2 (GWP100=1), CH_4 (GWP100=21), N_2O (GWP100=310) and F-gases (c-C_4F_8 GWP=8700, C_2F_6 GWP=9200, C_3F_8 GWP=7000, C_4F_{80} GWP=7000, C_5F_{12} GWP=7500, C_6F_{14} GWP=7400, C_7F_{16} GWP=7820, CF_4 GWP=6500, HFC-125 GWP=2800, HFC-134a GWP=1300, HFC-143a GWP=3800, HFC-152a GWP=140, HFC-227ea GWP=2900, HFC-23 GWP=11700, HFC-236fa GWP=6300, HFC-245fa GWP=858, HFC-32 GWP=650, HFC-365mfc GWP=804, HFH-43-10-mee GWP=1300, SF6 GWP=23900)" (WB 2023).

18. Industrial discharges to water bodies

Data source: OECD – "Water: wastewater generation and discharge". OECD Environment Statistics (database)
Date of data extraction 5/10/2023
Link to data and metadata: https://doi.org/10.1787/1771e2b8-en
Serie: 2000 - 2021
Unit: Million m^3/year
Data providers: National institutions
Data compilers: National institutions

Definitions, concepts and calculation *(according to OECD methodology)*:

"**Wastewater:** water which is of no further immediate value to the purpose for which it was used or in the pursuit of which it was produced because of its quality, quantity or time of occurrence. However, wastewater from one user can be a potential supply to a user elsewhere. Cooling water is not considered to be wastewater for purposes of this questionnaire" (Eurostat 2021).

"**Industrial (process) wastewater:** Water discharged after being used in, or produced by, industrial production processes and which is of no further immediate value to these processes. Where process water recycling systems have been installed, process wastewater is the final discharge from these circuits. To meet quality standards for eventual discharge into public sewers, this process wastewater is understood to be subjected to ex-process in-plant treatment. Cooling water is not considered to be process wastewater for purposes of this questionnaire. Sanitary wastewater and surface runoff from industries are also excluded here" (Eurostat 2021).

"**Wastewater discharge:** The amount of water (in m^3) or substance (in kg BOD/d or comparable) added/leached to a (fresh or non-fresh) water body from a point or a non-point source" (Eurostat 2021).

19. Agricultural discharges to water bodies

Data source: OECD – "Water: wastewater generation and discharge". OECD Environment Statistics (database)
Date of data extraction 19/10/2023
Link to data and metadata: https://doi.org/10.1787/1771e2b8-en
Serie: 2000 - 2021
Unit: Million m^3/year
Data providers: National institutions
Data compilers: National institutions

Definitions, concepts and calculation *(according to OECD methodology)*:

"**Wastewater:** water which is of no further immediate value to the purpose for which it was used or in the pursuit of which it was produced because of its quality, quantity or time of occurrence. However, wastewater from one user can be a potential supply to a user elsewhere. Cooling water is not considered to be wastewater for purposes of this questionnaire" (Eurostat 2021).

"**Wastewater discharge:** The amount of water (in m^3) or substance (in kg BOD/d or comparable) added/leached to a (fresh or non-fresh) water body from a point or a non-point source" (Eurostat 2021).

"**Agricultural sector** (ISIC 01-03) covers crop and animal production, hunting and related service activities; forestry and logging; and fishing and aquaculture. Wastewater generated from these activities for the most part enters the environment as non-point pollution" (UNSD 2023d).

20. Industrial BOD discharged to water bodies

Data source: OECD – "Water: wastewater generation and discharge". OECD Environment Statistics (database)

Date of data extraction 5/10/2023
Link to data and metadata: https://doi.org/10.1787/1771e2b8-en
Serie: 2005 - 2021
Unit: 1000 Kg O_2/day
Data providers: National institutions
Data compilers: National institutions

Definitions, concepts and calculation *(according to OECD methodology)*:

"**Wastewater:** water which is of no further immediate value to the purpose for which it was used or in the pursuit of which it was produced because of its quality, quantity or time of occurrence. However, wastewater from one user can be a potential supply to a user elsewhere. Cooling water is not considered to be wastewater for purposes of this questionnaire" (Eurostat 2021).

"**Industrial (process) wastewater:** Water discharged after being used in, or produced by, industrial production processes and which is of no further immediate value to these processes. Where process water recycling systems have been installed, process wastewater is the final discharge from these circuits. To meet quality standards for eventual discharge into public sewers, this process wastewater is understood to be subjected to ex-process in-plant treatment. Cooling water is not considered to be process wastewater for purposes of this questionnaire. Sanitary wastewater and surface runoff from industries are also excluded here" (Eurostat 2021).

"**Wastewater discharge:** The amount of water (in m^3) or substance (in kg BOD/d or comparable) added/leached to a (fresh or non-fresh) water body from a point or a non-point source" (Eurostat 2021).

"**BOD** measures the amount of oxygen required or consumed for the microbiological decomposition (oxidation) of organic material in water. BOD is an index of the degree of organic pollution in water. It should be measured as the oxygen consumed in 5 days at a constant temperature of 20°C in the dark, which is commonly referred to as BOD5" (Eurostat 2014).

21. Industrial COD discharged to water bodies

Data source: OECD – "Water: wastewater generation and discharge". OECD Environment Statistics (database)
Date of data extraction 5/10/2023
Link to data and metadata: https://doi.org/10.1787/1771e2b8-en
Serie: 2005 - 2020
Unit: 1000 Kg O_2/day
Data providers: National institutions
Data compilers: National institutions

Definitions, concepts and calculation *(according to OECD methodology):*

"**Wastewater:** water which is of no further immediate value to the purpose for which it was used or in the pursuit of which it was produced because of its quality, quantity or time of occurrence. However, wastewater from one user can be a potential supply to a user elsewhere. Cooling water is not considered to be wastewater for purposes of this questionnaire" (Eurostat 2021).

"**Industrial (process) wastewater:** Water discharged after being used in, or produced by, industrial production processes and which is of no further immediate value to these processes. Where process water recycling systems have been installed, process wastewater is the final discharge from these circuits. To meet quality standards for eventual discharge into public sewers, this process wastewater is understood to be subjected to ex-process in-plant treatment. Cooling water is not considered to be process wastewater for purposes of this questionnaire. Sanitary wastewater and surface runoff from industries are also excluded here" (Eurostat 2021).

"**Wastewater discharge:** The amount of water (in m^3) or substance (in kg BOD/d or comparable) added/leached to a (fresh or non-fresh) water body from a point or a non-point source" (Eurostat 2021).

"**Chemical Oxygen Demand (COD):** The mass concentration of oxygen consumed under specific conditions by the chemical oxidation with bichromate of organic and/or inorganic matter in water" (Eurostat 2021).

22. Industrial N discharged to water bodies

Data source: OECD – "Water: wastewater generation and discharge". OECD Environment Statistics (database)
Date of data extraction 5/10/2023
Link to data and metadata: https://doi.org/10.1787/1771e2b8-en
Serie: 2010 - 2020
Unit: 1000 Kg/day
Data providers: National institutions
Data compilers: National institutions

Definitions, concepts and calculation *(according to OECD methodology):*

"**Wastewater:** water which is of no further immediate value to the purpose for which it was used or in the pursuit of which it was produced because of its quality, quantity or time of occurrence. However, wastewater from one user can be a potential supply to a user elsewhere. Cooling water is not considered to be wastewater for purposes of this questionnaire" (Eurostat 2021).

"**Industrial (process) wastewater:** Water discharged after being used in, or produced by, industrial production processes and which is of no further immediate value to these processes. Where process water recycling systems have been installed, process wastewater is the final discharge from these circuits. To meet quality standards for eventual discharge into public sewers, this process wastewater is understood to be subjected to ex-process in-plant treatment. Cooling water is not considered to be process wastewater for purposes of this questionnaire. Sanitary wastewater and surface runoff from industries are also excluded here" (Eurostat 2021).

"**Wastewater discharge:** The amount of water (in m^3) or substance (in kg BOD/d or comparable) added/leached to a (fresh or non-fresh) water body from a point or a non-point source" (Eurostat 2021).

"**Nutrients** are the substances that organisms (i.e., plants and animals) need to grow and survive. However, too many nutrients can have serious impacts on human health and may lead to rapid plant growth and the depletion of oxygen and life in water (e.g., algal blooms, red tides). Key nutrients include nitrogen, phosphorus and potassium" (UNDESA 2012).

"**Nitrogen** occurs in several compounds, e.g., ammonia, ammonium, nitrite or nitrate, depending on such factors as acidity, temperature and oxygen concentration" (UNDESA 2012).

23. Industrial P discharged to water bodies

Data source: OECD – "Water: wastewater generation and discharge". OECD Environment Statistics (database)
Date of data extraction 5/10/2023
Link to data and metadata: https://doi.org/10.1787/1771e2b8-en
Serie: 2010 - 2020
Unit: 1000 Kg/day
Data providers: National institutions
Data compilers: National institutions

Definitions, concepts and calculation *(according to OECD methodology):*

"**Wastewater:** water which is of no further immediate value to the purpose for which it was used or in the pursuit of which it was produced because of its quality, quantity or time of occurrence. However, wastewater from one user can be a potential supply to a user elsewhere. Cooling water is not considered to be wastewater for purposes of this questionnaire" (Eurostat 2021).

"**Industrial (process) wastewater:** Water discharged after being used in, or produced by, industrial production processes and which is of no further immediate value to these processes. Where process water recycling systems have been installed, process wastewater is the final discharge from these circuits. To meet quality standards for eventual discharge into public sewers, this process wastewater is understood to be subjected to ex-process in-plant treatment. Cooling water is not considered to be process wastewater for purposes of this questionnaire. Sanitary wastewater and surface runoff from industries are also excluded here" (Eurostat 2021).

"**Wastewater discharge:** The amount of water (in m^3) or substance (in kg BOD/d or comparable) added/leached to a (fresh or non-fresh) water body from a point or a non-point source" (Eurostat 2021).

"**Nutrients** are the substances that organisms (i.e., plants and animals) need to grow and survive. However, too many nutrients can have serious impacts on human health and may lead to rapid plant growth and the depletion of oxygen and life in water (e.g., algal blooms, red tides). Key nutrients include nitrogen, phosphorus and potassium" (UNDESA 2012).

"**Phosphorus** can be found in different compounds, e.g., orthophosphates, condensed phosphates and organically bound phosphorus" (UNDESA 2012).

24. Industrial SS discharged to water bodies

Data source: OECD – "Water: wastewater generation and discharge". OECD Environment Statistics (database)
Date of data extraction 5/10/2023
Link to data and metadata: https://doi.org/10.1787/1771e2b8-en
Serie: 2010 - 2020
Unit: 1000 Kg/day
Data providers: National institutions
Data compilers: National institutions

Definitions, concepts and calculation *(according to OECD methodology):*

"**Wastewater:** water which is of no further immediate value to the purpose for which it was used or in the pursuit of which it was produced because of its quality, quantity or time of occurrence. However, wastewater from one user can be a potential supply to a user elsewhere. Cooling water is not considered to be wastewater for purposes of this questionnaire" (Eurostat 2021).

"**Industrial (process) wastewater:** Water discharged after being used in, or produced by, industrial production processes and which is of no further immediate value to these processes. Where process water recycling systems have been installed, process wastewater is the final discharge from these circuits. To meet quality standards for eventual discharge into public sewers, this process wastewater is understood to be subjected to ex-process in-plant treatment. Cooling water is not considered to be process wastewater for purposes of this questionnaire. Sanitary wastewater and surface runoff from industries are also excluded here" (Eurostat 2021).

"**Wastewater discharge:** The amount of water (in m^3) or substance (in kg BOD/d or comparable) added/leached to a (fresh or non-fresh) water body from a point or a non-point source" (Eurostat 2021).

"**Suspended solids** are small particles of solid pollutants in water that contribute to turbidity and resist separation by water treatment. Suspended solids are usually measured in terms of total suspended solids, which are also referred to as total suspended non-filterable solids (i.e., they cannot be filtered out of water using a filter)" (UNDESA 2012).

25. Agricultural BOD discharged to water bodies

Data source: OECD – "Water: wastewater generation and discharge". OECD Environment Statistics (database)
Date of data extraction 5/10/2023
Link to data and metadata: https://doi.org/10.1787/1771e2b8-en
Serie: 2000 - 2021
Unit: 1000 Kg O_2/day
Data providers: National institutions
Data compilers: National institutions

Definitions, concepts and calculation *(according to OECD methodology):*

"**Wastewater:** water which is of no further immediate value to the purpose for which it was used or in the pursuit of which it was produced because of its quality, quantity or time of occurrence. However, wastewater from one user can be a potential supply to a user elsewhere. Cooling water is not considered to be wastewater for purposes of this questionnaire" (Eurostat 2021).

"**Wastewater discharge:** The amount of water (in m^3) or substance (in kg BOD/d or comparable) added/leached to a (fresh or non-fresh) water body from a point or a non-point source" (Eurostat 2021).

"**BOD** measures the amount of oxygen required or consumed for the microbiological decomposition (oxidation) of organic material in water. BOD is an index of the degree of organic pollution in water. It should be measured as the oxygen consumed in 5

days at a constant temperature of 20°C in the dark, which is commonly referred to as BOD5" (Eurostat 2021).

"**Agricultural sector** (ISIC 01-03) covers crop and animal production, hunting, and related service activities; forestry and logging; and fishing and aquaculture. Wastewater generated from these activities for the most part enters the environment as non-point pollution" (UNSD 2023d).

26 Agricultural COD discharged to water bodies

Data source: OECD – "Water: wastewater generation and discharge". OECD Environment Statistics (database)
Date of data extraction 5/10/2023
Link to data and metadata: https://doi.org/10.1787/1771e2b8-en
Serie: 2000 - 2021
Unit: 1000 Kg O_2/day
Data providers: National institutions
Data compilers: National institutions

Definitions, concepts and calculation *(according to OECD methodology):*

"**Wastewater:** water which is of no further immediate value to the purpose for which it was used or in the pursuit of which it was produced because of its quality, quantity or time of occurrence. However, wastewater from one user can be a potential supply to a user elsewhere. Cooling water is not considered to be wastewater for purposes of this questionnaire" (Eurostat 2021).

"**Wastewater discharge:** The amount of water (in m^3) or substance (in kg BOD/d or comparable) added/leached to a (fresh or non-fresh) water body from a point or a non-point source" (Eurostat 2021).

"**Chemical Oxygen Demand (COD):** The mass concentration of oxygen consumed under specific conditions by the chemical oxidation with bichromate of organic and/or inorganic matter in water" (Eurostat 2021).

"**Agricultural sector** (ISIC 01-03) covers crop and animal production, hunting, and related service activities; forestry and logging; and fishing and aquaculture. Wastewater generated from these activities for the most part enters the environment as non-point pollution" (UNSD 2023d).

27. Agricultural N discharged to water bodies

Data source: OECD – "Water: wastewater generation and discharge". OECD Environment Statistics (database)
Date of data extraction 5/10/2023
Link to data and metadata: https://doi.org/10.1787/1771e2b8-en
Serie: 2000 - 2021
Unit: 1000 Kg/day
Data providers: National institutions
Data compilers: National institutions

Definitions, concepts and calculation *(according to OECD methodology):*

"**Wastewater:** water which is of no further immediate value to the purpose for which it was used or in the pursuit of which it was produced because of its quality, quantity or time of occurrence. However, wastewater from one user can be a potential supply to a user elsewhere. Cooling water is not considered to be wastewater for purposes of this questionnaire" (Eurostat 2021).

"**Wastewater discharge:** The amount of water (in m^3) or substance (in kg BOD/d or comparable) added/leached to a (fresh or non-fresh) water body from a point or a non-point source" (Eurostat 2021).

"**Agricultural sector** (ISIC 01-03) covers crop and animal production, hunting, and related service activities; forestry and logging; and fishing and aquaculture. Wastewater generated from these activities for the most part enters the environment as non-point pollution" (UNSD 2023d).

"**Nutrients** are the substances that organisms (i.e., plants and animals) need to grow and survive. However, too many nutrients can have serious impacts on human health and may lead to rapid plant growth and the depletion of oxygen and life in water (e.g., algal blooms, red tides). Key nutrients include nitrogen, phosphorus, and potassium" (UNDESA 2012).

"**Nitrogen** occurs in several compounds, e.g., ammonia, ammonium, nitrite or nitrate, depending on such factors as acidity, temperature and oxygen concentration" (UNDESA 2012).

28. Agricultural P discharged to water bodies

Data source: OECD – "Water: wastewater generation and discharge". OECD Environment Statistics (database)
Date of data extraction 5/10/2023
Link to data and metadata: https://doi.org/10.1787/1771e2b8-en
Serie: 2000 - 2021
Unit: 1000 Kg/day
Data providers: National institutions
Data compilers: National institutions

Definitions, concepts and calculation *(according to OECD methodology):*

"**Wastewater:** water which is of no further immediate value to the purpose for which it was used or in the pursuit of which it was produced because of its quality, quantity or time of occurrence. However, wastewater from one user can be a potential supply to a user elsewhere. Cooling water is not considered to be wastewater for purposes of this questionnaire" (Eurostat 2021).

"**Wastewater discharge:** The amount of water (in m^3) or substance (in kg BOD/d or comparable) added/leached to a (fresh or non-fresh) water body from a point or a non-point source" (Eurostat 2021).

"**Agricultural sector** (ISIC 01-03) covers crop and animal production, hunting, and related service activities; forestry and logging; and fishing and aquaculture. Wastewater generated from these activities for the most part enters the environment as non-point pollution" (UNSD 2023d).

"**Nutrients** are the substances that organisms (i.e., plants and animals) need to grow and survive. However, too many nutrients can have serious impacts on human health and may lead to rapid plant growth and the depletion of oxygen and life in water (e.g., algal blooms, red tides). Key nutrients include nitrogen, phosphorus, and potassium" (UNDESA 2012).

"**Phosphorus** can be found in different compounds, e.g., orthophosphates, condensed phosphates and organically bound phosphorus" (UNDESA 2012).

29. Agricultural SS discharged to water bodies

Data source: OECD – "Water: wastewater generation and discharge". OECD Environment Statistics (database)
Date of data extraction 5/10/2023
Link to data and metadata: https://doi.org/10.1787/1771e2b8-en
Serie: 2000 - 2021
Unit: 1000 Kg/day
Data providers: National institutions
Data compilers: National institutions

Definitions, concepts and calculation *(according to OECD methodology):*

"**Wastewater:** water which is of no further immediate value to the purpose for which it was used or in the pursuit of which it was produced because of its quality, quantity or time of occurrence. However, wastewater from one user can be a potential supply to a user elsewhere. Cooling water is not considered to be wastewater for purposes of this questionnaire" (Eurostat 2021).

"**Wastewater discharge:** The amount of water (in m^3) or substance (in kg BOD/d or comparable) added/leached to a (fresh or non-fresh) water body from a point or a non-point source" (Eurostat 2021).

"**Agricultural sector** (ISIC 01-03) covers crop and animal production, hunting, and related service activities; forestry and logging; and fishing and aquaculture. Wastewater generated from these activities for the most part enters the environment as non-point pollution" (UNSD 2023d).

"**Suspended solids** are small particles of solid pollutants in water that contribute to turbidity and resist separation by water treatment. Suspended solids are usually measured in terms of total suspended solids, which are also referred to as total suspended non-filterable solids (i.e., they cannot be filtered out of water using a filter)" (UNDESA 2012).

30. Proportion of total discharges to water bodies safely treated

Data source: UNSD SDG 6.3.1
Date of data extraction 13/09/2023
Link: https://unstats.un.org/sdgs/dataportal/database
Link to metadata: https://unstats.un.org/sdgs/metadata/files/Metadata-06-03-01.pdf
Serie: 2015
Unit: Percentage (%)
Data providers: National Statistical Offices (NSOs) are the primary responsible authorities for providing data to be used for global statistics. NSOs may draw on data collected or compiled by relevant national or other authorities, such as ministries, municipalities, or regulatory authorities.
Data compilers: UN-Habitat, WHO, and UNSD.

Definitions, concepts and calculation *(according to United Nations methodology):*

"**Proportion of total discharges to water bodies safely treated:** This indicator measures the volumes of wastewater which are generated through different activities, and the volumes of wastewater which are safely treated before discharge into the environment. The ratio of the volume treated to the volume generated is taken as the 'proportion of wastewater flow safely treated' " (UNSD 2023d).

"**Total wastewater generated** is the total volume of wastewater generated by economic activities (agriculture, forestry and fishing; mining and quarrying; manufacturing; electricity, gas, steam and air conditioning supply; and other economic activities) and households. Cooling water is excluded" (UNSD 2023d).

"**Wastewater:** Wastewater is water which is of no further value to the purpose for which it was used because of its quality, quantity or time of occurrence. Cooling water is not considered here" (UNSD 2023d).

"**Wastewater discharge:** The amount of water (in m^3) or substance (in kg BOD/d or comparable) added/leached to a water body (fresh or non-fresh) from a point source" (Eurostat 2021).

"**Wastewater treatment:** Process to render wastewater fit to meet applicable environmental standards or other quality norms for recycling or reuse" (UNSD 2023d).

"The amount of wastewater generated is calculated by summing all of the wastewater generated by different economic activities and households. The amount of wastewater safely treated is calculated by summing all of the wastewater flows which receive treatment considered equivalent to secondary treatment or better. The proportion of wastewater flows which are safely treated is calculated as a ratio of the amount of wastewater safely treated to the amount of wastewater generated" (UNSD 2023d).

Proportion of wastewater safely treated = Amount of wastewater generated / amount of wastewater safely treated

31. Proportion of industrial discharges to water bodies safely treated

Data source: UNSD SDG 6.3.1
Date of data extraction 13/09/2023
Link: https://unstats.un.org/sdgs/dataportal/database
Link to metadata: https://unstats.un.org/sdgs/metadata/files/Metadata-06-03-01.pdf
Serie: 2015
Unit: Percentage (%)
Data providers: National Statistical Offices (NSOs) are the primary responsible authorities for providing data to be used for global statistics. NSOs may draw on data collected or compiled by relevant national or other authorities, such as ministries, municipalities, or regulatory authorities.
Data compilers: UN-Habitat, WHO, and UNSD.

Definitions, concepts and calculation *(according to United Nations methodology):*

Proportion of industrial discharges to water bodies safely treated: This indicator measures the volumes of industrial wastewater which are generated, and the volumes of industrial wastewater which are safely treated before discharge into the environment. The ratio of the volume treated to the volume generated is taken as the 'proportion of industrial wastewater flow safely treated'.

Wastewater flows can be classified into industrial, services, and domestic flows, with reference to the International Standard Industrial Classification of All Economic Activities Revision 4 (ISIC).

- Industrial (ISIC divisions 05-35)
- Services (ISIC divisions 45-96)
- Domestic (private households)

"**Domestic wastewater:** Wastewater from residential settlements which originates predominantly from the human metabolism and from household activities" (UNSD 2023d).

"**Industrial (process) wastewater:** Water discharged after being used in, or produced by, industrial production processes and which is of no further immediate value to these processes. Where process water recycling systems have been installed, process wastewater is the final discharge from these circuits. To meet quality standards for eventual discharge into public sewers, this process wastewater is understood to be subjected to ex-process in-plant treatment. Cooling water is not considered here. Sanitary wastewater and surface runoff from industries are also excluded here" (UNSD 2023d).

"**Total wastewater generated** is the total volume of wastewater generated by economic activities (agriculture, forestry and fishing; mining and quarrying; manufacturing; electricity, gas, steam and air conditioning supply; and other economic activities) and households. Cooling water is excluded" (UNSD 2023d).

"**Wastewater:** Wastewater is water which is of no further value to the purpose for which it was used because of its quality, quantity or time of occurrence. Cooling water is not considered here" (UNSD 2023d).

"**Wastewater discharge:** The amount of water (in m^3) or substance (in kg BOD/d or comparable) added/leached to a water body (fresh or non-fresh) from a point source" (Eurostat 2021).

"**Wastewater treatment:** Process to render wastewater fit to meet applicable environmental standards or other quality norms for recycling or reuse" (UNSD 2023d).

The proportion of industrial wastewater flows which are safely treated is calculated as a ratio of the amount of industrial wastewater safely treated to the amount of industrial wastewater generated.

32. Investments in waste management by general governments

Data source: Eurostat
Date of data extraction: 28/09/2023
Link: https://ec.europa.eu/eurostat/databrowser/view/env_ac_epigg1/default/table?lang=en
Link to metadata: https://ec.europa.eu/eurostat/cache/metadata/en/env_ac_epea_esms.htm
Serie: 2014-2021
Unit: Millions constant 2015 United States dollars
Data providers: National institutions
Data compilers: National institutions

Definitions, concepts and calculation *(according to Eurostat's methodology):*

"**Gross investment in tangible goods** is defined by Eurostat as investment during the reference year in all tangible goods. Included are new and existing tangible capital goods, whether bought from third parties or produced for own use (i.e. capitalised production of tangible capital goods), having a useful life of more than one year including non-produced tangible goods such as land. Investments in intangible and financial assets are excluded" (Eurostat 2023b).

"**General government sector** is the grouping of institutional units which are non-market producers whose output is intended for individual and collective consumption and are financed by compulsory payments made by units belonging to other sectors, and institutional units principally engaged in the redistribution of national income and wealth. The institutional units classified in the general government sector are non-market producers, but they may have some secondary market output." (Eurostat 2013).

"**Waste management** refers to activities and measures aimed at the prevention of the generation of waste and the reduction of its harmful effect on the environment. It includes the collection and treatment of waste, including monitoring and regulation activities. It also includes recycling and composting, the collection and treatment of low-level radioactive waste, street cleaning and the collection of public litter" (Eurostat 2023c).

"**Waste** are materials that are not prime products (that is, products made for the market) for which the generator has no further use for own purposes of production, transformation, or consumption, and which he wants to dispose of. Wastes may be generated during the extraction of raw materials, during the processing of raw materials to intermediate and final products, during the consumption of final products, and during any other human activity. Residuals recycled or reused at the place of generation are excluded. Also excluded are waste materials that are directly discharged into ambient water or air" (Eurostat 2023c).

Exchange rates: Original data from Eurostat are expressed in Euros. The period average exchange rates (United States dollar to Euros) used were taken from the IMF, Database on International Financial Statistics (IMF 2023).

33. Investments in waste management by corporations as specialists and secondary producers

Data source: Eurostat
Date of data extraction: 28/09/2023
Link: https://ec.europa.eu/eurostat/databrowser/view/env_ac_epissp1/default/table?lang=en
Link to metadata: https://ec.europa.eu/eurostat/cache/metadata/en/env_ac_epea_esms.htm
Serie: 2014-2021
Unit: Millions constant 2015 United States dollars
Data providers: National institutions
Data compilers: National institutions

Definitions, concepts and calculation *(according to Eurostat's methodology)*:

"**Gross investment in tangible goods** is defined by Eurostat as investment during the reference year in all tangible goods. Included are new and existing tangible capital goods, whether bought from third parties or produced for own use (i.e. capitalised production of tangible capital goods), having a useful life of more than one year including non-produced tangible goods such as land. Investments in intangible and financial assets are excluded" (Eurostat 2023b).

"Corporations. This sector includes in particular specialist and secondary market producers of environmental protection services (i.e. the units of the corporations sector whose principal activity is the production of environmental protection services and units for which production of environmental protection services is a secondary activity)" (Eurostat 2023c).

"**Waste management** refers to activities and measures aimed at the prevention of the generation of waste and the reduction of its harmful effect on the environment. It includes the collection and treatment of waste, including monitoring and regulation activities. It also includes recycling and composting, the collection and treatment of low-level radioactive waste, street cleaning and the collection of public litter" (Eurostat 2023c).

"**Waste** are materials that are not prime products (that is, products made for the market) for which the generator has no further use for own purposes of production, transformation, or consumption, and which he wants to dispose of. Wastes may be generated during the extraction of raw materials, during the processing of raw materials to intermediate and final products, during the consumption of final products, and during any other human activity. Residuals recycled or reused at the place of generation are excluded. Also excluded are waste materials that are directly discharged into ambient water or air" (Eurostat 2023c).

Exchange rates. Original data from Eurostat are expressed in Euros. The period average exchange rates (United States dollar to Euros) used were taken from the IMF, Database on International Financial Statistics (IMF 2023).

34. Business investment in circular economy activities (percentage of GDP)

Data source: Eurostat - Circular Economy Indicators Database
Date of data extraction: 25/09/2023
Link: https://ec.europa.eu/eurostat/databrowser/view/cei_cie012/default/table?lang=en
Link to metadata: https://ec.europa.eu/eurostat/cache/metadata/en/cei_cie011_esmsip2.htm
Serie: 2005-2021
Unit: Percentage (%) of Gross Domestic Product (GDP).
Data providers: European Statistical System (ESS)
Data compilers: Eurostat

Definitions, concepts and calculation *(according to Eurostat's methodology):*

Sectors of circular economy included: According to Eurostat's methodology, this indicator includes Gross investment in tangible goods in the following three sectors: the recycling sector, repair and reuse sector and rental and leasing sector.

"**Gross investment in tangible goods** is defined by Eurostat as investment during the reference year in all tangible goods. Included are new and existing tangible capital goods, whether bought from third parties or produced for own use (i.e. capitalised production of tangible capital goods), having a useful life of more than one year including non-produced tangible goods such as land. Investments in intangible and financial assets are excluded" (Eurostat 2023b).

This indicator is calculated by Eurostat in three steps as follows:

- "Conceptual framework. The delineation of economic activities related to the circular economy was determined by means of a sector classification based on the purpose of each sector.
- The relevant activities were identified and matched against the integrated system of economic classification, drawing upon existing lists of goods and services for the environmental sector.
- Produce the estimates based on official statistics, in particular structural business statistics, PRODCOM, national accounts, the Labour Force Survey and others" (Eurostat 2023b).

35. Business investment in circular economy activities (Millions constant 2015 United States dollars)

Data source: Eurostat - Circular Economy Indicators Database
Date of data extraction: 25/09/2023
Link: https://ec.europa.eu/eurostat/databrowser/view/cei_cie012/default/table?lang=en
Link to metadata: https://ec.europa.eu/eurostat/cache/metadata/en/cei_cie011_esmsip2.htm
Serie: 2005-2021
Unit: Millions constant 2015 United States dollars
Data providers: European Statistical System (ESS)
Data compilers: Eurostat

Definitions, concepts and calculation *(according to Eurostat's methodology):*

Sectors of circular economy included: According to Eurostat's methodology, this indicator includes Gross investment in tangible goods in the following three sectors: the recycling sector, repair and reuse sector and rental and leasing sector.

"**Gross investment in tangible goods** is defined by Eurostat as investment during the reference year in all tangible goods. Included are new and existing tangible capital goods, whether bought from third parties or produced for own use (i.e. capitalised production of tangible capital goods), having a useful life of more than one year including non-produced tangible goods such as land. Investments in intangible and financial assets are excluded" (Eurostat 2023b).

This indicator is calculated by Eurostat in three steps as follows:

- "Conceptual framework. The delineation of economic activities related to the circular economy was determined by means of a sector classification based on the purpose of each sector.
- The relevant activities were identified and matched against the integrated system of economic classification, drawing upon existing lists of goods and services for the environmental sector.
- Produce the estimates based on official statistics, in particular structural business statistics, PRODCOM, national accounts, the Labour Force Survey and others" (Eurostat 2023b).

Exchange rates. Original data from Eurostat are expressed in Euros. The period average exchange rates (United States dollar to Euros) used were taken from the IMF, Database on International Financial Statistics (IMF 2023).

36. Gross value added to circular economy sector as percentage of the GDP

Data source: Eurostat - Circular Economy Indicators Database
Date of data extraction: 25/09/2023
Link: https://ec.europa.eu/eurostat/databrowser/view/cei_cie012/default/table?lang=en
Link to metadata: https://ec.europa.eu/eurostat/cache/metadata/en/cei_cie011_esmsip2.htm
Serie: 2005-2021
Unit: Percentage (%)
Data providers: European Statistical System (ESS)
Data compilers: Eurostat

Definitions, concepts and calculation *(according to Eurostat's methodology):*

Sectors of circular economy included: According to Eurostat's methodology, this indicator includes Gross investment in tangible goods in the following three sectors: the recycling sector, repair and reuse sector and rental and leasing sector.

"**Value added at factor costs** is the gross income from operating activities after adjusting for operating subsidies and indirect taxes. It can be calculated as the sum of turnover, capitalized production, other operating income, increases minus decreases of stocks, and deducting the following items: purchases of goods and services, other taxes on products which are linked to turnover but not deductible, duties and taxes linked to production. Value adjustments (such as depreciation) are not subtracted" (Eurostat 2023b).

This indicator is calculated by Eurostat in three steps as follows:

- "Conceptual framework. The delineation of economic activities related to the circular economy was determined by means of a sector classification based on the purpose of each sector.

- The relevant activities were identified and matched against the integrated system of economic classification, drawing upon existing lists of goods and services for the environmental sector.
- Produce the estimates based on official statistics, in particular structural business statistics, PRODCOM, national accounts, the Labour Force Survey and others" (Eurostat 2023b).

37. Gross value added to circular economy sector

Data source: Eurostat - Circular Economy Indicators Database
Date of data extraction: 25/09/2023
Link: https://ec.europa.eu/eurostat/databrowser/view/cei_cie012/default/table?lang=en
Link to metadata: https://ec.europa.eu/eurostat/cache/metadata/en/cei_cie011_esmsip2.htm
Serie: 2005-2021
Unit: Millions constant 2015 United States dollars
Data providers: European Statistical System (ESS)
Data compilers: Eurostat

Definitions, concepts and calculation *(according to Eurostat's methodology):*

Sectors of circular economy included: According to Eurostat's methodology, this indicator includes Gross investment in tangible goods in the following three sectors: the recycling sector, repair and reuse sector and rental and leasing sector.

"**Value added at factor costs** is the gross income from operating activities after adjusting for operating subsidies and indirect taxes. It can be calculated as the sum of turnover, capitalized production, other operating income, increases minus decreases of stocks, and deducting the following items: purchases of goods and services, other taxes on products which are linked to turnover but not deductible, duties and taxes linked to production. Value adjustments (such as depreciation) are not subtracted" (Eurostat 2023b).

This indicator is calculated by Eurostat in three steps as follows:

- "Conceptual framework. The delineation of economic activities related to the circular economy was determined by means of a sector classification based on the purpose of each sector.
- The relevant activities were identified and matched against the integrated system of economic classification, drawing upon existing lists of goods and services for the environmental sector.
- Produce the estimates based on official statistics, in particular structural business statistics, PRODCOM, national accounts, the Labour Force Survey and others" (Eurostat 2023b).

Exchange rates. Original data from Eurostat are expressed in Euros. The period average exchange rates (United States dollar to Euros) used were taken from the IMF, Database on International Financial Statistics (IMF 2023).

38. Jobs in circular economy sectors

Data source: Eurostat - Circular Economy Indicators Database
Date of data extraction: 25/09/2023
Link: https://ec.europa.eu/eurostat/databrowser/view/cei_cie011/default/table?lang=en
Link to metadata: https://ec.europa.eu/eurostat/cache/metadata/en/cei_cie011_esmsip2.htm
Serie: 2005-2021
Unit: Full-time equivalent (FTE)
Data providers: European Statistical System (ESS)
Data compilers: Eurostat

Definitions, concepts and calculation *(according to Eurostat's methodology):*

"**Number of persons employed** is defined as the total number of persons who work in the observation unit, i.e. the firm (inclusive of working proprietors, partners working regularly in the unit and unpaid family workers), as well as persons who work outside the unit who belong to it and are paid by it - e.g. sales representatives, delivery personnel, repair and maintenance teams. It excludes manpower supplied to the unit by other enterprises, persons carrying out repair and maintenance work in the enquiry unit on behalf of other enterprises, as well as those on compulsory military service" (Eurostat 2023b).

"**Circular economy sectors:** According to Eurostat's definitions, jobs in circular economy sectors measures the number of persons employed in the following three sectors: the recycling sector, repair and reuse sector and rental and leasing sector" (Eurostat 2023b). Following the recommendations of the Guidelines for measuring circular economy (UNECE/OECD), these sectors should be expanded as data availability progresses to include other circular economy activities, including second-hand markets and sharing economy.

39. Proportion of jobs in circular economy sectors in total employment

Data source: Eurostat - Circular Economy Indicators Database
Date of data extraction: 25/09/2023
Link: https://ec.europa.eu/eurostat/databrowser/view/cei_cie011/default/table?lang=en
Link to metadata: https://ec.europa.eu/eurostat/cache/metadata/en/cei_cie011_esmsip2.htm
Serie: 2005-2021
Unit: Percentage (%) in the total employment
Data providers: European Statistical System (ESS)
Data compilers: Eurostat

Definitions, concepts and calculation *(according to Eurostat's methodology):*

"**Number of persons employed** is defined as the total number of persons who work in the observation unit, i.e. the firm (inclusive of working proprietors, partners working regularly in the unit and unpaid family workers), as well as persons who work outside the unit who belong to it and are paid by it - e.g. sales representatives, delivery personnel, repair and maintenance teams. It excludes manpower supplied to the unit by other enterprises, persons carrying out repair and maintenance work in the enquiry unit on behalf of other enterprises, as well as those on compulsory military service" (Eurostat 2023b).

"**Circular economy sectors:** According to Eurostat's definitions, jobs in circular economy sectors measures the number of persons employed in the following three sectors: the recycling sector, repair and reuse sector and rental and leasing sector" (Eurostat 2023b). Following the recommendations of the Guidelines for measuring circular economy (UNECE/OECD), these sectors should be expanded as data availability progresses to include other circular economy activities, including second-hand markets and sharing economy.