

**UNECE**

# Guidelines for the Application of Environmental Indicators

2023 Edition



**UNITED NATIONS**

UNITED NATIONS ECONOMIC COMMISSION FOR EUROPE

# **Guidelines for the Application of Environmental Indicators 2023 Edition**



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## ACRONYMS

<b>BOD</b>	Biochemical oxygen demand
<b>BOD<sub>5</sub></b>	Annual average BOD after five days of incubation
<b>CBD</b>	Convention on Biological Diversity
<b>CE</b>	Circular Economy
<b>CEPA</b>	Classification of Environmental Protection Activities and Expenditure
<b>CES</b>	Conference of European Statisticians
<b>CLRTAP</b>	Convention on Long-range Transboundary Air Pollution
<b>CO<sub>2</sub></b>	Carbon dioxide
<b>DMC</b>	Domestic Material Consumption
<b>DPSIR framework</b>	DPSIR framework: Driving forces (D) – Pressures (P) – State (S) – Impact (I) – Responses (R)
<b>EEA</b>	European Environment Agency
<b>EEZ</b>	Exclusive economic zone
<b>EIONET</b>	European Environment Information and Observation Network
<b>EMEP</b>	1984 Protocol on Long-term Financing of the Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe
<b>Eurostat</b>	European Union Statistical Service
<b>FAO</b>	Food and Agriculture Organization of the United Nations
<b>FDES</b>	Framework for the Development of Environment Statistics
<b>GDP</b>	Gross Domestic Product
<b>GHG</b>	Greenhouse gas(es)
<b>GWP</b>	Global-warming potential
<b>IEA</b>	International Energy Agency
<b>IPCC</b>	Intergovernmental Panel on Climate Change
<b>ISIC</b>	International Standard Industrial Classification of All Economic Activities
<b>IUCN</b>	International Union for the Conservation of Nature
<b>IUCN WCPA</b>	International Union for the Conservation of Nature World Commission on Protected Areas
<b>LDN</b>	Land degradation neutrality
<b>LULUCF</b>	Land use, land-use change and forestry
<b>NACE</b>	Statistical classification of economic activities in the European Union
<b>NMVOCs</b>	Non-methane volatile organic compounds
<b>NO<sub>2</sub></b>	Nitrogen dioxide

<b>NO<sub>x</sub></b>	Nitrogen oxides
<b>OECD</b>	Organisation for Economic Co-operation and Development
<b>OECM</b>	Other effective area-based conservation measure
<b>ODS</b>	Ozone depleting substance
<b>O<sub>3</sub></b>	Ground-level ozone
<b>PEFA</b>	Physical energy flow accounts
<b>PEEA</b>	Pan-European environmental assessment
<b>PM</b>	Particulate matter: PM <sub>2.5</sub> , particles equal to or less than 2.5 micrometres (µm) in diameter; PM <sub>10</sub> , particles equal to or less than 10 µm in diameter
<b>PPP</b>	Purchasing power parity
<b>SDG</b>	Sustainable Development Goal
<b>SEEA</b>	System of Environmental Economic Accounting
<b>SEEA-CF</b>	System of Environmental Economic Accounting – Central Framework
<b>SO<sub>2</sub></b>	Sulfur dioxide
<b>SO<sub>x</sub></b>	Sulfur oxides
<b>TPES</b>	Total primary energy supply
<b>TSP</b>	Total suspended particles
<b>UNECE</b>	United Nations Economic Commission for Europe
<b>UNSD</b>	United Nations Statistics Division
<b>UWWTPs</b>	Urban wastewater treatment plants
<b>WHO</b>	World Health Organization
<b>WMO</b>	World Meteorological Organization

## FOREWORD

Environmental Indicators are essential tools for tracking progress in preserving indispensable ecosystems and biodiversity, in reducing waste and pollution and in tackling climate change.

Environmental indicators also play a key role for policy evaluation and designing new policies, and they help inform the public on the state and trends of the environment and on possible implications for human health.

UNECE has supported its member States over several decades in improving national environmental statistics and indicators with the aim to enhance the knowledge base in support of decision-making and public information.

Within the framework of ongoing cooperation under the *UNECE Joint Task Force on Environmental Statistics and Indicators* and the *Working Group on Environmental Monitoring and Assessment*, UNECE, the United Nations Environment Programme and the European Environment Agency have for many years promoted the production and use of a common and comparable priority set of environmental indicators for the pan-European region in support of environmental assessment, reporting and policymaking.

The present Guidelines provide a revised list of environmental indicators, as approved at the nineteenth session of the Joint Task Force on Environmental Statistics and Indicators, with the aim to better inform recent global policies. During the revision process the guidelines were also restructured to better align them with statistical frameworks, in particular the Framework for the Development of Environment Statistics.

The revised list of indicators will be promoted and applied throughout the pan-European region in the future. Each indicator responds to a specific purpose and helps describe causes and effects of environmental conditions.

The Guidelines also aim at supporting the preparation of the regular *pan-European environmental assessments* in support of the Environment for Europe process and its Ministerial Conferences. The guidelines are expected to remain a “living” document, considering that there will be a continuing need to align the guidelines with emerging policy needs and global processes.

This new edition also emphasizes the importance of data disaggregation which provides an invaluable contribution to the implementation of the Sustainable Development Goals.

I trust that this publication will provide valuable guidance to all actors involved in the production and use of environmental statistics and indicators and help them to enhance understanding of and the knowledge base on the environment.

I invite countries to use the revised guidelines to strengthen the production of a common set of environmental indicators and unlock the benefits for the environment and society which sound policymaking can bring.



Tatiana Molcean  
Under-Secretary-General of the United Nations and  
Executive Secretary of the United Nations  
Economic Commission for Europe



## EXECUTIVE SUMMARY

This document contains the *Guidelines for the Application of Environmental Indicators – 2023 Edition*, prepared by the UNECE Secretariat together with the Joint Task Force on Environmental Statistics and Indicators and with the support of the Working Group on Environmental Monitoring and Assessment. The Guidelines include a revised list of indicators with the aim to inform recent global policies, to better link them with statistical frameworks and to increase the user-friendliness of metadata.

The Guidelines consist of a list of indicators relevant for informing policies and a set of indicators which are recommended to be produced by UNECE member States as priority ones to enable comparability of environmental information and indicators across the UNECE region and beyond. All indicators are presented in an agreed format to support their practical application in the countries with the ultimate aim to track progress in meeting policy targets and to support sound policymaking. Metadata sheets for the priority indicators are available in chapter 6.

The priority indicators will be promoted and applied throughout the pan-European region in the future. Each indicator responds to a specific purpose and helps describe causes and effects of environmental conditions and can thus be applied for environmental assessments following the analytical EEA DPSIR framework.

The Guidelines also aim at supporting the preparation of the regular pan-European environmental assessments in support of the Environment for Europe process and its Ministerial Conferences.

The Guidelines are expected to remain a “living” document, considering that also in the future there will be the need to align them with emerging policy needs and global processes.

This new edition also emphasizes the importance of data disaggregation which provides an invaluable contribution to the implementation of the Sustainable Development Goals.

These Guidelines are intended to be used by government officials, in particular from environmental ministries or environmental agencies, as well as statistical offices and other relevant agencies responsible for the production of environmental statistics, environmental assessment, reporting and publication of statistical and environmental information. The Guidelines may also be of interest to other parties including business and industry, academia and non-governmental organizations, as well as to countries outside the UNECE region.

## 1. INTRODUCTION

1. Environmental indicators are a key tool for environmental assessment. Appropriately chosen indicators based on sufficient time-series data describe the state of the environment and its impact on human beings, ecosystems and materials, the pressures on the environment, the driving forces and the responses steering that system. Indicators are also used to show key trends, help describe causes and effects of environmental conditions and enable tracking progress in implementation of environmental policy goals, to assess their efficiency and to support refining existing or creating new policies as needed.
2. Sustainable development and management of resources require objective and up-to-date analytical information on the state-of-the-environment and information on possible future trends. The use of environmental indicators can provide a practical and efficient way to track the state of the environment and progress towards policy targets.
3. While a vast amount of environmental data on the state of the environment, trends, pressures and drivers is being collected across the pan-European region, gaps exist including due to lack of indicators that help measure progress towards new and emerging policy areas, including on circular economy, for example. The environmental indicators suggested in these Guidelines aim to address these gaps and are designed to answer key policy questions and serve as a basis for sound and informed policymaking. State-of-the-environment reports are key information products for many UNECE countries that benefit from the use of environmental indicators.
4. The Guidelines for the Application of Environmental Indicators – 2023 Edition are based on the 2009 version and consist of a revised version with the aim to:
  - (a) Inform better recent and new global policies (such as the 2030 Agenda for Sustainable Development, the Paris Agreement on climate change and the Sendai Framework for Disaster-risk Reduction);
  - (b) Link them with statistical frameworks, such as the United Nations Framework for the Development of Environment Statistics (FDES) and the System of Environmental-Economic Accounting – Central Framework (SEEA-CF);
  - (c) Increase user-friendliness of the metadata.
5. The review process of the Guidelines was initiated by the Joint Task Force on Environmental Statistics and Indicators at its fourteenth session, which emphasized the need to keep the Guidelines on Environmental Statistics and Indicators under review and work towards their alignment with the 2030 Agenda and other relevant global policies.
6. Updates include the:
  - (a) Revised organisation and content of the indicators presented in the first version of the Guidelines to better align it with FDES and to make a clear distinction between data, statistics and indicators;
  - (b) Updated methodological descriptions, policy references and methodological references;

- (c) A revised list of (priority) indicators including new indicators (e.g., Sustainable Development Goal indicators) and replaced or deleted existing indicators to better inform current and new policy areas and to consider methodological developments;
  - (d) Harmonisation of indicators, to the extent possible, with the indicator system employed by the European Environment Information and Observation Network (EIONET) of the European Environment Agency.
7. The priority indicators presented in the current edition of the guidelines will be implemented by countries with priority to facilitate comparability of indicators across the UNECE region in support of regional and global policy processes.
  8. Taking into account this important role of environmental indicators, members of the Joint Task Force on Environmental Statistics and participants in its nineteenth session, and in close cooperation with the European Environment Agency (EEA) and the United Nations Environment Programme, have agreed, on a set of priority indicators for application in the pan-European region. These indicators are described in detail in the Guidelines for the Application of Environmental Indicators – 2023 Edition.
  9. The indicators are designed to support all phases of environmental policy making and for applying the so-called D-P-S-I-R framework (Driving Forces – Pressure – State – Impact – Response Analytical framework) to support policy making from its design phase to setting targets, and from monitoring progress in policy implementation and evaluation to communication to the public and decision-makers.
  10. Each indicator tells the reader about the trend (or status) of the phenomenon being investigated over a given period. It also specifies whether associated policy objectives are being met and quantitative targets reached. Where these are not being achieved, it discusses the reasons for this.
  11. The guidelines are expected to help in:
    - (a) Improving the systems of environmental monitoring and reporting for the purpose of environmental decision-making and public awareness raising;
    - (b) Making national environment assessments comparable with those of other UN member states; and
    - (c) Facilitating data gathering for future environmental assessment reports.

## 1.1 PRIORITY INDICATORS FOR THE PAN-EUROPEAN REGION

12. The following Table 1 provides an overview on selected indicators to be produced by countries in the pan-European region with priority to facilitate comparability of environmental information and indicators. It includes also links to selected other indicator frameworks. However, since indicator frameworks are being reviewed and continuously updated, full coherence cannot be guaranteed.

**Table 1** List of priority indicators suggested to be produced regularly by countries in the pan-European region

<i>ID</i>	<i>Name of indicator</i>	<i>Indicator (same or similar) used by other indicator frameworks <sup>(a)</sup></i>	<i>DPSIR</i>	<i>Metadata available on page</i>
<b>Component: Environmental conditions and quality</b>				
<b>Subcomponent "physical conditions"</b>				
<b>Topic "Atmosphere, climate and weather"</b>				
B-1.1	Mean temperature anomaly (compared to climate normal 1961–1990)	EEA	I	51
B-1.2	Annual average temperature (in country, in capital, second major city, area or region)	EEA	S	53
B-2.2	Annual precipitation (in country, in capital, second major city, area or region)		S	55
<b>Topic "soil characteristics"</b>				
E-2.4	Proportion of land that is degraded over total land area (SDG indicator 15.3.1)*	SDG	S	57
<b>Subcomponent "land cover, ecosystems and biodiversity"</b>				
<b>Topic "ecosystems and biodiversity"</b>				
D-1.1	Share of total protected areas (categories of the International Union for the Conservation of Nature (IUCN) in the country area*	EEA	R	60
D-4.4	Red List Index (SDG indicator 15.5.1)	CBD	S/I	64
D-4.2	Share of species threatened (mammals, birds, fishes, reptiles, amphibians, invertebrates, vascular plants, mosses, lichens, fungi, algae)	EEA	S	67

<i>ID</i>	<i>Name of indicator</i>	<i>Indicator (same or similar) used by other indicator frameworks <sup>(a)</sup></i>	<i>DPSIR</i>	<i>Metadata available on page</i>
<b>Topic “forests”</b>				
D-3.1	Forest area as a proportion of total land area (SDG indicator 15.1.1)*	SDG	S	71
D-3.8	Forest fires (area burnt by forest fires)	EEA	S	73
<b>Subcomponent “environmental quality”</b>				
<b>Topic “air quality”</b>				
A-2.10	PM <sub>10</sub> : Annual mean concentration in cities*	EEA	S	76
A-2.8	Annual mean level of PM <sub>10</sub> in cities (population weighted) (SDG indicator 11.6.2)*	SDG	S	79
A-2.9	PM <sub>2.5</sub> : Annual mean concentration in cities*	EEA	S	82
A-2.7	Annual mean level of PM <sub>2.5</sub> in cities (population weighted) (SDG indicator 11.6.2)*	SDG	S	85
A-2.11	SO <sub>x</sub> : Annual mean concentration in cities*	EEA	S	85
A-2.12	NO <sub>x</sub> : Annual mean concentration in cities*	EEA	S	90
<b>Topic “freshwater quality”</b>				
C-17.2	Proportion of bodies of water with good ambient water quality (SDG indicator 6.3.2)*		S	93
<b>Component “environmental resources and their use”</b>				
I-1.4	Material footprint, material footprint per capita, and material footprint per GDP (SDG indicator 12.2.1)*	SDG, EEA	P	96
I-1.5	Domestic material consumption, domestic material consumption per capita, and domestic material consumption per GDP (SDG indicator 12.2.2)*	SDG	P	98

<i>ID</i>	<i>Name of indicator</i>	<i>Indicator (same or similar) used by other indicator frameworks <sup>(a)</sup></i>	<i>DPSIR</i>	<i>Metadata available on page</i>
<b>Subcomponent "energy resources"</b>				
<b>Topic "production, trade and consumption of energy"</b>				
G-1.3	Total energy use by the national economy	CES-CC	D	101
G-1.4	Energy use by resident households per capita	CES-CC	D	103
G-2.1	Total primary energy supply (TPES)*	EEA, CES-CC	D	106
G-3.1	Energy intensity measured in terms of primary energy and GDP (SDG indicator 7.3.1)	SDG	D	109
G-4.1	Renewable energy share in the total primary energy supply	EEA	R	112
<b>Subcomponent "land"</b>				
<b>Topic "land use"</b>				
E-1.2	Net land take*	EEA	P	114
<b>Topic "use of forest land"</b>				
D-3.3	Share of natural forest of total forest area*		R	118
D-3.12	Progress towards sustainable forest management (SDG indicator 15.2.1)	SDG, CBD	S/R	121
<b>Subcomponent "biological resources"</b>				
<b>Topic "aquatic resources"</b>				
D-5.2	Proportion of fish stocks within biologically sustainable levels (SDG indicator 14.4.1)*	SDG, CBD	S/R	125
<b>Subcomponent "water resources"</b>				
<b>Topic "water resources"</b>				
C-1.1	Renewable freshwater resources		S	127
<b>Topic "abstraction, use and returns of water"</b>				
C-2.1	Total freshwater abstracted by source	EEA	P	130
C-2.3	Water exploitation index (WEI)	EEA	P/R	133

<i>ID</i>	<i>Name of indicator</i>	<i>Indicator (same or similar) used by other indicator frameworks <sup>(a)</sup></i>	<i>DPSIR</i>	<i>Metadata available on page</i>
C-2.4	Level of Water Stress: freshwater withdrawal as a proportion of available freshwater resources (SDG indicator 6.4.2)	SDG	P/R	136
C-3.2	Total freshwater use	EEA	P	139
C-3.6	Change in water use efficiency over time (SDG indicator 6.4.1)	SDG	P/R	142
C-4.2	Total household water use per capita		P	145

## Component “residuals”

### Subcomponent “emissions to air”

#### Topic “emissions of greenhouse gases (GHGs)”

B-3.1	Total GHG emissions per capita		P	147
B-3.4	Total GHG emissions by sector	EEA	P	150
B-3.7	CO <sub>2</sub> emission per unit of value added (SDG indicator 9.4.1)	SDG	P	152
B-3.10	GHG emissions from LULUCF	EEA	P	156
B-3.11	CO <sub>2</sub> emissions from fuel combustion within the national territory*	EEA, CES-CC	P	159
B-3.12	Total GHG emissions from production activities	CES-CC	P	161
B-3.13	GHG emission intensity of production activities	CES-CC	P	165
A-1.19	Total emissions of SO <sub>x</sub> *	EEA	P	169
A-1.1	Emissions of SO <sub>x</sub> per capita*		P	172
A-1.20	Total emissions of NO <sub>x</sub> *	EEA	P	176
A-1.7	Emissions of NMVOCs per capita	EEA	P	179

#### Topic “consumption of ozone depleting substances (ODS)”

A-3.1	Total consumption of ozone-depleting substances (ODS)	EEA	P	183
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<i>ID</i>	<i>Name of indicator</i>	<i>Indicator (same or similar) used by other indicator frameworks <sup>(a)</sup></i>	<i>DPSIR</i>	<i>Metadata available on page</i>
<b>Topic “emissions of other substances to air”</b>				
A-1.28	Emissions of ammonia per capita	EEA	P	186
A-1.21	Total emissions of PM <sub>2.5</sub> *	EEA	P	188
A-1.17	Share of PM <sub>10</sub> emissions from stationary or mobile sources		P	192
A-1.18	Share of PM <sub>2.5</sub> emissions from stationary or mobile sources		P	195
<b>Subcomponent “generation and management of wastewater”</b>				
<b>Topic “collection and treatment of wastewater”</b>				
C-15.1	Treatment capacity of urban wastewater-treatment plants in terms of population equivalent (p.e.)		R	199
C-16.2	Proportion of domestic and industrial wastewater flows safely treated (SDG indicator 6.3.1)	SDG	R	203
C-15.5	Percentage of BOD <sub>5</sub> removed from generated wastewater before discharge into the environment		R	207
<b>Topic “discharge of wastewater to the environment”</b>				
C-16.1	Share of total wastewater discharged to the environment after treatment	EEA	P	211
<b>Subcomponent “generation and management of waste”</b>				
<b>Topic “generation of waste”</b>				
I-1.2	Total waste generation	EEA	D/P	215
I-1.1	Municipal waste generated per capita		D/P	217
I-1.3	Waste generation intensity per unit of GDP		D/P	220
I-2.1	Hazardous waste generated per capita (SDG indicator 12.4.2)*	SDG	D/P	223



<i>ID</i>	<i>Name of indicator</i>	<i>Indicator (same or similar) used by other indicator frameworks <sup>(a)</sup></i>	<i>DPSIR</i>	<i>Metadata available on page</i>
<b>Topic “management of waste”</b>				
I-3.2	National recycling rate, tons of material recycled (SDG indicator 12.5.1)*	SDG, EEA	R	226
I-2.2	Proportion of hazardous waste treated, by type of treatment (SDG indicator 12.4.2)	SDG	R	229
<b>Subcomponent “release of chemical substances”</b>				
<b>Topic “release of chemical substances”</b>				
F-2.1	Consumption of mineral fertilizers per unit of agricultural area		P	232
F-2.3	Consumption of organic fertilizers per unit of agricultural area		P	235
<b>Component “extreme events and disasters”</b>				
<b>Subcomponent “natural extreme events and disasters”</b>				
<b>Topic “Impact of natural extreme events and disasters”</b>				
K-1.6	Direct economic loss attributed to disasters in relation to GDP (SDG indicator 1.5.2/11.5.2, Sendai Framework indicator C-1)	SDG, Sendai Framework, EEA	I	238
K-1.7	Number of deaths attributed to disasters, per 100,000 population (Sendai Framework indicator A-2)	Sendai Framework	I	242
<b>Component “human settlements and environmental health”</b>				
<b>Subcomponent “human settlements”</b>				
<b>Topic “access to selected basic services”</b>				
C-6.1	Share of total population (urban and rural) connected to the water supply industry		S/R	245
C-6.2	Proportion of population using safely managed drinking water services (SDG indicator 6.1.1)*	SDG	S/R	247
C-14.1	Percentage of total population connected to a wastewater collecting system		S/R	250
I-4.1	Proportion of population served by municipal waste collection		S/R	253

<i>ID</i>	<i>Name of indicator</i>	<i>Indicator (same or similar) used by other indicator frameworks <sup>(a)</sup></i>	<i>DPSIR</i>	<i>Metadata available on page</i>
<b>Topic “environmental concerns specific to urban settlements”</b>				
H-1.1	Passenger and freight volumes, by mode of transport (SDG indicator 9.1.2)	SDG, EEA	D	255
H-1.2	Total passenger transport demand per capita		D/R	258
H-3.2	Road vehicle fleet in the country by fuel type (gasoline, diesel, gas, electricity, biofuels, other)		D/R	262
<b>Component “environmental protection, management and engagement”</b>				
<b>Subcomponent “environmental protection and resource management expenditure”</b>				
J-1.1	National expenditure on environmental protection as percentage of GDP*	EEA	R	265
<b>Subcomponent “environmental governance and regulation”</b>				
<b>Topic “environmental regulation and instruments”</b>				
J-1.2	Environmental tax revenues as a proportion of GDP*	EEA	R	270
J-1.6	Amount of fossil-fuel subsidies (production and consumption) per unit of GDP (SDG indicator 12.c.1)*	SDG, EEA	R	273

Notes: “\*” indicates that this indicator is used in the Seventh pan-European environmental assessment (PEEA)

<sup>(a)</sup> CES-CC: CBD: Indicator used for the monitoring of the Convention on Biological Diversity; CES Set of Core Climate Change-related Indicators; EEA: Indicator used by the European Environment Agency; SDG: Indicator of the Sustainable Development Goals; Sendai Framework: Indicator of the Sendai Framework for Disaster Risk Reduction 2015 – 2030.

## 2. CLARIFICATION OF TERMINOLOGY AND STRUCTURE OF THE GUIDELINES

### 2.1 CLARIFICATION OF IMPORTANT TERMINOLOGY USED IN THE GUIDELINES

13. A clear conceptual distinction between “environmental indicators”, “environment statistics” and “environmental data” is important for producers and users of these statistics, and for structuring the revised *Guidelines for the Application of Environmental Indicators – 2023 Edition*. To align the latest edition of the Guidelines with FDES to the maximum extent possible, the following FDES definitions are used.
  - **Environmental data** are large amounts of unprocessed observations and measurements about the environment and related processes. They may be collected or compiled via statistical surveys (censuses or sample surveys) by the national statistical system or may originate from administrative records, geographic databases, registers, inventories, monitoring networks, thematic mapping, remote sensing, scientific research and field studies.
  - **Environment statistics** are environmental data that have been structured, synthesized and aggregated according to statistical methods, standards and procedures. The role of environment statistics is to process environmental and other data into meaningful statistics that describe the state of and trends in the environment and the main processes affecting them. Not all environmental data are used to produce environment statistics. The FDES provides a framework that identifies environmental and other data that fall within its scope and then contributes to structuring, synthesizing and aggregating the data into statistical series and indicators.
  - **Environmental indicators** are environment statistics that have been selected for their ability to depict important phenomena or dynamics. Environmental indicators are used to synthesize and present complex environment and other statistics in a simple, direct, clear and relevant way. Environmental indicators are generated because environment statistics are usually too numerous and detailed to meet the needs of policymakers and the general public, and often require further processing and interpretation to be meaningful. Environmental indicators may take various forms such as rates, ratios or proportions, and be constructed at different levels of aggregation. The purpose of these indicators is to assess present and future directions with respect to goals and targets, evaluate and determine the impact of specific programmes, monitor progress, measure changes in a specific condition or situation over time, and convey messages.
14. Generally speaking, “data and statistics” are data items that have to be produced only once and can be used for the calculation of multiple indicators. Some of them can be also considered as “indicators” in themselves.
15. The Guidelines therefore:
  - (a) Describe indicators mainly from the perspective of policy relevance and how to calculate them (including which data and statistics are needed);
  - (b) Present a list of environmental data and statistics (linked with FDES and existing methodological guidance) that can be used for calculating the indicators.

16. This approach avoids redundancies in the Guidelines, but also helps National Statistical Offices, Ministries of Environment and other data producers in their efforts to develop comprehensive official environmental statistics that can be used for multiple purposes.

## 2.2 ORGANISATION OF THE LIST OF INDICATORS IN THE GUIDELINES

17. The FDES structure is used to organise the list of ECE environmental indicators in Table 2 below.
18. Using the FDES themes helps to link the production of indicators and underlying statistics with this internationally agreed framework. Furthermore, the grouping is (with some exceptions) mutually exclusive. Important policy domains such as climate change are mentioned as cross-cutting (meaning they require indicators, statistics and other data from several domains), but are not considered as a separate topic in FDES.
19. This approach also allows the organisation of the indicators and underlying statistics and data in the hierarchical structure of FDES, which is according to components, subcomponents and topics.
20. Using the FDES as the underlying structure also helps to check the completeness of the list of indicators, identify new indicators and assign them to the right place in this indicator framework.

**Table 2** Revised structure of organizing the environmental indicators, following the FDES structure

<i>Component</i>	<i>Subcomponent</i>	<i>Topic</i>
Environmental conditions and quality	Physical conditions	Atmosphere, climate and weather Soil characteristics
	Land cover, ecosystems and biodiversity	Ecosystems and biodiversity Forests
	Environmental quality	Air quality
		Freshwater quality Marine water quality
Environmental resources and their use	Energy resources	Production, trade and consumption of energy
	Land	Land use Use of forest land
		Soil resources
	Biological resources	Aquatic resources
	Water resources	Water resources
		Abstraction, use and returns of water

<i>Component</i>	<i>Subcomponent</i>	<i>Topic</i>
Residuals	Emissions to air	Emissions of greenhouse gases (GHGs)
		Consumption of ozone depleting substances (ODSs)
		Emissions of other substances to air
	Generation and management of wastewater	Generation and pollutant content of wastewater
		Collection and treatment of wastewater
		Discharge of wastewater to the environment
Generation and management of waste	Generation of waste	
	Management of waste	
	Release of chemical substances	
Extreme events and disasters	Natural extreme events and disasters	Natural extreme events and disasters
		Impact of natural extreme events and disasters
Human settlements and environmental health	Human settlements	Access to selected basic services
		Exposure to ambient pollution
		Environmental concerns specific to urban settlements
Environmental protection, management and engagement	Environmental protection and resource management expenditure	Environmental regulation and instruments
		Participation in multilateral environmental agreements and environmental conventions
	Environmental governance and regulation	Preparedness for natural extreme events and disasters
		Environmental information and awareness
		Environmental education

### 2.3 MAIN DIFFERENCES WITH THE PREVIOUS GUIDELINES

21. The first version of the Guidelines organized the list of indicators under 10 environmental themes, resulting in a list of 49 “indicators” (some of them placeholders).
22. As explained earlier, the list of environmental indicators is actually much larger than presented in the first version of the Guidelines. Furthermore, some of the groupings in the first version were not straightforward, for example:
  - Theme B – climate change:
    - (i) Climate change is a cross-cutting issue that should cover all main climate change phenomena related to climate change drivers, greenhouse gas emissions, climate change impacts, climate change mitigation and adaptation;
    - (ii) In the first version of the guidelines, the indicator group included atmospheric phenomena (temperature and precipitation) as well as greenhouse gas emissions;
    - (iii) Important climate change-related issues were also addressed in other groupings (e.g., in environmental themes related to air pollution and energy);
  - Theme C – water:
    - (i) This theme combined issues related to freshwater resources, water use, freshwater quality, access to water-related services, wastewater treatment and quality of coastal waters;
    - (ii) This combination resulted in a relatively large theme with many “indicators” that are actually related to different policy frameworks and use different types of underlying data and statistics.
23. The revised Guidelines therefore use a different grouping of indicators by using the FDES hierarchical structure of components, subcomponents and topics (see section 2.2).
24. Applying the structure of FDES results in renaming indicator groups, splitting indicator groups and moving some indicators to other groups as shown in Table 3 below.

**Table 3** Revised grouping of indicators

<i>Previous environmental theme</i>	<i>New grouping used in the revised guidelines</i>	<i>FDES topic</i>	
A – Air pollution and ozone depletion	Air quality	1.3.1	
	Exposure to ambient pollution	5.1.4	
	Emissions of greenhouse gases (GHGs)	3.1.1	
	Consumption of ozone depleting substances (ODSs)	3.1.2	
	Emission of other substances to air	3.1.3	
B – Climate change	Atmosphere, climate and weather	1.1.1	
C – Water	Water resources	2.6.1	
	Abstraction, use and returns of water	2.6.2	
	Access to selected basic services	5.1.2	
	Freshwater quality	1.3.2	
	Marine water quality	1.3.3	
	Generation and pollutant content of wastewater	3.2.1	
	Collection and treatment of wastewater	3.2.2	
	Discharge of wastewater to the environment	3.2.3	
	D – Biodiversity	Ecosystems and biodiversity	1.2.2
		Forests	1.2.3
Use of forest land		2.3.2	
E – Land and soil	Soil characteristics	1.1.4	
	Land use	2.3.1	
F – Agriculture	Release of chemical substances	3.4.1	
G – Energy	Production, trade and consumption of energy	2.2.2	
H – Transport	Environmental concerns specific to urban settlements	5.1.5	
I – Waste	Generation of waste	3.3.1	
	Management of waste	3.3.2	
J – Environmental financing	Environmental protection and resource management expenditure	6.1	
	Environmental regulation and instruments	6.2.2	

25. The first version of the Guidelines did not cover the full scope of FDES. Furthermore, the *Seventh pan-European environmental assessment* identified policy areas that cannot be informed sufficiently with environmental indicators, such as circular economy, sustainable tourism and sustainable infrastructure. Therefore, additional indicators were added to the Guidelines – 2023 Edition.

## 3. HOW TO USE THE GUIDELINES IN THE NATIONAL CONTEXT

### 3.1 DEVELOPMENT OF A NATIONAL SET ON ENVIRONMENTAL INDICATORS

26. The overall goal is to develop a national indicator set which can inform national, regional and global policy information needs in an internationally comparable way. Developing such a national environmental indicator set is a crucial step for countries committed to sustainable development and effective environmental management. However, a defined minimum set of indicators should be available in all countries, as they are relevant for regional and global environmental assessments and international comparability. This process of defining the national indicator set involves selecting, defining, and regularly monitoring a set of indicators that reflect the state of the environment and the effectiveness of environmental policies.
27. The *ECE Guidelines for the Application of Environmental Indicators – 2023 Edition* have been developed to inform the most relevant environment-related policy areas of the ECE region. Given their regional relevance (which has been carefully assessed by members of the Joint Task Force on Environmental Statistics and Indicators), the list of priority indicators is recommended for implementation by all ECE member countries with priority. Other (non-priority) indicators are recommended to be gradually implemented, in particular when they have been used in previous pan-European Environmental Assessments (PEEA) or are relevant for the next PEEA. Not all indicators of the ECE Guidelines may be relevant in the national context, and additional indicators or further disaggregation (see section 3.2) may be needed.
28. The following steps for identifying a national indicator set are recommended to be carried out in close collaboration of National Statistical Offices with Ministries of Environment or other relevant agencies:
  - (i) **Define objectives and scope:** Clearly articulate the objectives of the national environmental indicator set. Identify the key environmental issues and priorities relevant to the country's context. Define the scope of the indicators, considering factors such as ecosystems, pollution, biodiversity, climate change, and resource management.
  - (ii) **Stakeholder involvement:** Engage a diverse group of stakeholders, including other government agencies, NGOs, academic institutions, industry representatives, and local communities. Involving a broad range of perspectives ensures a comprehensive understanding of environmental issues and enhances the legitimacy of the indicator set.
  - (iii) **Selecting indicators:** Using the ECE Guidelines as a background document, identify a set of indicators that is relevant to national priorities, and feasible to measure. Consider indicators that cover various aspects of the environment, including air and water quality, biodiversity, land use, and climate change. It is strongly recommended to include all priority indicators in the national sets, as they have been found relevant from a regional perspective.
  - (iv) **Data availability and accessibility:** Assess the availability of data for each chosen indicator. Reliable data is essential for monitoring and evaluation. Establish mechanisms for data collection, management, and sharing among relevant agencies. Consider both existing datasets, such as from official statistics, and the need for new data collection initiatives.



- (v) **Integration with policy:** Integrate the environmental indicator set with national policies and strategies. Ensure that the indicators align with the goals and targets of key environmental policies, such as climate action plans, biodiversity strategies, and sustainable development agendas.
  - (vi) **Regular monitoring and reporting:** Implement a system for regular monitoring and reporting of environmental indicators. This may involve the development of a dedicated database, reporting tools, and communication strategies. Timely and transparent reporting enhances accountability and facilitates evidence-based decision-making.
  - (vii) **Capacity development:** Develop the capacity of relevant institutions and individuals involved in collecting, managing, and analysing environmental data. Training programs and knowledge-sharing initiatives contribute to the sustainability of the indicator set over the long term.
  - (viii) **Review and adaptation:** Periodically review the effectiveness of the indicator set. Assess whether it reflects current environmental priorities, scientific advancements, and policy changes. Be prepared to adapt the set to address emerging issues and ensure its continued relevance.
  - (ix) **International collaboration:** Collaborate with international organizations and initiatives (such as the ECE Joint Task Force on Environmental Statistics and Indicators) to harmonize indicators, methodologies, and data standards. This facilitates cross-border comparisons and enhances the country's participation in regional environmental assessments.
29. By following these steps, countries can establish a robust national environmental indicator set that supports informed decision-making, fosters sustainable development, and contributes to global environmental goals.

### 3.2 DATA DISAGGREGATION

30. Different users need environmental indicators and statistics at different levels of aggregation and depths of information. They may need cross-cutting environmental indicator data sets, for instance regarding climate change or circular economy. In other cases, they may be interested only in particular topics and themes pertaining to specific sectoral analysis and policymaking. Policymakers and decision makers at the highest levels and the general public tend to use environmental indicators and more aggregated statistics. Environmental administrators, researchers, analysts and academics may be more inclined to examine extensive and detailed environmental statistics. International agencies typically have well-articulated needs for environmental statistics based on environmental agreements or international data-collection processes.
31. While it is important to align the temporal aggregations of environmental data with those used in economic and social statistics to ensure their proper integration, a uniform calendar or fiscal year often does not correspond to the diversity of natural phenomena. Therefore, different time scales – or longer or shorter time periods – must also be used to aggregate environmental data over time. The environmental data used in environmental statistics are measured or monitored at various frequencies. Certain features of natural growth of biomass (e.g., in a natural, slow-growing forest that is not subject to logging), or processes such as changes in land cover or soil

erosion, do not justify or require frequent, diligent monitoring because the most relevant changes may be observed on an annual, or even much less frequent, basis. Other environmental processes, however, change so quickly that measurements are needed hourly or even more frequently (e.g., air quality).

32. The occurrence and impacts of environmental phenomena are distributed spatially without regard for political-administrative boundaries. The most meaningful spatial units for environment statistics and indicators are either natural units, such as watersheds, ecosystems, ecozones, landscape or land cover units, or management and planning units based on natural units, such as protected areas, coastal areas or river basin districts. While environmental statistics are usually collected and aggregated for natural physical, geographical and administrative areas, the concept of economic territory is used for environmental-economic accounting. This involves a geographic boundary that defines the scope of an economy. Economic territory is the area under the effective control of a single Government. It includes the land area of a country, including islands, airspace, territorial waters and territorial enclaves in the rest of the world. Economic territory excludes territorial enclaves of other countries and international organizations located in the reference country.
33. In addition to the above-mentioned temporal and spatial considerations, other disaggregation dimensions may be considered for the production and sharing of the proposed indicators, including economic activity, ethnicity, gender and household income. These disaggregation dimensions are, for example, relevant in the context of the central transformative promise of the 2030 Agenda for Sustainable Development and its Sustainable Development Goals: leave no one behind.

## 4. SELECTION PROCESS AND PRESENTATION OF INDICATORS AND METADATA

### 4.1 SELECTION OF THE PROPOSED INDICATORS

34. The indicator selection for 2023 Edition of the Guidelines is based on a review of the full list of ECE environmental indicators in the first version of the Guidelines, and a careful review carried out in close collaboration with the Joint Task Force (for example, as a result of the discussions held at the sixteenth, seventeenth and eighteenth sessions of the Joint Task Force) and by the secretariat with support of external consultants. In a silence procedure following the Joint Task Force's eighteenth session, the list of indicators as presented herein was agreed upon.
35. The revised list of proposed indicators takes into account various policy frameworks, multilateral environmental agreements and related indicator frameworks, such as:
- Sustainable Development Indicators
  - Latest revision of indicators of the European Environment Agency
  - Indicators used and recommended in the 7th pan-European Environmental Assessment
  - Conference of European Statisticians (CES) Set of Core Climate Change-related indicators
  - CES Pilot Set of Core Disaster-risk-related indicators
  - Indicators for the Kunming – Montreal Global Biodiversity Framework

### 4.2 PRESENTATION OF THE RECOMMENDED INDICATORS

36. Each indicator has received a unique identification number. The number provides a link back to the structure used in the first indicator Guidelines, by using the letter of the original indicator grouping and the number of the original "indicator".
37. For example, indicator B-1.2 (Annual average temperature) was originally part of indicator B1 (Air temperature), in environmental theme B. Climate change. As the "indicator" B1 actually consists of four different indicators, a consecutive number has been added after B-1 and the indicator is in the revised guidelines part of the topic "atmosphere, climate and weather".
38. The indicators are presented in tables having the following four columns:
- (i) ID: Unique identifier. The identifier is a combination between the originally used indicator coding (e.g., B1) and a consecutive number added to it. See explanation given above;
  - (ii) Name of the indicator: "\*" indicates that this indicator was used in the seventh pan-European environmental assessment (PEEA);
  - (iii) "Priority indicator": The Joint Task Force agreed that this indicator has priority for national implementation and finalization of related metadata sheets;
  - (iv) Comments.

39. Detailed metadata sheets explaining the indicator, its calculation methodology (and/or giving reference to methodological documents) and required statistics (or data from other sources) are included in the Annex for the priority indicators. For other indicators they will be made available online gradually at the UNECE website at <https://unece.org/indicators-and-reporting>.

## 5. RECOMMENDED ENVIRONMENTAL INDICATORS FOR IMPLEMENTATION IN THE UNECE REGION

### 5.1 COMPONENT “ENVIRONMENTAL CONDITIONS AND QUALITY”

40. In alignment with FDES component 1, this component includes indicators of the physical, biological and chemical characteristics of the environment and their changes over time. These fundamental background conditions are strongly interrelated and determine the types, extent, conditions and health of ecosystems. Many of these natural conditions change very slowly as a result of natural processes or human influence. Others may show immediate and dramatic effects. Importantly, changes in environmental conditions and quality are the result of combined and accumulated impacts of natural and human processes. Connecting the changes with individual activities or events is thus not a straightforward process.

#### 5.1.1 Subcomponent “physical conditions”

41. The subcomponent on physical conditions captures those physical aspects of the environment that change relatively slowly because of human influence. It contains indicators on meteorological, hydrographical, geological and geographical conditions and soil characteristics. See FDES subcomponent 1.1.

##### 5.1.1.1 Topic “atmosphere, climate and weather” (list of indicators)

42. This topic covers indicators of atmospheric, climatic and weather conditions across territories and over time. See FDES topic 1.1.1. These indicators were previously part of the environmental theme “B. Climate change” and are listed in Table 4 below.

**Table 4** Indicators of the topic “atmosphere, climate and weather”

<i>ID</i>	<i>Name of indicator</i>	<i>Priority indicator</i>	<i>Comments</i>
B-1.1	Mean temperature anomaly (compared to climate normal 1961–1990)	Yes	
B-1.5	Mean temperature anomaly (compared to climate normal 1991–2020)		WMO has released new climate normal in August 2023
B-1.2	Annual average temperature (in country, in capital, second major city, area or region)	Yes	
B-1.3	Maximum monthly average temperature (in country, in capital, second major city, area or region)		
B-1.4	Minimum monthly average temperature (in country, in capital, second major city, area or region)		
B-2.1	Annual deviation from the average precipitation (in country, in capital, second major city, area or region)		
B-2.2	Annual precipitation (in country, in capital, second major city, area or region)	Yes	
B-2.3	Maximum monthly precipitation (in country, in capital, second major city, area or region)		
B-2.4	Minimum monthly precipitation (in country, in capital, second major city, area or region)		
B-2.5	Percentage of land area suffering from unusually wet or dry conditions (Standard Precipitation Index)		
B-2.6	Occurrence of extremes of temperatures and precipitation		

#### 5.1.1.2 Topic “soil characteristics” (list of indicators)

43. Soil is a multifunctional part of the environment. It provides the physical base to support the production and cycling of biological resources, provides the foundation for buildings and infrastructure, constitutes the source of nutrients and water for agriculture and forestry systems, provides a habitat for diverse organisms, plays an essential role in carbon sequestration and fulfils a complex buffering role against environmental variability, ranging from dampening diurnal and seasonal change in temperature and water supply to the storage and binding of a range of chemical and biological agents. The main environmental concerns about soil pertain to its degradation through soil erosion or nutrient depletion, among other processes. See FDES topic 1.1.4. These indicators were previously part of the theme “E. Land and soil” and are listed in Table 5 below.

**Table 5** Indicators of the topic “soil characteristics”

<i>ID</i>	<i>Name of indicator</i>	<i>Priority indicator</i>	<i>Comments</i>
E-2.1	Proportion of agricultural area affected by water erosion		
E-2.2	Proportion of agricultural area affected by wind erosion		
E-2.4	Proportion of land that is degraded over total land area (SDG indicator 15.3.1)*	Yes	
E-3.3	Progress in management of contaminated sites (number of identified and remediated contaminated sites)		

### 5.1.2 Subcomponent “land cover, ecosystems and biodiversity”

44. This subcomponent organizes environmental indicators on land cover, ecosystems and biodiversity, as well as their recordable changes over time and across locations. Land cover is defined by the Food and Agriculture Organization of the United Nations (FAO) as “the observed (bio)physical cover on the earth’s surface.” Changes in land cover are the result of natural processes and changes in land use. Ecosystems can be broadly defined as a community of organisms, together with their physical environment, viewed as a system of interacting and interdependent relationships. Biodiversity is the variability among living organisms from all sources including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part, including diversity within species, between species and of ecosystems. It is also a measure of ecosystem health. Biodiversity is a fundamental characteristic of ecosystems, while variability among ecosystems is a fundamental driver of biodiversity.

#### 5.1.2.1 Topic “ecosystems and biodiversity” (list of indicators)

45. This topic covers physical quantitative as well as qualitative information about a country’s main ecosystems, including the extent, chemical and physical characteristics, and biological components (biodiversity) of the ecosystems. The extent and conditions of the ecosystems determine their capacity to produce ecosystem services. See FDES topic 1.2.2. These indicators were previously part of the theme “D. Biodiversity” and are listed in Table 6 below.

**Table 6** Indicators of the topic “ecosystems and biodiversity”

<i>ID</i>	<i>Name of indicator</i>	<i>Priority indicator</i>	<i>Comments</i>
D-7.3	Red List of Ecosystems		CBD headline indicator A.1
D-1.1	Share of total protected areas (categories of the International Union for the Conservation of Nature (IUCN)) in the country area*	Yes	PEEA uses “Total area under protection and share of country area”
D-7.2	Extent of natural ecosystems		CBD headline indicator A.2
D-4.4	Red List Index (SDG indicator 15.5.1)	Yes	CBD headline indicator A.3
D-5.3	Proportion of populations within species with an effective population size > 500		CBD headline indicator A.4
D-1.7	Area under restoration		CBD headline indicator 2.2
D-1.8	Coverage of protected areas and OECMs		CBD headline indicator 3.1
D-6.1	Rate of invasive alien species establishment		CBD headline indicator 6.1
D-1.2	Share of total protected areas (national categories) in the country area		National categories are not comparable across countries, therefore using indicator D-1.1 instead is recommended. However, countries which have not yet implemented IUCN categories may continue using D-1.2 as an alternative.
D-1.3	Coverage of protected areas in relation to marine areas (SDG indicator 14.5.1)*		
D-1.5	Proportion of important sites for terrestrial and freshwater biodiversity that are covered by protected areas, by ecosystem type (SDG indicator 15.1.2)		
D-4.2	Share of species threatened (mammals, birds, fishes, reptiles, amphibians, invertebrates, vascular plants, mosses, lichens, fungi, algae)	Yes	
D-5.1	Volume and distribution of selected species (keystone species, flagship species, endemic species and other species)		



<i>ID</i>	<i>Name of indicator</i>	<i>Priority indicator</i>	<i>Comments</i>
D-2.2	Conservation status of habitats of high importance for biodiversity conservation (conservation status for habitats according to conservation status criteria)		
C-18.4	Hazardous substances in marine organisms		
D-2.3	Ecosystem coverage		

### 5.1.2.2 Topic “forests” (list of indicators)

46. Forests provide livelihoods for millions of people around the world. They offer timber, food, shelter, fuel and medicinal products, perform significant ecosystem functions such as hydrological regulation, soil protection and biodiversity protection and act as carbon sinks. Therefore, it is crucial to understand the extent and characteristics of forests and to produce indicators about their diverse dimensions. See FDES topic 1.2.3. These indicators were previously part of the theme “D. Biodiversity” and are listed in Table 7 below.

**Table 7** Indicators of the topic “forests”

<i>ID</i>	<i>Name of indicator</i>	<i>Priority indicator</i>	<i>Comments</i>
D-3.1	Forest area as a proportion of total land area (SDG indicator 15.1.1)*	Yes	PEEA uses “Total area of forest and other wooded land”
D-3.2	Share of other wooded land in country area*		PEEA uses “Total area of forest and other wooded land”
D-3.8	Forest fires (area burnt by forest fires)	Yes	
D-3.9	Deadwood in forests (volume of deadwood per forest area)		

### 5.1.3 Subcomponent “environmental quality”

47. This subcomponent organizes indicators on the concentration of pollutants in the air, freshwater and marine water, and on soil pollution and noise levels. Measurements of concentrations of substances in the environmental media reflect the combined and cumulative impact of human and natural processes. This pollution impacts both the human subsystem and ecosystems. See FDES subcomponent 1.3.

#### 5.1.3.1 Topic “air quality” (list of indicators)

48. This topic includes indicators on the ambient concentration of the most important air pollutants, including suspended solid particles, gases and other relevant pollutants that can have a negative effect on human and ecosystem health. See FDES topic 1.3.1. These indicators were previously part of group “A. Air pollution and ozone depletion” and are listed in Table 8 below.

**Table 8** Indicators of the topic “air quality”

<i>ID</i>	<i>Name of indicator</i>	<i>Priority indicator</i>	<i>Comments</i>
A-2.10	PM <sub>10</sub> : Annual mean concentration in cities*	Yes	
A-2.8	Annual mean level of PM <sub>10</sub> in cities (population weighted) (SDG indicator 11.6.2)*	Yes	
A-2.1	PM <sub>10</sub> : Number of days with exceeded daily limit value		
A-2.9	PM <sub>2.5</sub> : Annual mean concentration in cities*	Yes	
A-2.7	Annual mean level of PM <sub>2.5</sub> in cities (population weighted) (SDG indicator 11.6.2)*	Yes	
A-2.5	PM <sub>2.5</sub> : Number of days with exceeded daily limit value		
A-2.11	SO <sub>x</sub> : Annual mean concentration in cities*	Yes	
A-2.2	SO <sub>2</sub> : Number of days with exceeded daily limit value		
A-2.3	O <sub>3</sub> : Number of days with exceeded daily limit value		
A-2.12	NO <sub>x</sub> : Annual mean concentration in cities*	Yes	
A-2.4	NO <sub>2</sub> : Number of days with exceeded daily limit value		

### 5.1.3.2 Topic “freshwater quality” (list of indicators)

49. Without sufficient quantities of good quality freshwater, ecosystems and humans cannot survive. Precipitation, aquifers, lakes, rivers, coastal zones and oceans are all interconnected in the water cycle, so the choice of where to measure or monitor pollutants and which pollutants to monitor will depend on local and national priorities, ecosystem characteristics and resources available. Identification of the pollutants that are most relevant for monitoring depends on several factors. These include the immediate and subsequent water uses that are important to humans and the nature of the pollutants found in water bodies and watersheds that affect the country’s biocapacities and local ecological equilibriums. See FDES topic 1.3.2. These indicators were previously part of the theme “C. Water” and are listed in Table 9 below.

**Table 9** Indicators of the topic “freshwater quality”

<i>ID</i>	<i>Name of indicator</i>	<i>Priority indicator</i>	<i>Comments</i>
C-10.1	BOD in rivers		
C-10.2	Ammonium (NH <sub>4</sub> ) in rivers		
C-11.1	Phosphates in freshwater (rivers, lakes, groundwater)		
C-11.2	Nitrates in freshwater (rivers, lakes, groundwater)		
C-17.2	Proportion of bodies of water with good ambient water quality (SDG indicator 6.3.2)*	Yes	

### 5.1.3.3 Topic “marine water quality”

50. Oceans cover about 70 per cent of the earth’s surface. They play a critical role in regulating weather and atmospheric processes, absorb 30 per cent of emitted CO<sub>2</sub>, are a fundamental part of the water cycle and are home to species and varied ecosystems worldwide. Oceans also provide important ecosystem services for humans, with food at the forefront. Oceans are under tremendous anthropogenic pressure, including both chemical and physical contamination and over-exploitation. Marine water and ecosystems have been increasingly polluted in the last century, with critical impacts on biodiversity. Degradation is accompanied by depletion of aquatic resources based on human exploitation.
51. Relevant indicators about marine and coastal water quality and pollutant concentrations may include, but are not limited to, nutrients and chlorophyll, organic matter, pathogens, metals, organic contaminants, physical and chemical characteristics, and coral bleaching. See FDES topic 1.3.3. These indicators were previously part of the theme “C. Water” and are listed in Table 10 below.

**Table 10** Indicators of the topic “marine water quality”

<i>ID</i>	<i>Name of indicator</i>	<i>Priority indicator</i>	<i>Comments</i>
C-12.1	Chlorophyll in transitional, coastal and marine waters (trends in chlorophyll-a concentrations)		
C-12.2	Phosphates in transitional, coastal and marine waters		
C-12.3	Nitrates in transitional, coastal and marine waters		
C-18.1	Number of items on beach per 100 m of shoreline*		PEEA recommendation: Governments should increase their efforts to complement inventories of the number of items of beach and marine litter with information on composition and sources of litter
C-18.2	Average marine acidity (pH) measured at agreed suite of sampling stations (SDG indicator 14.3.1)*		
C-18.3	Average sea surface temperature anomaly*		
C-12.4	Index of coastal eutrophication potential		CBD headline indicator 7.1

## 5.2 COMPONENT “ENVIRONMENTAL RESOURCES AND THEIR USE”

52. In alignment with FDES component 2, this component includes indicators on environmental resources and their use, with a focus on measuring stocks and changes in stocks of these resources and their use for production and consumption.
53. Changes in the stocks of environmental resources include additions and reductions, from both anthropogenic and natural activities. In the case of non-renewable resources, continued extraction usually leads eventually to the depletion of the resource. For renewable resources, if extraction (e.g., abstraction, removal and harvesting) exceeds natural regeneration and humanmade replenishment, the resource is depleted. Depletion, in physical terms, is the decrease in the quantity of the stock of a natural resource over an accounting period that is due to the extraction of the natural resource by economic units occurring at a level greater than that of regeneration. See FDES component 2.
54. Material footprint and domestic material consumption are two important composite indicators that integrate information on extraction and use of different environmental resources. Therefore, they cannot be assigned to a specific FDES topic, even if they belong to the component “environmental resources and their use”. See Table 11 below.

**Table 11** Composite indicators of the component “environmental resources and their use”

<i>ID</i>	<i>Name of indicator</i>	<i>Priority indicator</i>	<i>Comments</i>
I-1.4	Material footprint, material footprint per capita, and material footprint per GDP (SDG indicator 12.2.1)*	Yes	PEEA uses “Material footprint, tons per capita”
I-1.5	Domestic material consumption, domestic material consumption per capita, and domestic material consumption per GDP (SDG indicator 12.2.2)*	Yes	Domestic material consumption, tons per capita

### 5.2.1 Subcomponent “energy resources”

55. Energy can be produced from non-renewable or renewable sources. Non-renewable energy resources are the minerals used for energy production. These environmental resources cannot be renewed in any human timescale, so their extraction and use in the economy depletes the resource, limiting its availability for future generations. Indicators on the magnitude of their stocks through time are required to assist in the sustainable management of these resources. See FDES subcomponent 2.2.

#### 5.2.1.1 Topic “production, trade and consumption of energy” (list of indicators)

56. Energy production refers to the capture, extraction or manufacture of fuels or other energy products in forms which are ready for general consumption. Energy products are produced in a number of ways, depending on the energy source. Energy production, transformation, distribution and consumption are processes characterized by different efficiency rates, which cause distinct environmental impacts (including land use change, air pollution, GHG emissions and waste). Therefore, producing indicators to describe these activities is key to informing environmental sustainability policy.

Total energy production originates from sources that can be classified as non-renewable or renewable. Energy production includes the production of primary and secondary energy. See FDES topic 2.2.2. These indicators were previously part of the theme “G. Energy” and are listed in Table 12 below.

**Table 12 Indicators of the topic “production, trade and consumption of energy”**

<i>ID</i>	<i>Name of indicator</i>	<i>Priority indicator</i>	<i>Comments</i>
G-1.1	Total final consumption (TFC) of energy		
G-1.2	Final energy consumption		
G-1.3	Total energy use by the national economy	Yes	
G-1.4	Energy use by resident households per capita	Yes	
G-2.1	Total primary energy supply (TPES)*	Yes	In PEEA disaggregated by energy source
G-3.1	Energy intensity measured in terms of primary energy and GDP (SDG indicator 7.3.1)	Yes	
G-3.2	Energy intensity measured in terms of final energy consumption and GDP		
G-4.1	Renewable energy share in the total primary energy supply	Yes	
G-4.2	Renewable energy share in the total final energy consumption within the national territory (SDG indicator 7.2.1)*		
G-4.3	Share of fossil fuels in total primary energy supply (TPES)		
G-4.4	Use of renewable energy for transport (share of energy from renewable sources used in transport)		

### 5.2.2 Subcomponent “land”

57. Land is a unique environmental resource that delineates the space in which economic activities and environmental processes take place and within which environmental resources and economic assets are located. The two primary aspects are land cover and land use. They are closely related; while land cover describes the biophysical aspects of land, land use refers to the functional aspects of land. Changes in land cover can be the result of natural processes and of land use changes. Generally, the total area of a country remains unchanged from one period to the next. Hence, changes in the stocks of land comprise changes within and between stocks in different classes of land cover and land use (land restructuring). See FDES subcomponent 2.3.

### 5.2.2.1 Topic “land use” (list of indicators)

58. Land use reflects both the activities undertaken and the institutional arrangements put in place for a given area for the purposes of economic production, or the maintenance and restoration of environmental functions. Land being “used” means the existence of some kind of human activity or management. Consequently, there are areas of land that are “not in use” by human activities. These areas are important from an ecological point of view. Land use indicators cover both land in use and land not in use. Indicators on land use are usually obtained through the combination of field surveys and remote sensing (mostly satellite images). Land use data may also be obtained from administrative land registers where available.
59. This topic also includes indicators on land use pertaining to specific agricultural and forest management methods, in particular, land under organic farming, irrigation, agroforestry, sustainable forest management and different ownership categories. These indicators are important because they describe how the use and management of land and biological resources impact the environment. See FDES topic 2.3.1. Table 13 below presents two new indicators not included in the first version of the Guidelines.

**Table 13** Indicators of the topic “land use”

<i>ID</i>	<i>Name of indicator</i>	<i>Priority indicator</i>	<i>Comments</i>
D-7.1	Landscape fragmentation pressure and trends (density of unfragmented landscape elements (“meshes”) per unit area)		
E-1.2	Total land uptake*	Yes	

### 5.2.2.2 Topic “use of forest land” (list of indicators)

60. Changes in forest area in the different categories result from economic activities (afforestation or deforestation), reclassifications among the categories, or natural processes (expansion or regression). FAO defines afforestation as the establishment of forest through planting and/or deliberate seeding on land that, until then, was not classified as forest. It implies a transformation from non-forest to forest. FAO defines deforestation, in turn, as the conversion of forest to another land use or the long-term reduction of the tree canopy cover below the minimum 10 per cent threshold. Reforestation, which is the re-establishment of forest through planting and/or deliberate seeding on land classified as forest, is also included here.
61. Not all forest land is used primarily to produce wood. The primary designated functions of forests are production, protection of soil and water, conservation of biodiversity, social services, multiple use and other. To better understand the uses of forest land, indicators on forest land should be broken down according to its primary designated function. See FDES topic 2.3.2. These indicators were previously part of the theme “D. Biodiversity” and are listed in Table 14 below.

**Table 14** Indicators of the topic “use of forest land”

<i>ID</i>	<i>Name of indicator</i>	<i>Priority indicator</i>	<i>Comments</i>
D-3.3	Share of natural forest of total forest area*	Yes	PEEA calls this indicator “share of primary forest area”
D-3.4	Share of planted forest of total forest area*		
D-3.6	Share of forest area designated for protection of soil, water and ecosystem services of total forest area*		PEEA refers to “soil and water protection”
D-3.7	Share of forest area protected and designated for the conservation of biodiversity*		
D-3.10	Forest: growing stock, increment and fellings		
D-3.11	Forest carbon stock		
D-3.12	Progress towards sustainable forest management (SDG indicator 15.2.1)	Yes	CBD headline indicator 10.2

### 5.2.3 Subcomponent “soil resources”

62. Soil resources comprise the top layers (horizons) of soil that form a biological system. Accounting for soil resources can provide information on the area and volume of soil resources lost due to erosion or degradation, or made unavailable by changes in land cover and other sources. Accounting for soil resources in terms of their type, nutrient content, carbon content and other characteristics is relevant for a more detailed examination of the health of soil systems and of the connections between soil resources and production in agriculture and forestry. See FDES subcomponent 2.4.

#### 5.2.3.1 Topic “soil resources” (list of indicators)

63. This topic covers stocks of soil resources and their changes (additions and reductions) in terms of area and volume, by soil type. See FDES topic 2.4.1. Table 15 below presents indicators that were used in the pan-European environmental assessment, and consequently added to the ECE environmental indicators list.

**Table 15** Indicators of the topic “soil resources”

<i>ID</i>	<i>Name of indicator</i>	<i>Priority indicator</i>	<i>Comments</i>
E-3.1	Proportion of area with improving or degrading soil organic carbon content*		
E-3.2	Soil organic carbon content*		

## 5.2.4 Subcomponent “biological resources”

64. Biological resources are renewable resources capable of regeneration through natural (non-managed or managed) processes; they include timber and aquatic resources and a range of other animal and plant resources (e.g., livestock, orchards, crops and wild animals), fungi and bacteria. Biological resources form an important part of biodiversity and ecosystems. If harvesting and other losses exceed natural or managed regeneration or replenishment, biological resources become depleted (see FDES subcomponent 2.5.).

### 5.2.4.1 Topic “aquatic resources” (list of indicators)

65. Aquatic resources comprise fish, crustaceans, molluscs, shellfish, aquatic mammals and other aquatic organisms that are considered to live within the boundaries of the exclusive economic zone (EEZ) of a country throughout their life cycle, including both coastal and inland fisheries. Migrating and straddling fish stocks are considered to belong to a given country during the period when those stocks inhabit its EEZ (see FDES topic 2.5.2.). The recommended indicator is presented in Table 16 below.

**Table 16** Indicators of the topic “aquatic resources”

<i>ID</i>	<i>Name of indicator</i>	<i>Priority indicator</i>	<i>Comments</i>
D-5.2	Proportion of fish stocks within biologically sustainable levels (SDG indicator 14.4.1)*	Yes	CBD headline indicator 5.1 (Proportion of fish stocks within biologically sustainable levels)

## 5.2.5 Subcomponent “water resources”

66. Management of water resources, in terms of quantities, distribution and quality, is one of the world’s most important priorities today. Policymakers need indicators on water resources, their abstraction, use and returns for many reasons, including to estimate the amount of available water resources; monitor abstraction from key water bodies to prevent overutilization; ensure equitable usage of abstracted water; and track the volume of water returned to the environment. See FDES subcomponent 2.6.

### 5.2.5.1 Topic “water resources” (list of indicators)

67. Water resources consist of freshwater and brackish water, regardless of their quality, in inland water bodies, including surface water, groundwater and soil water. Inland water stocks are the volume of water contained in surface water and groundwater bodies and in the soil at a point in time. Water resources are also measured in terms of flows to and out of the inland water resources during a period of time. Surface water comprises all water that flows over or is stored on the ground’s surface, regardless of its salinity levels. Surface water includes water in artificial reservoirs, lakes, rivers and streams, snow, ice and glaciers. Groundwater comprises water that collects in porous layers of underground formations known as aquifers. A country’s renewable water resources are generated by precipitation and inflows of water from neighbouring territories and reduced by evapotranspiration. See FDES topic 2.6.1. These indicators were previously part of the theme “C. Water” and are listed in Table 17 below.



**Table 17** Indicators of the topic “water resources”

<i>ID</i>	<i>Name of indicator</i>	<i>Priority indicator</i>	<i>Comments</i>
C-1.1	Renewable freshwater resources	Yes	

### 5.2.5.2 Topic “abstraction, use and returns of water” (list of indicators)

68. Abstraction, use and returns of water are the flows of water between the environment and the human subsystem and within the human subsystem. Water abstraction is the amount of water that is removed from any source, either permanently or temporarily, in a given period of time. Water is abstracted from surface water and groundwater resources by economic activities and households. It can be abstracted for own use or for distribution to other users. Indicators on water abstraction should be disaggregated according to the source of the water (surface or groundwater) and by abstractor (economic activity or households). Water abstraction usually refers to the off-stream use of water. The most important off-stream uses for which water is abstracted are (i) water supply to human settlements, (ii) water for agriculture, (iii) water for industries and (iv) water for cooling in thermoelectricity generation. See FDES topic 2.6.2. These indicators were previously part of the theme “C. Water” and are listed in Table 18 below.

**Table 18** Indicators of the topic “abstraction, use and returns of water”

<i>ID</i>	<i>Name of indicator</i>	<i>Priority indicator</i>	<i>Comments</i>
C-2.1	Total freshwater abstracted by source	Yes	Disaggregation by economic activity recommended
C-2.3	Water exploitation index (WEI)	Yes	
C-2.4	Level of Water Stress: freshwater withdrawal as a proportion of available freshwater resources (SDG indicator 6.4.2)	Yes	
C-3.1	Total freshwater available for use		
C-3.2	Total freshwater use	Yes	
C-3.4	Freshwater use per unit GDP		
C-3.6	Change in water use efficiency over time (SDG indicator 6.4.1)	Yes	
C-4.1	Households water use per capita of population connected to public water supply		
C-4.2	Total household water use per capita	Yes	
C-7.2	Percentage of water lost during transportation		
C-7.3	Share of water losses by different reasons (leakages, evaporation, burst mains and meter errors)		
C-8.1	Share of reused water in total freshwater use		
C-8.3	Percentage of reused water by economic activity		

### 5.3 COMPONENT “RESIDUALS”

69. In alignment with FDES component 3, this component is closely related to the physical flow accounts (flows from the economy to the environment) of the SEEA-CF on which the terms and definitions are based, where relevant. It contains indicators on the amount and characteristics of residuals generated by human production and consumption processes, their management, and their final release to the environment. Residuals are flows of solid, liquid and gaseous materials, and energy, that are discarded, discharged or emitted by establishments and households through processes of production, consumption or accumulation. Residuals may be discarded, discharged or emitted directly to the environment or be captured, collected, treated, recycled or reused. It covers the main groups of residuals that are emissions of substances to air, water or soil, wastewater and waste, and the release of residuals from the application of chemical substances.

#### 5.3.1 Subcomponent “emissions to air”

70. Air pollution can be caused by natural as well as anthropogenic factors. This subcomponent focuses on the emission of pollutants from anthropogenic factors that are socioeconomic processes. Emissions to air are gaseous and particulate substances released to the atmosphere by establishments and households as a result of production, consumption and accumulation processes. The statistical description of such emissions covers their sources and the quantities emitted by substance. See FDES subcomponent 3.1.

##### 5.3.1.1 Topic “emissions of greenhouse gases (GHGs)” (list of indicators)

71. GHG emissions constitute a special category of air emissions. GHG emission inventories are compiled based on the guidelines developed by the Intergovernmental Panel on Climate Change, under the auspices of the United Nations Framework Convention on Climate Change. The source categories of GHG emissions are based on processes. The categories of sinks for GHG emissions are also included. GHGs include both direct and indirect GHGs. The most important direct GHGs are carbon dioxide, methane and nitrous oxide, and the most important indirect GHGs are sulphur dioxide, nitrogen oxides and non-methane volatile organic compounds. See FDES topic 3.1.1.
72. These indicators were previously part of the themes “A. Air pollution and ozone depletion” and “B. Climate change” and are listed in Table 19 below.

**Table 19** Indicators of the topic “emissions of greenhouse gases (GHGs)”

<i>ID</i>	<i>Name of indicator</i>	<i>Priority indicator</i>	<i>Comments</i>
B-3.1	Total GHG emissions per capita	Yes	
B-3.4	Total GHG emissions by sector	Yes	GHG inventory sectors: energy, industrial processes and product use, agriculture, land use and forestry, waste
B-3.2	Total GHG emissions per km <sup>2</sup>		
B-3.3	Total GHG emissions per unit of GDP		
B-3.10	GHG emissions from LULUCF	Yes	
B-3.5	Total GHG emissions (excluding LULUCF) from the national territory*		
B-3.16	GHG emissions (excluding LULUCF) per capita*		
B-3.7	CO <sub>2</sub> emission per unit of value added (SDG indicator 9.4.1)	Yes	
B-3.8	Total GHG emissions from the national economy		Residence-based indicator
B-3.11	CO <sub>2</sub> emissions from fuel combustion within the national territory*	Yes	PEEA uses “territorial fossil CO <sub>2</sub> emissions”, therefore disaggregation fossil versus non-fossil necessary
B-3.12	Total GHG emissions from production activities	Yes	
B-3.13	GHG emission intensity of production activities	Yes	
B-3.14	Direct GHG emissions from households		
B-3.15	Net emissions/removals of carbon dioxide by forest land		
A-1.19	Total emissions of SO <sub>x</sub> *	Yes	
A-1.1	Emissions of SO <sub>x</sub> per capita*	Yes	PEEA uses “emissions of SO <sub>2</sub> , kg per annum per capita”; EEA refers to SO <sub>x</sub>
A-1.2	Emissions of SO <sub>x</sub> per km <sup>2</sup>		
A-1.3	Emissions of SO <sub>x</sub> per unit of GDP		
A-1.20	Total emissions of NO <sub>x</sub> *	Yes	

<i>ID</i>	<i>Name of indicator</i>	<i>Priority indicator</i>	<i>Comments</i>
A-1.4	Emissions of NO <sub>x</sub> per capita*		
A-1.5	Emissions of NO <sub>x</sub> per km <sup>2</sup>		
A-1.6	Emissions of NO <sub>x</sub> per unit of GDP		
A-1.22	Total emissions of NMVOCs		
A-1.7	Emissions of NMVOCs per capita	Yes	
A-1.8	Emissions of NMVOCs per km <sup>2</sup>		
A-1.9	Emissions of NMVOCs per unit of GDP		
A-1.10	Share of SO <sub>2</sub> emissions from stationary or mobile sources		
A-1.11	Share of NO <sub>x</sub> emissions from stationary or mobile sources		
A-1.12	Share of emissions of NMVOCs from stationary or mobile sources		
A-1.13	Share of ammonia emissions from stationary or mobile sources		
A-1.14	Share of carbon monoxide emissions from stationary or mobile sources		
A-1.15	Share of hydrocarbons emissions from stationary or mobile sources		
A-3.2	Hydrofluorocarbon phase-down		
B-3.17	Average CO <sub>2</sub> emissions from newly registered motor vehicles		

### 5.3.1.2 Topic "consumption of ozone depleting substances (ODSs)" (list of indicators)

73. ODS is another important category of emissions that is actively monitored by the Montreal Protocol. Reported statistics worldwide have shown this protocol to be very effective in phasing out the use of these substances. Examples of ODSs include chlorofluorocarbons, hydrochlorofluorocarbons, halons, methyl chloroform, carbon tetrachloride and methyl bromide. However, as emissions of these substances are difficult to measure directly, countries report on the apparent consumption of ODSs. See FDES topic 3.1.2.
74. These indicators were previously part of the theme "A. Air pollution and ozone depletion" and are listed in Table 20 below.

**Table 20** Indicators of the topic “consumption of ozone depleting substances (ODSs)”

<i>ID</i>	<i>Name of indicator</i>	<i>Priority indicator</i>	<i>Comments</i>
A-3.1	Total consumption of ozone-depleting substances (ODS)	Yes	Total and breakdowns into groups of substances
A-3.9	Consumption of hydrochlorofluorocarbons (ozone depleting potential per capita)*		

### 5.3.1.3 Topic “emissions of other substances to air” (list of indicators)

75. Other environmentally important polluting substances are emitted to air beyond GHGs and ODSs. The most important are the different fractions of PM, which is an air pollutant consisting of mixed solid (i.e., dust) and liquid particles suspended in the air. PM eventually concentrates in the air and is measured to establish pollution levels (for instance as PM<sub>2.5</sub> and PM<sub>10</sub>, see Topic “Air Quality”). Furthermore, the particulate material contains different chemical elements and compounds that can be harmful beyond the potential impact of dust. Other potentially harmful emissions include heavy metals (such as cadmium, lead and mercury) and other substances that are linked to environmental and health problems. See FDES topic 3.1.3.
76. These indicators were previously part of group “A. Air pollution and ozone depletion” and are listed in Table 21 below.

**Table 21** Indicators of the topic “emissions of other substances to air”

<i>ID</i>	<i>Name of indicator</i>	<i>Priority indicator</i>	<i>Comments</i>
A-1.28	Emissions of ammonia per capita	Yes	
A-1.30	Emissions of ammonia per km <sup>2</sup>		
A-1.29	Emissions of ammonia per unit of GDP		
A-1.31	Emissions of PM <sub>10</sub> per capita		
A-1.23	Emissions of PM <sub>10</sub> per km <sup>2</sup>		
A-1.24	Emissions of PM <sub>10</sub> per unit of GDP		
A-1.21	Total emissions of PM <sub>2.5</sub> *	Yes	
A-1.25	Emissions of PM <sub>2.5</sub> per capita*		
A-1.26	Emissions of PM <sub>2.5</sub> per km <sup>2</sup>		
A-1.27	Emissions of PM <sub>2.5</sub> per unit of GDP		
A-1.16	Share of total suspended particles (TSP) emissions from stationary or mobile sources		
A-1.17	Share of PM <sub>10</sub> emissions from stationary or mobile sources	Yes	
A-1.18	Share of PM <sub>2.5</sub> emissions from stationary or mobile sources	Yes	

### 5.3.2 Subcomponent “generation and management of wastewater”

77. This subcomponent contains indicators on the generation, management and discharge of wastewater, as well as the pollutant content of wastewater (emissions of substances to water). Policymakers, analysts and civil society need indicators on wastewater to properly manage this potentially harmful by-product of the human subsystem. See FDES subcomponent 3.2.

#### 5.3.2.1 Topic “generation and pollutant content of wastewater” (list of indicators)

78. This topic includes indicators on the volume of water that is no longer required and is thus discarded by the user and statistics on the amount of pollutants contained in wastewater (emissions to water) before any collection or treatment. Indicators on the generation of wastewater and emissions to water should be broken down by the economic activity and households that generate them. See FDES topic 3.2.1.
79. These indicators were previously part of the theme “C. Water” and the set has yet to be developed.

#### 5.3.2.2 Topic “collection and treatment of wastewater” (list of indicators)

80. Wastewater may be discharged directly to the environment by the generator or may be collected in sewerage systems and treated in wastewater treatment plants (urban, industrial or other). This topic can include indicators describing (i) volumes of wastewater collected and transported to its final place of discharge or treatment facilities, (ii) volume of wastewater treated by type of treatment (primary, secondary and tertiary), (iii) physical infrastructure related to wastewater collection and treatment (e.g. number of treatment plants and capacities of plants), (iv) pollutant content extracted in the treatment facilities and (v) other relevant information. See FDES topic 3.2.2.
81. These indicators were previously part of the theme “C. Water” and are listed in Table 22 below.

**Table 22** Indicators of the topic “collection and treatment of wastewater”

<i>ID</i>	<i>Name of indicator</i>	<i>Priority indicator</i>	<i>Comments</i>
C-15.1	Treatment capacity of urban wastewater-treatment plants in terms of population equivalent (p.e.)	Yes	Total and per treatment type (primary, secondary, tertiary)
C-15.2	Treatment capacity of urban wastewater-treatment plants in terms of hydraulic capacity (1,000 m <sup>3</sup> /day)		Total and per treatment type (primary, secondary, tertiary)
C-15.3	Treatment capacity of individual wastewater-treatment facilities in terms of population equivalent (p.e.)		
C-15.4	Treatment capacity of individual wastewater-treatment facilities in terms of hydraulic capacity (1,000 m <sup>3</sup> /day)		
C-16.2	Proportion of domestic and industrial wastewater flows safely treated (SDG indicator 6.3.1)	Yes	
C-15.5	Percentage of BODs removed from generated wastewater before discharge into the environment	Yes	
C-15.6	Percentage of total phosphorus removed from generated wastewater before discharge into the environment		
C-15.7	Percentage of total nitrogen removed from generated wastewater before discharge into the environment		

### 5.3.2.3 Topic “discharge of wastewater to the environment” (list of indicators)

82. This topic captures information at the stage of final discharge of wastewater to the environment. It includes (i) volume of wastewater discharged to the environment without treatment; (ii) volume of wastewater discharged to the environment after treatment, by type of treatment (primary, secondary and tertiary) and type of treatment facility (public, private, municipal, industrial); and (iii) effluent quality. See FDES topic 3.2.3.
83. These indicators were previously part of the theme “C. Water” and are listed in Table 23 below.

**Table 23** Indicators of the topic “discharge of wastewater to the environment”

<i>ID</i>	<i>Name of indicator</i>	<i>Priority indicator</i>	<i>Comments</i>
C-16.1	Share of total wastewater discharged to the environment after treatment	Yes	Total and per treatment category

### 5.3.3 Subcomponent “generation and management of waste”

84. This subcomponent includes indicators on the amount and characteristics of waste, defined as discarded material for which the owner or user has no further use, generated by human activities in the course of production and consumption processes. To reduce the amount of waste generated and increase the share of waste that is recycled and reused as material or energy source are central to sustainable consumption and production and natural resource management. The final disposal of waste in the environment, even if in a controlled manner, creates pollution and occupies considerable land areas. See FDES subcomponent 3.3.

#### 5.3.3.1 Topic “generation of waste” (list of indicators)

85. This topic includes indicators describing the amount of waste generated before any collection or treatment, by waste type, and by generator (by economic activity (by the International Standard Industrial Classification of All Economic Activities) and households). The waste lists that countries and international organizations use for waste statistics are usually based either on the generating process or the material content of the waste, or on the combination of the two. In many cases, the origin of the waste (the economic activity) generally determines the material content of the waste. See FDES topic 3.3.1.
86. These indicators were previously part of the theme “I. Waste” and are listed in Table 24 below.

**Table 24** Indicators of the topic “generation of waste”

<i>ID</i>	<i>Name of indicator</i>	<i>Priority indicator</i>	<i>Comments</i>
I-1.2	Total waste generation	Yes	
I-1.8	Total waste generation per capita*		
I-1.1	Municipal waste generated per capita	Yes	
I-1.3	Waste generation intensity per unit of GDP	Yes	
I-2.1	Hazardous waste generated per capita (SDG indicator 12.4.2)*	Yes	Includes breakdown of hazardous waste generated by key type of waste, including e-waste. PEEA uses indicator “domestic e-waste generation per capita”

#### 5.3.3.2 Topic “management of waste” (list of indicators)

87. This topic includes indicators on (a) The amount of waste collected and transported to treatment facilities or final disposal; (b) The amount of waste treated and disposed of by type of treatment and disposal (e.g., reuse, recycling, composting, incineration, landfilling, other); (c) The physical infrastructure for waste treatment and disposal, including the number and capacity of treatment and disposal plants; and (d) Other relevant information. See FDES topic 3.3.2.



88. These indicators were previously part of the theme “I. Waste” and are listed in Table 25 below.

**Table 25** Indicators of the topic “management of waste”

<i>ID</i>	<i>Name of indicator</i>	<i>Priority indicator</i>	<i>Comments</i>
I-3.2	National recycling rate, tons of material recycled (SDG indicator 12.5.1)*	Yes	Breakdown by waste stream similar to related European Environment Agency indicators; PEEA uses “Recycling rate of municipal solid waste, including composting and anaerobic digestion”
I-3.3	Recovery rate of construction and demolition waste*		
I-2.2	Proportion of hazardous waste treated, by type of treatment (SDG indicator 12.4.2)	Yes	
I-2.3	Stock of hazardous waste at the end of the year		
I-4.3	Proportion of urban solid waste regularly collected and with adequate final discharge out of total urban waste generated, by cities. (SDG indicator 11.6.1)		
I-4.2	Diversion of waste from landfill (amounts of waste deposited in landfills, by type of waste category)		

### 5.3.4 Subcomponent “release of chemical substances”

89. FDES sub-component 3.4 consists only of topic 3.4.1 (release of chemical substances) which is explained in the following section 5.3.4.1.

#### 5.3.4.1 Topic “release of chemical substances” (list of indicators)

90. This topic deals with chemical fertilizers to enrich soils and pesticide use in protecting plants and animals from disease. Other chemicals accelerate the growth of biota and preserve and enhance the quality, size and appearance of biological products. Environmental effects are generated by the diffusion of chemicals through cycling systems and build-up of contaminants in water, land and living organisms (through the food chain). Indicators under this topic include the amount of natural and chemical fertilizers, pesticides and other chemicals (hormones and pellets) used by type of active ingredients (see also Subcomponent “Biological Resources”), the area under application and the method employed. See FDES topic 3.4.1.
91. These indicators were previously part of the theme “F. Agriculture” and are listed in Table 26 below.

**Table 26** Indicators of the topic “release of chemical substances”

<i>ID</i>	<i>Name of indicator</i>	<i>Priority indicator</i>	<i>Comments</i>
F-2.1	Consumption of mineral fertilizers per unit of agricultural area	Yes	
F-2.2	Share of area treated with mineral fertilizers in total agricultural area		
F-2.3	Consumption of organic fertilizers per unit of agricultural area	Yes	
F-2.4	Share of area treated with organic fertilizers in total agricultural area		
F-2.5	Share of area under crop treated with fertilizers in total area		
F-2.6	Consumption of fertilizers per unit of area under crop		
F-4.1	Consumption of pesticides per unit of agricultural area		
F-4.2	Consumption of insecticides per unit of agricultural area		
F-4.3	Consumption of herbicides and desiccants per unit of agricultural area		
F-4.4	Consumption of fungicides and bactericides per unit of agricultural area		
F-4.5	Consumption of plant regulators per unit of agricultural area		
F-4.6	Consumption of rodenticides per unit of agricultural area		
F-4.7	Consumption of other pesticides (e.g., mineral oils) per unit of agricultural area		

#### **5.4 COMPONENT “EXTREME EVENTS AND DISASTERS”**

92. In alignment with FDES component 4, this component includes indicators on the occurrence of extreme events and disasters and their impacts on human well-being and the infrastructure of the human subsystem.

##### **5.4.1 Subcomponent “natural extreme events and disasters”**

93. This subcomponent organizes indicators on the frequency and intensity of extreme events and disasters deriving from natural phenomena, as well as their impact on human lives and habitats and the environment as a whole. Indicators on natural extreme events and disasters are important to policymakers, analysts and civil society not only when assessing the impact of an ongoing disaster, but also when monitoring the frequency, intensity and impact of disasters over time.

#### 5.4.1.1 Topic “Occurrence of natural extreme events and disasters” (list of indicators)

94. The types of indicators included in this topic may be, but are not limited to, the type, location, magnitude, date of occurrence and duration of a given natural disaster.
95. The recommended indicators are listed in Table 27 below.

**Table 27** Indicators of the topic “occurrence of natural extreme events and disasters”

<i>ID</i>	<i>Name of indicator</i>	<i>Priority indicator</i>	<i>Comments</i>
K-1.4	Number of hazardous events per year (per type of hazard)		
K-1.5	Proportion of hazardous events with deaths per year (per type of hazard)		

#### 5.4.1.2 Topic “Impact of natural extreme events and disasters” (list of indicators)

96. This topic includes information on the impact of a natural extreme event or disaster. Impact can be measured in a number of ways. Common dimensions include the number of persons killed, injured, made homeless or affected, as well as economic loss. Economic loss may refer to damage to buildings and other economic assets, the number of transportation networks affected, economic disruption or loss of revenue for commercial services, and utility disruption. Physical loss or damage refers to the magnitude of the impact of the event or disaster on the quantity and quality of land, crops, livestock, aquaculture and biomass. The specific impact of each natural disaster on the integrity of the local ecosystem may also be reported on, where statistics exist. In addition, the external assistance received for disaster relief may also be measured.
97. The recommended indicators are listed in Table 28 below.

**Table 28** Indicators of the topic “impact of natural extreme events and disasters”

<i>ID</i>	<i>Name of indicator</i>	<i>Priority indicator</i>	<i>Comments</i>
K-1.6	Direct economic loss attributed to disasters in relation to GDP (SDG indicator 1.5.2/11.5.2, Sendai Framework indicator C-1)	Yes	
K-1.7	Number of deaths attributed to disasters, per 100,000 population (Sendai Framework indicator A-2)	Yes	
K-1.8	Direct agricultural loss attributed to disasters (Sendai Framework indicator C-2)		

## 5.5 COMPONENT “HUMAN SETTLEMENTS AND ENVIRONMENTAL HEALTH”

98. This component contains indicators on the environment in which humans live and work, particularly with regard to living conditions and environmental health. These indicators are important for the management and improvement of conditions related to human settlements, shelter conditions, safe water, sanitation and health, particularly in the context of rapid urbanization, increasing pollution, environmental degradation, disasters, extreme events and climate change. See FDES component 5.

### 5.5.1 Subcomponent “human settlements”

99. This subcomponent includes relevant indicators on basic services and infrastructure of human settlements. Human settlements refer to the totality of the human community, whether people live in large cities, towns or villages. They encompass the human population that resides in a settlement, the physical elements (e.g., shelter and infrastructure), services (e.g., water, sanitation, waste removal, energy and transport), and the exposure of humans to potentially deleterious environmental conditions. See FDES subcomponent 5.1.

#### 5.5.1.1 Topic “access to selected basic services” (list of indicators)

100. This topic includes information about access to water, sanitation, waste removal services and energy in urban and rural areas. Access to these basic services can have a positive effect on human health and well-being, thereby contributing to improved environmental quality. See FDES topic 5.1.2.
101. These indicators were previously part of the themes “C. Water”, “G. Energy” and “I. Waste”, and are listed in Table 29 below.

**Table 29** Indicators of the topic “access to selected basic services”

<i>ID</i>	<i>Name of indicator</i>	<i>Priority indicator</i>	<i>Comments</i>
C-6.1	Share of total population (urban and rural) connected to the water supply industry	Yes	
C-6.2	Proportion of population using safely managed drinking water services (SDG indicator 6.1.1)*	Yes	
C-6.3	Percentage of population using basic drinking water services by location*		
C-9.7	Mortality rate attributed to unsafe water, unsafe sanitation and lack of hygiene (SDG indicator 3.9.2)		
C-14.1	Percentage of total population connected to a wastewater collecting system	Yes	
C-14.2	Percentage of total population connected to wastewater treatment facilities*		Total and per treatment type; PEEA uses “Population connected to wastewater treatment”
C-14.3	Proportion of population using safely managed sanitation services (SDG indicator 6.2.1)*		
C-14.4	Percentage of population using basic sanitation services by location**		
I-4.1	Proportion of population served by municipal waste collection	Yes	
G-5.1	Percentage of population with access to electricity by location*		

#### 5.5.1.2 Topic “exposure to ambient pollution” (list of indicators)

102. This topic includes spatially described indicators on human populations exposed to different levels of air and noise pollution. This topic overlays pollutant emission and exposure data onto geographic and demographic data to create a more detailed understanding of the location of populations currently exposed to pollutants and those most at risk of future exposure. Location-specific geospatial information on ambient pollutant levels is extremely important for environmental protection and environmental health policies, particularly in larger cities. See Table 30 below and FDES topic 5.1.4.

**Table 30** Indicators of the topic “exposure to ambient pollution”

<i>ID</i>	<i>Name of indicator</i>	<i>Priority indicator</i>	<i>Comments</i>
A-2.6	Mortality rate attributed to household and ambient air pollution (SDG indicator 3.9.1)		Proposed indicator; cannot currently be calculated by countries themselves
K-1.9	Number of people exposed to unhealthy noise levels		EEA uses indicator “Estimated number of people exposed to unhealthy noise levels, based on END thresholds”

#### 5.5.1.3 Topic “environmental concerns specific to urban settlements” (list of indicators)

103. A growing proportion of the world’s population, currently more than half, live in urban areas. This topic is intended to organize issues of specific relevance to this part of the population. Depending on national and local conditions and priorities, additional environmentally relevant urban concerns should be included here. Such issues may include, but are not limited to, the extent of urban sprawl, the availability of green spaces for urban residents, the prevailing types of transportation in and between urban areas, and the existence and effectiveness of urban planning and zoning.
104. With regard to transportation, indicators may include the number of private, public and commercial vehicles by engine type, as well as the extent of roadway infrastructure. Most importantly, from the environmental perspective, additional indicators should include the number of passengers transported by public transportation systems and the number of passengers transported annually by hybrid and electric modes of transportation. See FDES topic 5.1.5.
105. These indicators were previously part of the themes “H. Transport” and are listed in Table 31 below.

**Table 31** Indicators of the topic “environmental concerns specific to urban settlements”

<i>ID</i>	<i>Name of indicator</i>	<i>Priority indicator</i>	<i>Comments</i>
H-1.1	Passenger and freight volumes, by mode of transport (SDG indicator 9.1.2)	Yes	
H-1.2	Total passenger transport demand per capita	Yes	
H-1.4	Share of road transport demand in total passenger transport		
H-1.5	Share of railway transport demand in total passenger transport*		PEEA uses “railway passenger traffic, national and international”

<i>ID</i>	<i>Name of indicator</i>	<i>Priority indicator</i>	<i>Comments</i>
H-1.6	Share of inland waterways demand in total passenger transport		
H-1.7	Share of maritime transport demand in total passenger transport		
H-1.8	Share of domestic aviation demand in total passenger transport		
H-2.1	Total Freight transport demand per unit of GDP		
H-2.3	Share of road transport in total freight transport demand		
H-2.4	Share of railway transport in total freight transport demand		
H-2.5	Share of inland waterways transport in total freight transport demand		
H-2.6	Share of maritime transport in total freight transport demand		
H-2.7	Share of domestic aviation in total freight transport demand		
H-3.1	Road vehicle fleet in the country by vehicle category (passenger cars, motor coaches and buses, trucks, trolleybuses, road tractors)		
H-3.2	Road vehicle fleet in the country by fuel type (gasoline, diesel, gas, electricity, biofuels, other)	Yes	
H-4.1	Share of road vehicle fleet in the country less/equal to 2 years old (passenger cars, motor coaches and buses, trucks, trolleybuses, road tractors)		
H-4.2	Share of road vehicle fleet in the country with the age from 2 years to 5 years (passenger cars, motor coaches and buses, trucks, trolleybuses, road tractors)		
H-4.3	Share of road vehicle fleet in the country with the age from 5 years to 10 years (passenger cars, motor coaches and buses, trucks, trolleybuses, road tractors)		
H-4.4	Share of road vehicle fleet in the country more than 10 years old (passenger cars, motor coaches and buses, trucks, trolleybuses, road tractors)		
H-3.3	New registrations of electric vehicles		
H-5.1	Motorway length*		
H-5.2	Motor vehicle movements on national territory by vehicle-kilometres (millions)*		

## 5.6 COMPONENT “ENVIRONMENTAL PROTECTION, MANAGEMENT AND ENGAGEMENT”

106. This component organizes information on environmental protection and resource management expenditure to improve the environment and maintain ecosystem health. Indicators on environmental governance, institutional strength, enforcement of regulations and extreme event preparedness are also considered. This component also includes information on a wide variety of programmes and actions to increase awareness, including environmental information and education, as well as private and community activities aimed at diminishing environmental impacts and improving the quality of local environments. See FDES component 6.

### 5.6.1 Subcomponent “environmental protection and resource management expenditure” (list of indicators)

107. This subcomponent is closely related to the environmental activity accounts of the SEEA-CF and is based on the CEA. Expenditure on environmental protection and resource management may be used as one measure of public and private engagement in protecting, restoring and managing the environment towards more sustainable use. Monitoring and tracking the level of environmental protection and resource management expenditure is important for policymakers, analysts and civil society in order to determine the current and desired levels of engagement and commitment from both government and the private sector. See FDES subcomponent 6.1.

108. These indicators (placeholders) were previously part of the theme “J. Environmental financing” and are listed in Table 32 below.

**Table 32** Indicators of the subcomponent “environmental protection and resource management expenditure”

<i>ID</i>	<i>Name of indicator</i>	<i>Priority indicator</i>	<i>Comments</i>
J-1.1	National expenditure on environmental protection as percentage of GDP*	Yes	PEEA uses indicator “government environmental protection expenditures as proportion of GDP”
J-1.5	Contribution to the international \$100 billion commitment on climate-related expenditure*		
J-1.7	Domestic public funding on conservation and sustainable use of biodiversity and ecosystems		CBD headline indicator D.2

### 5.6.2 Subcomponent “environmental governance and regulation”

109. To provide a holistic view of a country’s efforts towards sustaining and protecting the environment, policymakers, analysts and civil society require indicators on environmental governance and regulation at the national level. The magnitude of these activities can inform about the extent of institutional development, availability of resources, and the existence and enforcement of regulatory and market instruments whose primary purpose is to protect, regulate and manage the changing environment. See FDES subcomponent 6.2.



### 5.6.2.1 Topic “environmental regulation and instruments” (list of indicators)

110. This topic refers to policy responses to regulate and establish acceptable limits for protecting the environment and human health. It entails both direct regulatory and economic instruments. Direct regulatory instruments include environmental and related laws, standards, limits and their enforcement capacities. These can be described using indicators on regulated pollutants, licensing systems, applications for licences, quotas for biological resource extraction, and budget and number of staff dedicated to enforcement of environmental regulations. Economic instruments may comprise the existence and number of green/environmental taxes, environmental subsidies, eco-labelling and certification and emission permits. See FDES topic 6.2.2.
111. These indicators (placeholders) were previously part of the theme “J. Environmental financing” and are listed in Table 33 below.

**Table 33** Indicators of the topic “environmental regulation and instruments”

<i>ID</i>	<i>Name of indicator</i>	<i>Priority indicator</i>	<i>Comments</i>
J-1.2	Environmental tax revenues as a proportion of GDP*	Yes	
J-1.3	Environmentally related taxes, % total tax revenue		
J-1.4	Share of energy and transport related taxes in total taxes and social contributions		
J-1.6	Amount of fossil-fuel subsidies (production and consumption) per unit of GDP (SDG indicator 12.c.1)*	Yes	
J-1.8	Payments for use of natural resources		

### 5.6.2.2 Topic “participation in multilateral environmental agreements and environmental conventions” (list of indicators)

112. This topic includes information on a given country’s participation in multilateral environmental agreements and other global environmental conventions. The information to be produced on this topic is mainly descriptive, although comparable time series can also be derived from these statistics. See FDES topic 6.2.3.
113. SDG indicator 6.5.2 “proportion of transboundary basin area with an operational arrangement for water cooperation” was added because it is also used in the pan-European environmental assessment (see Table 34 below).

**Table 34** Indicators of the topic “participation in multilateral environmental agreements and environmental conventions”

<i>ID</i>	<i>Name of indicator</i>	<i>Priority indicator</i>	<i>Comments</i>
C-17.1	Proportion of transboundary basin area with an operational arrangement for water cooperation (SDG indicator 6.5.2)*		

### 5.6.3 Subcomponent “extreme event preparedness and disaster management”

114. These indicators and statistics include the existence and strength of the disaster management agency’s facilities and infrastructure, including indicators and statistics on extreme event preparedness and disaster management expenditure. See FDES subcomponent 6.3.

### 5.6.4 Topic “preparedness for natural extreme events and disasters” (list of indicators)

115. Disaster preparedness measures vary according to a given community and location’s characteristics and historical profile for natural extreme events and disasters. Relevant information may include the existence and description of national disaster plans; the type and number of shelters in place; the type and number of internationally certified emergency and recovery management specialists; the number of volunteers; and the quantity of first aid and emergency supplies and equipment stockpiles. The existence of early warning systems for all major hazards, and expenditure on disaster prevention, preparedness, clean-up and rehabilitation are also important data requirements. See FDES topic 6.3.1 and Table 35 below.

**Table 35** Indicators of the topic “preparedness for natural extreme events and disasters”

<i>ID</i>	<i>Name of indicator</i>	<i>Priority indicator</i>	<i>Comments</i>
K-1.1	Number of people per 100,000 that are covered by early warning information through local governments or through national dissemination mechanisms (Sendai Framework indicator G-3)*		PEEA uses “estimated proportion of population covered by local disaster risk reduction strategies”

### 5.6.5 Subcomponent “environmental information and awareness”

116. This subcomponent covers statistics about environmental information and diverse processes that contribute to increasing social awareness of environmental issues, thus promoting pro-environmental engagement and actions by the public and decision-makers at both the local and national levels. See FDES subcomponent 6.4.

### 5.6.5.1 Topic “environmental information” (list of indicators)

117. Environmental information includes quantitative and qualitative facts describing the state of the environment and its changes as described in the components of FDES. See FDES topic 6.4.1 and Table 36 below.

**Table 36** Indicators of the topic “environmental information”

<i>ID</i>	<i>Name of indicator</i>	<i>Priority indicator</i>	<i>Comments</i>
K-1.2	Number of companies publishing sustainability reports (SDG indicator 12.6.1)*		

### 5.6.5.2 Topic “environmental education” (list of indicators)

118. Environmental education refers to the process of sharing and constructing environmental information and knowledge, as well as information on how humans interact with the environment. Environmental education is carried out through a variety of programmes, including formal and informal education and training, directed towards different audiences. It may be curriculum- and classroom-based or experiential and may be provided on-site or in community settings by government agencies or non-governmental organizations (NGOs). See FDES topic 6.4.2 and Table 37 below.

**Table 37** Indicators of the topic “environmental education”

<i>ID</i>	<i>Name of indicator</i>	<i>Priority indicator</i>	<i>Comments</i>
K-1.3	Proportion of students in lower secondary education showing adequate understanding of issues relating to global citizenship and sustainability, by sex*		

## 6. METADATA OF PRIORITY INDICATORS

### 6.1 INDICATOR B-1.1 MEAN TEMPERATURE ANOMALY (COMPARED TO CLIMATE NORMAL 1961–1990)

#### A. General

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	B: Climate change
Component (FDES)	1: Environmental conditions and quality
Sub-component (FDES)	1.1: Physical conditions
Indicator topic (FDES)	1.1.1: Atmosphere, climate and weather
ID and name in previous indicator guidelines	B1: Air temperature
First publication	19/7/2022
Latest update	-
Indicator definition	The indicator shows the annual average temperature of the air, its development over a given period of time, and deviations from a long-term average in the country as a whole and in particular regions.
Unit of measure	Degrees Celsius (°C)
Coverage	Air temperature
Spatial aggregation	National territory, individual cities, and other selected areas
Reference period	Calendar year (monthly disaggregation recommended)
Update frequency	Annual
Purpose	The air temperature is directly linked to the state of the Earth's climate system. The indicator shows trends in the variation of the annual average temperature and provides a measure of changes that can be related both to cyclic natural changes in the climate and to anthropogenic impact on global climate change.

<i>Parameter</i>	<i>Description</i>
Policy context	Change in air temperature - observed over a long period of time - is an evidence of one of climate change's most serious effects, which has been especially noticeable in recent decades. There is mounting evidence that the increase of anthropogenic emissions of greenhouse gases (GHG) is one of the reasons for recently observed rapid increases in average annual temperature. Countries which are Parties to the United Nations Framework Convention on Climate Change (UNFCCC) have to carry out systematic observations of the climate change parameters, create databases and conduct research related to the climate system.
Link with SDG indicators	
Methodology for indicator calculation	The network of hydro-meteorological stations in a given country collects data over long periods of time. The methodology recommended by WMO should be applied (see methodological references).
Comments	-

## **B. Policy references**

<i>Title of the reference document</i>	<i>Link</i>
Paris Agreement	<a href="https://unfccc.int/process-and-meetings/the-paris-agreement">https://unfccc.int/process-and-meetings/the-paris-agreement</a>
Sendai Framework for Disaster Risk Reduction 2015-2030	<a href="https://www.unisdr.org/we/inform/publications/43291">https://www.unisdr.org/we/inform/publications/43291</a>

## **C. Methodology references**

<i>Title of the reference document</i>	<i>Link</i>
WMO Guidelines on the Calculation of Climate Normals	<a href="https://library.wmo.int/index.php?lvl=notice_display&amp;id=20130#.Ytas-5AzaUl">https://library.wmo.int/index.php?lvl=notice_display&amp;id=20130#.Ytas-5AzaUl</a>
WMO Guide to Instruments and Methods of Observation (WMO-No. 8)	<a href="https://library.wmo.int/index.php?id=12407&amp;lvl=notice_display#.YtbB_5AzaUk">https://library.wmo.int/index.php?id=12407&amp;lvl=notice_display#.YtbB_5AzaUk</a>

**D. Data and statistics needed to compile the indicator**

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
261	Temperature: Mean annual temperature	1.1.1: Atmosphere, climate and weather

**E. International databases containing this indicator**

<i>Name of the database</i>	<i>Link</i>
n/a	n/a

**6.2 INDICATOR B-1.2 ANNUAL AVERAGE TEMPERATURE (IN COUNTRY, IN CAPITAL, SECOND MAJOR CITY, AREA OR REGION)****A. General**

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	B: Climate change
Component (FDES)	1: Environmental conditions and quality
Sub-component (FDES)	1.1: Physical conditions
Indicator topic (FDES)	1.1.1: Atmosphere, climate and weather
ID and name in previous indicator guidelines	B1: Air temperature
First publication	19/7/2022
Latest update	-
Indicator definition	The indicator shows the annual average temperature of the air and its development over a given period of time for the entire country, in the capital, a second major city, area and region.
Unit of measure	Degrees Celsius (°C)
Coverage	Air temperature
Spatial aggregation	National territory, individual cities, and other selected areas
Reference period	Calendar year (monthly disaggregation recommended)
Update frequency	Annual

<i>Parameter</i>	<i>Description</i>
Purpose	The air temperature is directly linked to the state of the Earth's climate system. The indicator shows trends in the variation of the annual average temperature and provides a measure of changes that can be related both to cyclic natural changes in the climate and to anthropogenic impact on global climate change.
Policy context	Change in air temperature - observed over a long period of time - is an evidence of one of climate change's most serious effects, which has been especially noticeable in recent decades. There is mounting evidence that the increase of anthropogenic emissions of greenhouse gases (GHG) is one of the reasons for recently observed rapid increases in average annual temperature. Countries which are Parties to the United Nations Framework Convention on Climate Change (UNFCCC) have to carry out systematic observations of the climate change parameters, create databases and conduct research related to the climate system.
Link with SDG indicators	n/a
Methodology for indicator calculation	The network of hydro-meteorological stations in a given country collects data over long periods of time. The methodology recommended by WMO should be applied (see methodological references).
Comments	-

## **B. Policy references**

<i>Title of the reference document</i>	<i>Link</i>
Paris Agreement	<a href="https://unfccc.int/process-and-meetings/the-paris-agreement">https://unfccc.int/process-and-meetings/the-paris-agreement</a>
Sendai Framework for Disaster Risk Reduction 2015-2030	<a href="https://www.unisdr.org/we/inform/publications/43291">https://www.unisdr.org/we/inform/publications/43291</a>

### C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
WMO Guidelines on the Calculation of Climate Normals	<a href="https://library.wmo.int/index.php?lvl=notice_display&amp;id=20130#.Ytas-5AzaUl">https://library.wmo.int/index.php?lvl=notice_display&amp;id=20130#.Ytas-5AzaUl</a>
WMO Guide to Instruments and Methods of Observation (WMO-No. 8)	<a href="https://library.wmo.int/index.php?id=12407&amp;lvl=notice_display#.YtbB_5AzaUk">https://library.wmo.int/index.php?id=12407&amp;lvl=notice_display#.YtbB_5AzaUk</a>

### D. Data and statistics needed to compile the indicator

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
261	Temperature: Mean annual temperature	1.1.1: Atmosphere, climate and weather

### E. International databases containing this indicator

<i>Name of the database</i>	<i>Link</i>
n/a	n/a

## 6.3 INDICATOR B-2.2 ANNUAL PRECIPITATION (IN COUNTRY, IN CAPITAL, SECOND MAJOR CITY, AREA OR REGION)

### A. General

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	B: Climate change
Component (FDES)	1: Environmental conditions and quality
Sub-component (FDES)	1.1: Physical conditions
Indicator topic (FDES)	1.1.1: Atmosphere, climate and weather
ID and name in previous indicator guidelines	B2: Atmospheric precipitation
First publication	19/7/2022
Latest update	14/7/2023
Indicator definition	The indicator measures annual precipitation. Precipitation (the total volume of water precipitated to a certain surface area for a given period of time) means water, in either liquid or solid state, falling out of the clouds or depositing from the air on the land surface, on various materials or plants.



<i>Parameter</i>	<i>Description</i>
Unit of measure	Linear depth of the precipitated water in millimetres (mm)
Coverage	Precipitation
Spatial aggregation	National territory (disaggregation by smaller areas recommended)
Reference period	Calendar year (disaggregation by month recommended)
Update frequency	Annual
Purpose	The indicator provides a measure of the state of the climate system as well as the impact of precipitation on the change in quantity of surface waters and ground waters and on soil and biota. Analysis of the perennial sets of the main climate formation characteristics, such as atmospheric precipitation, air temperature and air humidity, makes it possible to evaluate the precipitation structure change in a certain area and to assess the dynamics of past and future changes in precipitation volumes and related changes in climate.
Policy context	Atmospheric precipitation is one of the most important characteristics of climate. Atmospheric precipitation generates renewable freshwater resources (surface waters and ground waters) and thus influences the state of all components of the environment (soil, forests, fauna and flora). The volume, quality and distribution of atmospheric precipitation as well as its seasonal and annual distribution are very significant for agriculture and forestry. In addition, the quantity of atmospheric precipitation influences the state of ambient air by regulating its humidity, and it limits the dispersion of suspended particulate matter in lower layers of the atmosphere.
Link with SDG indicators	n/a
Methodology for indicator calculation	Collection of data on the quantity of atmospheric precipitation should be carried out by the network of meteorological stations. Methodological guidance is provided by WMO (see methodological reference documents).
Comments	-

**B. Policy references**

<i>Title of the reference document</i>	<i>Link</i>
Paris Agreement	<a href="https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement">https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement</a>
United Nations Framework Convention on Climate Change	<a href="https://unfccc.int/">https://unfccc.int/</a>

**C. Methodology references**

<i>Title of the reference document</i>	<i>Link</i>
WMO Guide to Instruments and Methods of Observation (WMO-No. 8)	<a href="https://library.wmo.int/index.php?id=12407&amp;lvl=notice_display#.YtbB_5AzaUk">https://library.wmo.int/index.php?id=12407&amp;lvl=notice_display#.YtbB_5AzaUk</a>

**D. Data and statistics needed to compile the indicator**

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
160	Precipitation	2.6.1: Water resources

**E. International databases containing this indicator**

<i>Name of the database</i>	<i>Link</i>
WMO Catalogue for Climate Data	<a href="https://climatedata-catalogue.wmo.int/">https://climatedata-catalogue.wmo.int/</a>

**6.4 INDICATOR E-2.4 PROPORTION OF LAND THAT IS DEGRADED OVER TOTAL LAND AREA (SDG 15.3.1)****A. General**

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	E: Land and soil
Component (FDES)	1: Environmental conditions and quality
Sub-component (FDES)	1.1: Physical conditions
Indicator topic (FDES)	1.1.4: Soil characteristics
ID and name in previous indicator guidelines	E2: Area affected by soil erosion
First publication	20/7/2022
Latest update	14/7/2023

<i>Parameter</i>	<i>Description</i>
Indicator definition	Land degradation is defined as the reduction or loss of the biological or economic productivity and complexity of rain fed cropland, irrigated cropland, or range, pasture, forest and woodlands resulting from a combination of pressures, including land use and management practices.
Unit of measure	%
Coverage	All degraded land
Spatial aggregation	National
Reference period	Calendar year
Update frequency	Annual
Purpose	This indicator measures achievement of SDG target 15.3: By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world.
Policy context	Prevention of soil degradation and desertification
Link with SDG indicators	15.3.1 Proportion of land that is degraded over total land area
Methodology for indicator calculation	<p>Area of degraded land divided by total land area.</p> <p>Land degradation is defined as the reduction or loss of the biological or economic productivity and complexity of rain fed cropland, irrigated cropland, or range, pasture, forest and woodlands resulting from a combination of pressures, including land use and management practices.</p> <p>Total land area is the total surface area of a country excluding the area covered by inland waters, like major rivers and lakes.</p> <p>For more information on method of computation and data sources see “Metadata of SDG indicator 15.3.1”</p>
Comments	-

**B. Policy references**

<i>Title of the reference document</i>	<i>Link</i>
Transforming our world: the 2030 Agenda for Sustainable Development	<a href="https://sdgs.un.org/2030agenda">https://sdgs.un.org/2030agenda</a>
United Nations Convention to Combat Desertification in those Countries experiencing serious Drought and/or Desertification, particularly in Africa	<a href="https://www.unccd.int/">https://www.unccd.int/</a>
United Nations Framework Convention on Climate Change	<a href="https://unfccc.int/">https://unfccc.int/</a>

**C. Methodology references**

<i>Title of the reference document</i>	<i>Link</i>
Metadata of SDG indicator 15.3.1: Proportion of land that is degraded over total land area	<a href="https://unstats.un.org/sdgs/metadata/files/Metadata-15-03-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-15-03-01.pdf</a>

**D. Data and statistics needed to compile the indicator**

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
262	Land cover type	1.2.1: Land cover
263	Land productivity	1.2.2: Ecosystems and biodiversity
264	Soil organic carbon stock	2.4.1: Soil resources
265	Total land area	1.1.3: Geological and geographical information

**E. International databases containing this indicator**

<i>Name of the database</i>	<i>Link</i>
SDG Indicators Database	<a href="https://unstats.un.org/sdgs/dataportal/database">https://unstats.un.org/sdgs/dataportal/database</a>

## 6.5 INDICATOR D-1.1 SHARE OF TOTAL PROTECTED AREAS (INTERNATIONAL UNION FOR CONSERVATION OF NATURE (IUCN) CATEGORIES) IN THE COUNTRY AREA

### A. General

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	D: Biodiversity
Component (FDES)	1: Environmental conditions and quality
Sub-component (FDES)	1.2: Land cover, ecosystems and biodiversity
Indicator topic (FDES)	1.2.2: Ecosystems and biodiversity
ID and name in previous indicator guidelines	D1: Protected areas
First publication	7/9/2021
Latest update	-
Indicator definition	The indicator shows the total area of protected areas and other effective area-based conservation measures (terrestrial, freshwater and marine – within territorial seas) in compliance with the national legislation, as a share of the overall area of the country. Wherever data are available, this indicator is further broken down by IUCN WCPA protected areas management categories, to demonstrate their respective extent and share in the total area of the country.
Unit of measure	Percentage of the total country territory (for territorial seas: percentage of total territorial seas)
Coverage	All nationally designated protected areas and other effective area-based conservation measures conforming to the IUCN definitions of a protected area and other effective area-based conservation measures
Spatial aggregation	National territory
Reference period	End of each calendar year or nearest date within that calendar year
Update frequency	Annual

<i>Parameter</i>	<i>Description</i>
Purpose	Area-based conservation including protected areas and other effective area-based conservation measures is the most effective and most widely used response to the degradation of ecosystems and the loss of biodiversity. The share of a country's area designated as protected areas or other effective area-based conservation measures therefore demonstrates the extent to which areas important for conserving ecosystems and biodiversity, with the ecosystem services provided by them and the human wellbeing benefits supported by these ecosystem services, are protected.
Policy context	Ecosystems and biodiversity have strong intrinsic values, provide multiple ecosystem services to human societies, and thereby support sustainable development and human wellbeing on Earth. They enable nature-based solutions to a wide range of challenges to Society. Protected areas and other effective area-based conservation measures are essential for conserving ecosystems and biodiversity. The IUCN WCPA protected area management categories are the globally accepted classification system for protected areas by management objective. Trends in the use of the various management categories therefore provide more information about the use of the protected areas as conservation instruments.
Link with SDG indicators	14.5.1 Coverage of protected areas in relation to marine areas; related, but not identical 15.1.2 Proportion of important sites for terrestrial and freshwater biodiversity that are covered by protected areas, by ecosystem type: related, but not identical 15.4.1 Coverage by protected areas of important sites for mountain biodiversity; related, but not identical

<i>Parameter</i>	<i>Description</i>
Methodology for indicator calculation	Share of protected areas and other effective area-based conservation measures (%) = (total area of protected areas in hectares or km <sup>2</sup> / total area of the country/coastal seas in hectares or km <sup>2</sup> ) × 100.  Broken down separately for protected areas and other effective area-based conservation measures, and for IUCN WCPA PA management categories.
Comments	-

## B. Policy references

<i>Title of the reference document</i>	<i>Link</i>
United Nations Convention on Biological Diversity (CBD)	<a href="https://www.cbd.int/">https://www.cbd.int/</a>
Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora	<a href="https://environment.ec.europa.eu/topics/nature-and-biodiversity/habitats-directive_en">https://environment.ec.europa.eu/topics/nature-and-biodiversity/habitats-directive_en</a>
Recommendation No. 16 (1989) of the standing committee on areas of special conservation interest of the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention)	<a href="https://search.coe.int/bern-convention/Pages/result_details.aspx?ObjectId=0900001680746c25">https://search.coe.int/bern-convention/Pages/result_details.aspx?ObjectId=0900001680746c25</a>
Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. European Union Biodiversity Strategy for 2030. Bringing nature back into our lives.	<a href="https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1590574123338&amp;uri=CELEX:52020DC0380">https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1590574123338&amp;uri=CELEX:52020DC0380</a>

## C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
Guidelines for Applying Protected Area Management Categories	<a href="https://portals.iucn.org/library/sites/library/files/documents/pag-021.pdf">https://portals.iucn.org/library/sites/library/files/documents/pag-021.pdf</a>
Evaluating official marine protected area coverage for Aichi Target 11: Appraising the data and methods that define our progress. Aquatic Conservation: Marine and Freshwater Ecosystems 24: 8-23.	<a href="https://www.researchgate.net/publication/285402181_Evaluating_official_marine_protected_area_coverage_for_Aichi_Target_11_Appraising_the_data_and_methods_that_define_our_progress">https://www.researchgate.net/publication/285402181_Evaluating_official_marine_protected_area_coverage_for_Aichi_Target_11_Appraising_the_data_and_methods_that_define_our_progress</a>

**D. Data and statistics needed to compile the indicator**

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
58	Total areas under protection (IUCN categories of protected areas)	1.2.2: Ecosystems and biodiversity
59	Areas under category Ia protection (IUCN category "strict nature reserve")	1.2.2: Ecosystems and biodiversity
60	Areas under category Ib protection (IUCN category "wilderness area")	1.2.2: Ecosystems and biodiversity
61	Areas under category II protection (IUCN category "national park")	1.2.2: Ecosystems and biodiversity
62	Areas under category III protection (IUCN category "national monument or feature")	1.2.2: Ecosystems and biodiversity
63	Areas under category IV protection (IUCN category "habitat/species management area")	1.2.2: Ecosystems and biodiversity
64	Areas under category V protection (IUCN category "protected landscape / seascape")	1.2.2: Ecosystems and biodiversity
65	Areas under category VI protection (IUCN category "protected area with sustainable use of natural resources")	1.2.2: Ecosystems and biodiversity
66	Country area	1.1.3: Geological and geographical information
226	Total areas designated as other effective area-based conservation measures	1.2.2: Ecosystems and biodiversity
227	Area of territorial seas (up to 12 nm) per country	1.1.3: Geological and geographical information

**E. International databases containing this indicator**

<i>Name of the database</i>	<i>Link</i>
World Database on Protected Areas (IUCN)	<a href="https://www.iucn.org/our-work/protected-areas-and-land-use">https://www.iucn.org/our-work/protected-areas-and-land-use</a>



## 6.6 INDICATOR D-4.4 RED LIST INDEX (SDG 15.5.1)

### A. General

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	D: Biodiversity
Component (FDES)	1: Environmental conditions and quality
Sub-component (FDES)	1.2: Land cover, ecosystems and biodiversity
Indicator topic (FDES)	1.2.2: Ecosystems and biodiversity
ID and name in previous indicator guidelines	D4: Threatened and protected species
First publication	14/7/2023
Latest update	14/7/2023
Indicator definition	The Red List Index measures change in aggregate extinction risk across groups of species. It is based on genuine changes in the number of species in each category of extinction risk on The IUCN Red List of Threatened Species ( <a href="http://www.iucnredlist.org">www.iucnredlist.org</a> ) is expressed as changes in an index ranging from 0 to 1.
Unit of measure	Index
Coverage	Species
Spatial aggregation	National territory
Reference period	Calendar year
Update frequency	Annual
Purpose	The world's species are impacted by a number of threatening processes, including habitat destruction and degradation, overexploitation, invasive alien species, human disturbance, pollution and climate change. This indicator can be used to assess overall changes in the extinction risk of groups of species as a result of these threats and the extent to which threats are being mitigated.

<i>Parameter</i>	<i>Description</i>
Policy context	<p>SDG Goal 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.</p> <p>Target 15.5: Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species.</p> <p>United Nations Convention on Biodiversity: Amidst a dangerous decline in nature threatening the survival of 1 million species and impacting the lives of billions of people, the GBF aims to halt and reverse nature loss. The framework consists of global targets to be achieved by 2030 and beyond to safeguard and sustainably use biodiversity.</p>
Link with SDG indicators	15.5.1 Red List Index
Methodology for indicator calculation	<p>The Red List Index is calculated at a point in time by first multiplying the number of species in each Red List Category by a weight (ranging from 1 for 'Near Threatened' to 5 for 'Extinct' and 'Extinct in the Wild') and summing these values. This is then divided by a maximum threat score, which is the total number of species multiplied by the weight assigned to the 'Extinct' category. This final value is subtracted from 1 to give the Red List Index value.</p>
Comments	-

## B. Policy references

<i>Title of the reference document</i>	<i>Link</i>
United Nations Convention on Biological Diversity (CBD)	<a href="https://www.cbd.int/">https://www.cbd.int/</a>
Transforming our world: the 2030 Agenda for Sustainable Development	<a href="https://sdgs.un.org/2030agenda">https://sdgs.un.org/2030agenda</a>

### C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
Metadata for SDG indicator 15.5.1: Red List Index	<a href="https://unstats.un.org/sdgs/metadata/files/Metadata-15-05-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-15-05-01.pdf</a>
Guidelines for Using the IUCN Red List Categories and Criteria, Version 14	<a href="https://www.iucnredlist.org/resources/redlistguidelines">https://www.iucnredlist.org/resources/redlistguidelines</a>
Guidelines for Application of IUCN Red List Criteria at Regional and National Levels, Version 4	<a href="https://portals.iucn.org/library/node/10336">https://portals.iucn.org/library/node/10336</a>

### D. Data and statistics needed to compile the indicator

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
270	Number of species on the IUCN list according to IUCN Red List categories	1.2.2: Ecosystems and biodiversity

### E. International databases containing this indicator

<i>Name of the database</i>	<i>Link</i>
IUCN Red List Statistics	<a href="https://www.iucnredlist.org/statistics">https://www.iucnredlist.org/statistics</a>

## 6.7 INDICATOR D-4.2 SHARE OF SPECIES THREATENED (MAMMALS, BIRDS, FISHES, REPTILES, AMPHIBIANS, INVERTEBRATES, VASCULAR PLANTS, MOSSES, LICHENS, FUNGI, ALGAE)

### A. General

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	D: Biodiversity
Component (FDES)	1: Environmental conditions and quality
Sub-component (FDES)	1.2: Land cover, ecosystems and biodiversity
Indicator topic (FDES)	1.2.2: Ecosystems and biodiversity
ID and name in previous indicator guidelines	D4: Threatened and protected species
First publication	6/10/2021
Latest update	14/7/2023
Indicator definition	<p>The indicator shows the percentage of nationally threatened species (i. e. those assessed as either vulnerable, endangered or critically endangered according to the IUCN Red List assessment criteria, in national assessments), including mammals, birds, fishes, reptiles, amphibians, invertebrates, vascular plants, mosses, lichens, fungi and algae.</p> <p>This indicator requires a disaggregation by taxonomic groups of species. Priority should be given to vertebrates and vascular plants. Member States are encouraged to assess the status of their biodiversity, using the appropriate IUCN Red List guidance.</p>
Unit of measure	%
Coverage	Mammals, birds, fishes, reptiles, amphibians, invertebrates, vascular plants, mosses, lichens, fungi
Spatial aggregation	National territory
Reference period	End of each calendar year or nearest date within that calendar year
Update frequency	Annual

<i>Parameter</i>	<i>Description</i>
Purpose	<p>The indicator provides a measure of the state of biodiversity in terms of the number of nationally threatened species, also providing information on the effectiveness of national efforts to improve conservation status of species on their territory.</p> <p>This indicator was kept as priority indicator upon the wish of some countries. It only makes sense if it refers to NATIONAL threat status: Under IUCN Red List rules, each species can be assigned a global assessment category, and can also be assessed at a sub-global (regional, national, sub-national, ...) levels, depending on policy needs. Increasing occurrence of globally threatened species within a country might actually be a good sign (they might congregate there because they are better protected than elsewhere), but an increase of the percentage of nationally threatened species would indicate a negative trend.</p> <p>For the sake of comparability, it is also critical that national assessments are carried out using the IUCN Red List criteria and regional assessment methodology, not national assessment categories and methodologies.</p>
Policy context	<p>Ecosystems and biodiversity have strong intrinsic values, provide multiple ecosystem services to human societies, and thereby support sustainable development and human wellbeing on Earth. They enable nature-based solutions to a wide range of challenges to Society. The proportion of threatened species within the overall species complement of a country is an important measure of the status of biodiversity.</p> <p>The indicator is relevant to SDG target 15.5 ("Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species"), as well as SDG target 15.9 ("By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts").</p>

<i>Parameter</i>	<i>Description</i>
Link with SDG indicators	14.4.1 Proportion of fish stocks within biologically sustainable levels; A relatively loose relationship 15.5.1 Red List Index; Related, but not the same
Methodology for indicator calculation	Percentage of species threatened = Number of species threatened / total number of species x 100%. Broken down separately for each taxonomic group as listed under "coverage" above. Priority should be given to vertebrates and vascular plants.
Comments	-

## B. Policy references

<i>Title of the reference document</i>	<i>Link</i>
United Nations Convention on Biological Diversity (CBD)	<a href="https://www.cbd.int/">https://www.cbd.int/</a>
United Nations Convention on Biological Diversity: Post-2020 Global Biodiversity Framework	<a href="https://www.cbd.int/doc/c/409e/19ae/369752b245f05e88f760aeb3/wg2020-05-l-02-en.pdf">https://www.cbd.int/doc/c/409e/19ae/369752b245f05e88f760aeb3/wg2020-05-l-02-en.pdf</a>
Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. European Union Biodiversity Strategy for 2030. Bringing nature back into our lives.	<a href="https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:52020DC0380">https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:52020DC0380</a>
Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora	<a href="https://environment.ec.europa.eu/topics/nature-and-biodiversity/habitats-directive_en">https://environment.ec.europa.eu/topics/nature-and-biodiversity/habitats-directive_en</a>
Recommendation No. 16 (1989) of the standing committee on areas of special conservation interest of the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention)	<a href="https://search.coe.int/bern-convention/Pages/result_details.aspx?ObjectId=0900001680746c25">https://search.coe.int/bern-convention/Pages/result_details.aspx?ObjectId=0900001680746c25</a>

### C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
Guidelines for Using the IUCN Red List Categories and Criteria, Version 14	<a href="https://www.iucnredlist.org/resources/redlistguidelines">https://www.iucnredlist.org/resources/redlistguidelines</a>
Guidelines for Application of IUCN Red List Criteria at Regional and National Levels, Version 4	<a href="https://portals.iucn.org/library/sites/library/files/documents/RL-2012-002.pdf">https://portals.iucn.org/library/sites/library/files/documents/RL-2012-002.pdf</a>

### D. Data and statistics needed to compile the indicator

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
243	Number of threatened species of fungi	1.2.2: Ecosystems and biodiversity
244	Overall number of species of mammals documented in country	1.2.2: Ecosystems and biodiversity
245	Overall number of species of birds documented in country	1.2.2: Ecosystems and biodiversity
246	Overall number of species of fish documented in country	1.2.2: Ecosystems and biodiversity
247	Overall number of species of reptiles documented in country	1.2.2: Ecosystems and biodiversity
248	Overall number of species of amphibians documented in country	1.2.2: Ecosystems and biodiversity
249	Overall number of species of invertebrates documented in country	1.2.2: Ecosystems and biodiversity
250	Overall number of species of vascular plants documented in country	1.2.2: Ecosystems and biodiversity
251	Overall number of species of mosses documented in country	1.2.2: Ecosystems and biodiversity
252	Overall number of species of lichens documented in country	1.2.2: Ecosystems and biodiversity
253	Overall number of species of fungi documented in country	1.2.2: Ecosystems and biodiversity
258	Number of threatened species of algae	1.2.2: Ecosystems and biodiversity
259	Overall number of species of algae documented in country	1.2.2: Ecosystems and biodiversity

### E. International databases containing this indicator

<i>Name of the database</i>	<i>Link</i>
n/a	n/a

## 6.8 INDICATOR D-3.1 FOREST AREA AS A PROPORTION OF TOTAL LAND AREA (SDG 15.1.1)

### A. General

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	D: Biodiversity
Component (FDES)	1: Environmental conditions and quality
Sub-component (FDES)	1.2: Land cover, ecosystems and biodiversity
Indicator topic (FDES)	1.2.3: Forests
ID and name in previous indicator guidelines	D3: Forests and other wooded land
First publication	22/9/2021
Latest update	19/12/2023
Indicator definition	The indicator measures the percentage of the forests in the total country area
Unit of measure	%
Coverage	Forests
Spatial aggregation	National territory
Reference period	End of each calendar year or nearest date within that calendar year
Update frequency	Annual
Purpose	The indicator provides a measure of the state of forests in a country and shows trends in its uses and its protection.
Policy context	Forests are among the most diverse and widespread ecosystems on earth. They have strong intrinsic values, provide multiple ecosystem services (provision of timber and other products, recreation, regulatory ecosystem services related to soil and water) to human societies, and thereby support sustainable development and human wellbeing on Earth. They also enable nature-based solutions to a wide range of challenges to Society (e. g. carbon sequestration, flood protection). Overexploitation, fragmentation, environmental degradation and conversion into other types of land use threaten many forest resources.



<i>Parameter</i>	<i>Description</i>
Link with SDG indicators	This indicator is relevant to SDG target 15.1 (“By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements”) 15.1.1 Forest area as a proportion of total land area
Methodology for indicator calculation	Share of forests in country area (%) = (total forest area in thousands of hectares or km <sup>2</sup> / the total area of the country in thousands of hectares or km <sup>2</sup> ) x 100%. Data on forest area are sourced from national reporting, e. g. as summarized in the FAO Global Forest Resources Assessment.
Comments	-

## B. Policy references

<i>Title of the reference document</i>	<i>Link</i>
Transforming our world: the 2030 Agenda for Sustainable Development	<a href="https://sdgs.un.org/2030agenda">https://sdgs.un.org/2030agenda</a>
United Nations Convention on Biological Diversity (CBD)	<a href="https://www.cbd.int/">https://www.cbd.int/</a>
United Nations Convention on Biological Diversity: Post-2020 Global Biodiversity Framework	<a href="https://www.cbd.int/doc/c/409e/19ae/369752b245f05e88f760aeb3/wg2020-05-l-02-en.pdf">https://www.cbd.int/doc/c/409e/19ae/369752b245f05e88f760aeb3/wg2020-05-l-02-en.pdf</a>
Communication from the Commission to the European Parliament, the Council, the Economic and Social Committee and the Committee of the Regions: Our life insurance, our natural capital: a European Union biodiversity strategy to 2020	<a href="https://www.eea.europa.eu/policy-documents/eu-2020-biodiversity-strategy">https://www.eea.europa.eu/policy-documents/eu-2020-biodiversity-strategy</a>
Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions New European Union Forest Strategy for 2030	<a href="https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021DC0572">https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021DC0572</a>

**C. Methodology references**

<i>Title of the reference document</i>	<i>Link</i>
Metadata of SDG indicator 15.1.1: Forest area as a proportion of total land area	<a href="https://unstats.un.org/sdgs/metadata/files/Metadata-15-01-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-15-01-01.pdf</a>

**D. Data and statistics needed to compile the indicator**

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
230	Forest area	1.2.3: Forests
265	Total land area	1.1.3: Geological and geographical information

**E. International databases containing this indicator**

<i>Name of the database</i>	<i>Link</i>
SDG Indicators Database	<a href="https://unstats.un.org/sdgs/dataportal/database">https://unstats.un.org/sdgs/dataportal/database</a>

**6.9 INDICATOR D-3.8 FOREST FIRES (AREA BURNT BY FOREST FIRES)****A. General**

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	D: Biodiversity
Component (FDES)	1: Environmental conditions and quality
Sub-component (FDES)	1.2: Land cover, ecosystems and biodiversity
Indicator topic (FDES)	1.2.3: Forests
ID and name in previous indicator guidelines	D3: Forests and other wooded land
First publication	4/10/2021
Latest update	17/7/2023
Indicator definition	The indicator measures the area burnt by forest fires in each country, per year.
Unit of measure	Hectares
Coverage	Area burnt by forest fires
Spatial aggregation	National territory
Reference period	End of each calendar year or nearest date within that calendar year
Update frequency	Annual

<i>Parameter</i>	<i>Description</i>
Purpose	This indicator shows trends in the area affected by forest fires. Forest fires have recently affected regions in northern Eurasia not typically prone to fires, as well as the Mediterranean region, often related to droughts and heatwaves. Because of climate change, more areas within the UNECE region are likely to become exposed to significant and increasing fire risks in the future. The indicator allows to verify and follow such trends.
Policy context	<p>Forests are among the most diverse and widespread ecosystems on earth. They have strong intrinsic values, provide multiple ecosystem services (provision of timber and other products, recreation, regulatory ecosystem services related to soil and water) to human societies, and thereby support sustainable development and human wellbeing on Earth. They also enable nature-based solutions to a wide range of challenges to Society (e. g. carbon sequestration, flood protection).</p> <p>Forest fires are an important pressure and risk to forests and other wooded lands, besides overexploitation, fragmentation, environmental degradation and conversion into other types of land use.</p> <p>This indicator is relevant to SDG target 15.1 (“By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements”).</p>
Link with SDG indicators	<p>15.1.1 Forest area as a proportion of total land area; Indirectly related</p> <p>15.2.1 Progress towards sustainable forest management; Indirectly related</p>
Methodology for indicator calculation	Burnt area is documented in hectares (ha) based on national reporting or the European Forest Fire Information System supported by ground surveys or remote sensing data.
Comments	-

## B. Policy references

<i>Title of the reference document</i>	<i>Link</i>
United Nations Convention on Biological Diversity (CBD)	<a href="https://www.cbd.int/">https://www.cbd.int/</a>
United Nations Convention on Biological Biodiversity: Post-2020 Global Biodiversity Framework	<a href="https://www.cbd.int/doc/c/409e/19ae/369752b245f05e88f760aeb3/wg2020-05-l-02-en.pdf">https://www.cbd.int/doc/c/409e/19ae/369752b245f05e88f760aeb3/wg2020-05-l-02-en.pdf</a>
Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. European Union Biodiversity Strategy for 2030. Bringing nature back into our lives.	<a href="https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:52020DC0380">https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:52020DC0380</a>
Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions New European Union Forest Strategy for 2030.	<a href="https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021DC0572">https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021DC0572</a>

## C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
The European Fire Database - Technical specifications and data submission	<a href="https://effis-gwis-cms.s3.eu-west-1.amazonaws.com/effis/reports-and-publications/effis-related-publications/eudb_tech_spec_final_2register.pdf">https://effis-gwis-cms.s3.eu-west-1.amazonaws.com/effis/reports-and-publications/effis-related-publications/eudb_tech_spec_final_2register.pdf</a>

## D. Data and statistics needed to compile the indicator

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
232	Burnt forest area	2.3.2: Use of forest land

## E. International databases containing this indicator

<i>Name of the database</i>	<i>Link</i>
The European Forest Fire Information System	<a href="https://effis.jrc.ec.europa.eu/">https://effis.jrc.ec.europa.eu/</a>

## 6.10 INDICATOR A-2.10 PM<sub>10</sub>: ANNUAL MEAN CONCENTRATION IN CITIES

### A. General

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	A: Air pollution and ozone depletion
Component (FDES)	1: Environmental conditions and quality
Sub-component (FDES)	1.3: Environmental quality
Indicator topic (FDES)	1.3.1: Air quality
ID and name in previous indicator guidelines	A2: Ambient air quality in urban areas
First publication	18/07/2023
Latest update	
Indicator definition	Annual mean concentration of particulate matter 10 micrometers or less in diameter
Unit of measure	µg/m <sup>3</sup>
Coverage	PM <sub>10</sub> concentration in main cities
Spatial aggregation	Individual monitoring stations
Reference period	Calendar year
Update frequency	Annual
Purpose	<p>The indicator provides a measure of the state of the environment in terms of air quality and the impact of air pollution on the population and on vegetation and ecosystems.</p> <p>The indicator helps to identify whether measures taken to reduce particular matter concentrations in densely populated areas have been successful in the long-term and to measure distance from the national or WHO air quality target.</p>

<i>Parameter</i>	<i>Description</i>
Policy context	<p>Air pollution is the leading environmental risk factor globally. WHO estimates show that around 7 million deaths, mainly from noncommunicable diseases, are attributable to the joint effects of ambient and household air pollution. Similar global assessments of ambient air pollution alone suggest between 4 million and 9 million deaths annually and hundreds of millions of lost years of healthy life, with the greatest attributable disease burden seen in low- and middle-income countries. To date, strong evidence shows causal relationships between PM air pollution exposure and all-cause mortality, as well as acute lower respiratory infections, chronic obstructive pulmonary disease, heart disease, lung cancer and stroke. A growing body of evidence also suggests causal relationships for type II diabetes and impacts on neonatal mortality from low birth weight and short gestation. Air pollution exposure may increase the incidence of and mortality from a larger number of diseases than those currently considered, such as Alzheimer's and other neurological diseases. The burden of disease attributable to air pollution is now estimated to be competing with other major global health risks such as unhealthy diet and tobacco smoking and was in the top five out of 87 risk factors in the global assessment.</p> <p>Air quality standard of EU Directive 2008/50/EC: Annual average concentration: 50 µg/m<sup>3</sup>; WHO global air quality guidelines 2021: Average annual concentration: 15 µg/m<sup>3</sup></p>
Link with SDG indicators	11.6.2 Annual mean levels of fine particulate matter (e.g., PM <sub>2.5</sub> and PM <sub>10</sub> ) in cities (population weighted); Related, but not identical!
Methodology for indicator calculation	The rules for averaging monitoring data are laid down in the WHO Air Quality Guidelines (2021).
Comments	-

## B. Policy references

<i>Title of the reference document</i>	<i>Link</i>
Transforming our world: the 2030 Agenda for Sustainable Development	<a href="https://sdgs.un.org/2030agenda">https://sdgs.un.org/2030agenda</a>
1979 ECE Convention on Long-range Transboundary Air Pollution (CLRTAP)	<a href="https://www.unece.org/environmental-policy/conventions/envlrtapwelcome/the-air-convention-and-its-protocols/the-convention-and-its-achievements.html">https://www.unece.org/environmental-policy/conventions/envlrtapwelcome/the-air-convention-and-its-protocols/the-convention-and-its-achievements.html</a>
Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe	<a href="https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX:32008L0050">https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX:32008L0050</a>

## C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
WHO global air quality guidelines: particulate matter (PM <sub>2.5</sub> and PM <sub>10</sub> ), ozone, nitrogen dioxide, sulfur dioxide and carbon monoxide	<a href="https://apps.who.int/iris/handle/10665/345329">https://apps.who.int/iris/handle/10665/345329</a>
Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe	<a href="https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX:32008L0050">https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX:32008L0050</a>
Protecting health through ambient air quality management: a resource package for the WHO European Region	<a href="https://www.who.int/europe/publications/item/WHO-EURO-2023-6898-46664-67857">https://www.who.int/europe/publications/item/WHO-EURO-2023-6898-46664-67857</a>

## D. Data and statistics needed to compile the indicator

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
3	Ambient air quality - PM <sub>10</sub> : Annual average concentration	1.3.1: Air quality

## E. International databases containing this indicator

<i>Name of the database</i>	<i>Link</i>
WHO Ambient air Quality Database Application	<a href="https://whoairquality.shinyapps.io/AmbientAirQualityDatabase/">https://whoairquality.shinyapps.io/AmbientAirQualityDatabase/</a>

## 6.11 INDICATOR A-2.8 PM<sub>10</sub>: ANNUAL MEAN LEVEL OF PM<sub>10</sub> IN CITIES (POPULATION WEIGHTED) (SDG INDICATOR 11.6.2)

### A. General

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	A: Air pollution and ozone depletion
Component (FDES)	1: Environmental conditions and quality
Sub-component (FDES)	1.3: Environmental quality
Indicator topic (FDES)	1.3.1: Air quality
ID and name in previous indicator guidelines	A2: Ambient air quality in urban areas
First publication	09/08/2022
Latest update	18/07/2023
Indicator definition	Population-weighted annual average PM <sub>10</sub> concentration for urban population in a country
Unit of measure	µg/m <sup>3</sup>
Coverage	PM <sub>10</sub> concentration in main cities
Spatial aggregation	National, calculated from selected cities
Reference period	Calendar year
Update frequency	Annual
Purpose	Air pollution consists of many pollutants, among other particulate matter. These particles are able to penetrate deeply into the respiratory tract and therefore constitute a risk for health by increasing mortality from respiratory infections and diseases, lung cancer, and selected cardiovascular diseases. The indicator contributes to measuring achievement of SDG target 11.6: By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management.
Policy context	SDG target 11.6: By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management. Air pollution is the leading environmental risk factor globally.



<i>Parameter</i>	<i>Description</i>
	<p>WHO estimates show that around 7 million deaths, mainly from noncommunicable diseases, are attributable to the joint effects of ambient and household air pollution. Similar global assessments of ambient air pollution alone suggest between 4 million and 9 million deaths annually and hundreds of millions of lost years of healthy life, with the greatest attributable disease burden seen in low- and middle-income countries. To date, strong evidence shows causal relationships between PM<sub>2.5</sub> air pollution exposure and all-cause mortality, as well as acute lower respiratory infections, chronic obstructive pulmonary disease, heart disease, lung cancer and stroke. A growing body of evidence also suggests causal relationships for type II diabetes and impacts on neonatal mortality from low birth weight and short gestation. Air pollution exposure may increase the incidence of and mortality from a larger number of diseases than those currently considered, such as Alzheimer's and other neurological diseases. The burden of disease attributable to air pollution is now estimated to be competing with other major global health risks such as unhealthy diet and tobacco smoking, and was in the top five out of 87 risk factors in the global assessment. See WHO global air quality guidelines 2021.</p>
Link with SDG indicators	11.6.2 Annual mean levels of fine particulate matter (e.g. PM <sub>2.5</sub> and PM <sub>10</sub> ) in cities (population weighted)
Methodology for indicator calculation	<p>The annual urban mean concentration of PM<sub>10</sub> is estimated with improved modelling using data integration from satellite remote sensing, population estimates, topography and ground measurements (WHO, 2016; Shaddick et al, 2016). Countries which have air quality monitoring networks in place in urban areas can use the annual mean concentrations from the ground measurements and the corresponding number of inhabitants to derive the population-weighted exposure to particulate matter in cities.</p>
Comments	-

## B. Policy references

<i>Title of the reference document</i>	<i>Link</i>
Transforming our world: the 2030 Agenda for Sustainable Development	<a href="https://sdgs.un.org/2030agenda">https://sdgs.un.org/2030agenda</a>
1979 ECE Convention on Long-range Transboundary Air Pollution (CLRTAP)	<a href="https://www.unece.org/environmental-policy/conventions/envlrtapwelcome/the-air-convention-and-its-protocols/the-convention-and-its-achievements.html">https://www.unece.org/environmental-policy/conventions/envlrtapwelcome/the-air-convention-and-its-protocols/the-convention-and-its-achievements.html</a>
Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe	<a href="https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX:32008L0050">https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX:32008L0050</a>

## C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
Metadata of SDG indicator 11.6.2: Annual mean levels of fine particulate matter (e.g. PM <sub>2.5</sub> and PM <sub>10</sub> ) in cities (population weighted)	<a href="https://unstats.un.org/sdgs/metadata/">https://unstats.un.org/sdgs/metadata/</a>
Data Integration Model for Air Quality: A Hierarchical Approach to the Global Estimation of Exposures to Ambient Air Pollution	<a href="https://doi.org/10.1111/rssc.12227">https://doi.org/10.1111/rssc.12227</a>

## D. Data and statistics needed to compile the indicator

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
3	Ambient air quality - PM <sub>10</sub> : Annual average concentration	1.3.1: Air quality
272	Ambient air quality: Number of inhabitants corresponding to the monitoring station	1.3.1: Air quality

## E. International databases containing this indicator

<i>Name of the database</i>	<i>Link</i>
WHO Ambient air Quality Database Application	<a href="https://whoairquality.shinyapps.io/AmbientAirQualityDatabase/">https://whoairquality.shinyapps.io/AmbientAirQualityDatabase/</a>

## 6.12 INDICATOR A-2.9 PM<sub>2.5</sub>: ANNUAL MEAN CONCENTRATION IN CITIES

### A. General

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	A: Air pollution and ozone depletion
Component (FDES)	1: Environmental conditions and quality
Sub-component (FDES)	1.3: Environmental quality
Indicator topic (FDES)	1.3.1: Air quality
ID and name in previous indicator guidelines	A2: Ambient air quality in urban areas
First publication	18/07/2023
Latest update	-
Indicator definition	Annual mean concentration of particulate matter 2.5 micrometers or less in diameter
Unit of measure	µg/m <sup>3</sup>
Coverage	PM <sub>2.5</sub> concentration in main cities
Spatial aggregation	Individual monitoring stations
Reference period	Calendar year
Update frequency	Annual
Purpose	<p>The indicator provides a measure of the state of the environment in terms of air quality and the impact of air pollution on the population and on vegetation and ecosystems.</p> <p>The indicator helps to identify whether measures taken to reduce particulate matter concentrations in densely populated areas have been successful in the long-term and to measure distance from the national or WHO air quality target.</p>

<i>Parameter</i>	<i>Description</i>
Policy context	<p>Air pollution is the leading environmental risk factor globally. WHO estimates show that around 7 million deaths, mainly from noncommunicable diseases, are attributable to the joint effects of ambient and household air pollution. Similar global assessments of ambient air pollution alone suggest between 4 million and 9 million deaths annually and hundreds of millions of lost years of healthy life, with the greatest attributable disease burden seen in low- and middle-income countries. To date, strong evidence shows causal relationships between PM<sub>2.5</sub> air pollution exposure and all cause mortality, as well as acute lower respiratory infections, chronic obstructive pulmonary disease, heart disease, lung cancer and stroke. A growing body of evidence also suggests causal relationships for type II diabetes and impacts on neonatal mortality from low birth weight and short gestation. Air pollution exposure may increase the incidence of and mortality from a larger number of diseases than those currently considered, such as Alzheimer's and other neurological diseases. The burden of disease attributable to air pollution is now estimated to be competing with other major global health risks such as unhealthy diet and tobacco smoking, and was in the top five out of 87 risk factors in the global assessment.</p> <p>Air quality standard of European Union Directive 2008/50/EC: Annual average concentration: 20 µg/m<sup>3</sup>; WHO global air quality guidelines 2021: Average annual concentration: 5 µg/m<sup>3</sup></p>
Link with SDG indicators	11.6.2 Annual mean levels of fine particulate matter (e.g. PM <sub>2.5</sub> and PM <sub>10</sub> ) in cities (population weighted); Related, but not identical!
Methodology for indicator calculation	The rules for averaging monitoring data are laid down in the WHO Air Quality Guidelines (2021).
Comments	-

## B. Policy references

<i>Title of the reference document</i>	<i>Link</i>
Transforming our world: the 2030 Agenda for Sustainable Development	<a href="https://sdgs.un.org/2030agenda">https://sdgs.un.org/2030agenda</a>
1979 ECE Convention on Long-range Transboundary Air Pollution (CLRTAP)	<a href="https://www.unece.org/environmental-policy/conventions/envlrtapwelcome/the-air-convention-and-its-protocols/the-convention-and-its-achievements.html">https://www.unece.org/environmental-policy/conventions/envlrtapwelcome/the-air-convention-and-its-protocols/the-convention-and-its-achievements.html</a>
Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe	<a href="https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX:32008L0050">https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX:32008L0050</a>

## C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
WHO global air quality guidelines: particulate matter (PM <sub>2.5</sub> and PM <sub>10</sub> ), ozone, nitrogen dioxide, sulfur dioxide and carbon monoxide	<a href="https://apps.who.int/iris/handle/10665/345329">https://apps.who.int/iris/handle/10665/345329</a>
Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe	<a href="https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX:32008L0050">https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX:32008L0050</a>
Protecting health through ambient air quality management: a resource package for the WHO European Region	<a href="https://www.who.int/europe/publications/item/WHO-EURO-2023-6898-46664-67857">https://www.who.int/europe/publications/item/WHO-EURO-2023-6898-46664-67857</a>

## D. Data and statistics needed to compile the indicator

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
268	Ambient air quality - PM <sub>2.5</sub> : Annual average concentration	1.3.1: Air quality

## E. International databases containing this indicator

<i>Name of the database</i>	<i>Link</i>
WHO Ambient air Quality Database Application	<a href="https://whoairquality.shinyapps.io/AmbientAirQualityDatabase/">https://whoairquality.shinyapps.io/AmbientAirQualityDatabase/</a>

### 6.13 INDICATOR A-2.7 ANNUAL MEAN LEVEL OF PM<sub>2.5</sub> IN CITIES (POPULATION WEIGHTED) (SDG INDICATOR 11.6.2)

#### A. General

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	A: Air pollution and ozone depletion
Component (FDES)	1: Environmental conditions and quality
Sub-component (FDES)	1.3: Environmental quality
Indicator topic (FDES)	1.3.1: Air quality
ID and name in previous indicator guidelines	A2: Ambient air quality in urban areas
First publication	09/08/2022
Latest update	
Indicator definition	Population-weighted annual average PM <sub>2.5</sub> concentration for urban population in a country
Unit of measure	µg/m <sup>3</sup>
Coverage	PM <sub>2.5</sub> concentration in main cities
Spatial aggregation	National, calculated from selected cities
Reference period	Calendar year
Update frequency	Annual
Purpose	Air pollution consists of many pollutants, among other particulate matter. These particles are able to penetrate deeply into the respiratory tract and therefore constitute a risk for health by increasing mortality from respiratory infections and diseases, lung cancer, and selected cardiovascular diseases. The indicator contributes to measuring achievement of SDG target 11.6: By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management.

<i>Parameter</i>	<i>Description</i>
Policy context	<p>SDG target 11.6: By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management. Air pollution is the leading environmental risk factor globally. WHO estimates show that around 7 million deaths, mainly from noncommunicable diseases, are attributable to the joint effects of ambient and household air pollution. Similar global assessments of ambient air pollution alone suggest between 4 million and 9 million deaths annually and hundreds of millions of lost years of healthy life, with the greatest attributable disease burden seen in low- and middle-income countries.</p> <p>To date, strong evidence shows causal relationships between PM<sub>2.5</sub> air pollution exposure and allcause mortality, as well as acute lower respiratory infections, chronic obstructive pulmonary disease, heart disease, lung cancer and stroke. A growing body of evidence also suggests causal relationships for type II diabetes and impacts on neonatal mortality from low birth weight and short gestation. Air pollution exposure may increase the incidence of and mortality from a larger number of diseases than those currently considered, such as Alzheimer's and other neurological diseases. The burden of disease attributable to air pollution is now estimated to be competing with other major global health risks such as unhealthy diet and tobacco smoking, and was in the top five out of 87 risk factors in the global assessment. See WHO global air quality guidelines 2021.</p>
Link with SDG indicators	11.6.2 Annual mean levels of fine particulate matter (e.g. PM <sub>2.5</sub> and PM <sub>10</sub> ) in cities (population weighted)

<i>Parameter</i>	<i>Description</i>
Methodology for indicator calculation	<p>The annual urban mean concentration of PM<sub>2.5</sub> is estimated with improved modelling using data integration from satellite remote sensing, population estimates, topography and ground measurements (WHO, 2016; Shaddick et al, 2016).</p> <p>Countries which have air quality monitoring networks in place in urban areas can use the annual mean concentrations from the ground measurements and the corresponding number of inhabitants to derive the population-weighted exposure to particulate matter in cities.</p>
Comments	-

## B. Policy references

<i>Title of the reference document</i>	<i>Link</i>
Transforming our world: the 2030 Agenda for Sustainable Development	<a href="https://sdgs.un.org/2030agenda">https://sdgs.un.org/2030agenda</a>
1979 ECE Convention on Long-range Transboundary Air Pollution (CLRTAP)	<a href="https://www.unece.org/environmental-policy/conventions/envlrtapwelcome/the-air-convention-and-its-protocols/the-convention-and-its-achievements.html">https://www.unece.org/environmental-policy/conventions/envlrtapwelcome/the-air-convention-and-its-protocols/the-convention-and-its-achievements.html</a>
Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe	<a href="https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX:32008L0050">https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX:32008L0050</a>

## C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
Metadata of SDG indicator 11.6.2: Annual mean levels of fine particulate matter (e.g. PM <sub>2.5</sub> and PM <sub>10</sub> ) in cities (population weighted)	<a href="https://unstats.un.org/sdgs/metadata/">https://unstats.un.org/sdgs/metadata/</a>
Data Integration Model for Air Quality: A Hierarchical Approach to the Global Estimation of Exposures to Ambient Air Pollution	<a href="https://doi.org/10.1111/rssc.12227">https://doi.org/10.1111/rssc.12227</a>



#### D. Data and statistics needed to compile the indicator

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
268	Ambient air quality – PM <sub>2.5</sub> : Annual average concentration	1.3.1: Air quality
272	Ambient air quality: Number of inhabitants corresponding to the monitoring station	1.3.1: Air quality

#### E. International databases containing this indicator

<i>Name of the database</i>	<i>Link</i>
SDG Indicators Database	<a href="https://unstats.un.org/sdgs/dataportal/database">https://unstats.un.org/sdgs/dataportal/database</a>

### 6.14 INDICATOR A-2.11 SO<sub>2</sub>: ANNUAL MEAN CONCENTRATION IN CITIES

#### A. General

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	A: Air pollution and ozone depletion
Component (FDES)	1: Environmental conditions and quality
Sub-component (FDES)	1.3: Environmental quality
Indicator topic (FDES)	1.3.1: Air quality
ID and name in previous indicator guidelines	A2: Ambient air quality in urban areas
First publication	24/07/2023
Latest update	-
Indicator definition	Annual mean concentration of sulfur dioxide
Unit of measure	µg/m <sup>3</sup>
Coverage	SO <sub>2</sub> concentration in main cities
Spatial aggregation	Individual monitoring stations
Reference period	Calendar year
Update frequency	Annual

<i>Parameter</i>	<i>Description</i>
Purpose	<p>The indicator provides a measure of the state of the environment in terms of air quality and the impact of air pollution on the population and on vegetation and ecosystems.</p> <p>The indicator helps to identify whether measures taken to reduce sulfur dioxide concentrations in densely populated areas have been successful in the long-term.</p>
Policy context	<p>Sulfur dioxide is derived from the combustion of sulfur-containing fossil fuels and is a major air pollutant in many parts of the world. Oxidation of sulfur dioxide, especially at the surface of particles in the presence of metallic catalysts, leads to the formation of sulfurous and sulfuric acids. Neutralization, by ammonia, leads to the production of bisulfates and sulfates. There is a causal relationship between short-term sulfur dioxide concentrations and respiratory effects.</p> <p>Air quality standards of European Union Directive 2008/50/EC: 1 hour average concentration: 350 µg/m<sup>3</sup>; 24 hours average concentration 125 µg/m<sup>3</sup> (revision to 50 µg/m<sup>3</sup> is proposed)</p> <p>WHO global air quality guidelines 2021: Daily mean 40 µg/m<sup>3</sup></p>
Link with SDG indicators	n/a
Methodology for indicator calculation	The rules for averaging monitoring data are laid down in the WHO Air Quality Guidelines (2021).
Comments	-

## B. Policy references

<i>Title of the reference document</i>	<i>Link</i>
1979 ECE Convention on Long-range Transboundary Air Pollution (CLRTAP)	<a href="https://www.unece.org/environmental-policy/conventions/envlrtapwelcome/the-air-convention-and-its-protocols/the-convention-and-its-achievements.html">https://www.unece.org/environmental-policy/conventions/envlrtapwelcome/the-air-convention-and-its-protocols/the-convention-and-its-achievements.html</a>
Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe	<a href="https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX:32008L0050">https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX:32008L0050</a>

### C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
WHO global air quality guidelines: particulate matter (PM <sub>2.5</sub> and PM <sub>10</sub> ), ozone, nitrogen dioxide, sulfur dioxide and carbon monoxide	<a href="https://apps.who.int/iris/handle/10665/345329">https://apps.who.int/iris/handle/10665/345329</a>
Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe	<a href="https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX:32008L0050">https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX:32008L0050</a>
Protecting health through ambient air quality management: a resource package for the WHO European Region	<a href="https://www.who.int/europe/publications/item/WHO-EURO-2023-6898-46664-67857">https://www.who.int/europe/publications/item/WHO-EURO-2023-6898-46664-67857</a>

### D. Data and statistics needed to compile the indicator

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
8	Ambient air quality – SO <sub>2</sub> : Annual average concentration	1.3.1: Air quality

### E. International databases containing this indicator

<i>Name of the database</i>	<i>Link</i>
n/a	n/a

## 6.15 INDICATOR A-2.12 NO<sub>2</sub>: ANNUAL MEAN CONCENTRATION IN CITIES

### A. General

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	A: Air pollution and ozone depletion
Component (FDES)	1: Environmental conditions and quality
Sub-component (FDES)	1.3: Environmental quality
Indicator topic (FDES)	1.3.1: Air quality
ID and name in previous indicator guidelines	A2: Ambient air quality in urban areas
First publication	24/07/2023
Latest update	-
Indicator definition	Annual mean concentration of nitrogen dioxide

<i>Parameter</i>	<i>Description</i>
Unit of measure	$\mu\text{g}/\text{m}^3$
Coverage	$\text{NO}_2$ concentration in main cities
Spatial aggregation	Individual monitoring stations
Reference period	Calendar year
Update frequency	Annual
Purpose	<p>The indicator provides a measure of the state of the environment in terms of air quality and the impact of air pollution on the population and on vegetation and ecosystems.</p> <p>The indicator helps to identify whether measures taken to reduce nitrogen dioxide concentrations in densely populated areas have been successful in the long-term.</p>
Policy context	<p>Nitrogen dioxide is an important atmospheric trace gas not only because of its health effects but also because: (a) it absorbs visible solar radiation and contributes to impaired atmospheric visibility; (b) it absorbs visible radiation and has a potentially direct role in global climate change; (c) it is, along with nitric oxide, a chief regulator of the oxidizing capacity of the free troposphere by controlling the build-up and fate of radical species, including hydroxyl radicals; and (d) it plays a critical role in determining ozone concentrations in the troposphere because the photolysis of nitrogen dioxide is the only key initiator of the photochemical formation of ozone, whether in polluted or in non-polluted atmospheres. Nitrogen dioxide is subject to extensive further atmospheric transformations that lead to the formation of strong oxidants that participate in the conversion of nitrogen dioxide to nitric acid and sulfur dioxide to sulfuric acid and subsequent conversions to their ammonium neutralization salts. Thus, through the photochemical reaction sequence initiated by solar-radiation-induced activation of nitrogen dioxide, the newly generated pollutants are an important source of organic, nitrate and sulfate particles currently measured as <math>\text{PM}_{10}</math> or <math>\text{PM}_{2.5}</math>. For these reasons, nitrogen dioxide is a key precursor of a range of secondary pollutants whose effects on human health are well-documented.</p>

<i>Parameter</i>	<i>Description</i>
	Air quality standard of European Union Directive 2008/50/EC: Annual average concentration: 40 µg/m <sup>3</sup> WHO global air quality guidelines 2021: Annual AQG level 10 µg/m <sup>3</sup>
Link with SDG indicators	n/a
Methodology for indicator calculation	The rules for averaging monitoring data are laid down in the WHO Air Quality Guidelines (2021).
Comments	-

## B. Policy references

<i>Title of the reference document</i>	<i>Link</i>
1979 ECE Convention on Long-range Transboundary Air Pollution (CLRTAP)	<a href="https://www.unece.org/environmental-policy/conventions/envlrtapwelcome/the-air-convention-and-its-protocols/the-convention-and-its-achievements.html">https://www.unece.org/environmental-policy/conventions/envlrtapwelcome/the-air-convention-and-its-protocols/the-convention-and-its-achievements.html</a>
Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe	<a href="https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX:32008L0050">https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX:32008L0050</a>

## C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
WHO global air quality guidelines: particulate matter (PM <sub>2.5</sub> and PM <sub>10</sub> ), ozone, nitrogen dioxide, sulfur dioxide and carbon monoxide	<a href="https://apps.who.int/iris/handle/10665/345329">https://apps.who.int/iris/handle/10665/345329</a>
Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe	<a href="https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX:32008L0050">https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX:32008L0050</a>
Protecting health through ambient air quality management: a resource package for the WHO European Region	<a href="https://www.who.int/europe/publications/item/WHO-EURO-2023-6898-46664-67857">https://www.who.int/europe/publications/item/WHO-EURO-2023-6898-46664-67857</a>

**D. Data and statistics needed to compile the indicator**

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
13	Ambient air quality – NO <sub>2</sub> : Annual average concentration	1.3.1: Air quality

**E. International databases containing this indicator**

<i>Name of the database</i>	<i>Link</i>
WHO Ambient air Quality Database Application	<a href="https://whoairquality.shinyapps.io/AmbientAirQualityDatabase/">https://whoairquality.shinyapps.io/AmbientAirQualityDatabase/</a>

**6.16 INDICATOR C-17.2: PROPORTION OF BODIES OF WATER WITH GOOD AMBIENT WATER QUALITY (SDG INDICATOR 6.3.2)****A. General**

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	C: Water
Component (FDES)	1: Environmental conditions and quality
Sub-component (FDES)	1.3: Environmental quality
Indicator topic (FDES)	1.3.2: Fresh water quality
ID and name in previous indicator guidelines	N/A
First publication	24/7/2021
Latest update	-
Indicator definition	The indicator is defined as the proportion of water bodies in the country that have good ambient water quality. Ambient water quality refers to natural, untreated water in rivers, lakes and groundwaters and represents a combination of natural influences together with the impacts of all anthropogenic activities.
Unit of measure	%
Coverage	All freshwater bodies of a country (rivers, lakes groundwater). Disaggregation by types of water bodies recommended.
Spatial aggregation	National. Disaggregation by river basins recommended.
Reference period	Calendar year

<i>Parameter</i>	<i>Description</i>
Update frequency	Every 3 years starting 2017
Purpose	The indicators measures change of ambient water quality over time.
Policy context	<p>SDG target 6.3: By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally.</p> <p>Good ambient water quality is essential for protecting aquatic ecosystems and the services they provide, including: the preservation of biodiversity; the protection of human health during recreational use and through the provision of drinking water; the support of human nutrition through the provision of fish and water for irrigation; the enabling of a variety of economic activities; and the strengthening of the resilience of people against water-related disasters. Good ambient water quality is therefore closely linked to the achievement of many other Sustainable Development Goals.</p> <p>European Union Water Framework Directive 2000/60/EC: Setting out rules to halt deterioration in the status of European Union water bodies and achieve good status for Europe’s rivers, lakes and groundwater.</p>
Link with SDG indicators	6.3.2 Proportion of bodies of water with good ambient water quality
Methodology for indicator calculation	The indicator is computed as the proportion of the number of water bodies classified as having good quality (i.e., with at least 80 % compliance) to the total number of assessed water bodies, expressed as a percentage.
Comments	-

**B. Policy references**

<i>Title of the reference document</i>	<i>Link</i>
Transforming our world: the 2030 Agenda for Sustainable Development	<a href="https://sdgs.un.org/2030agenda">https://sdgs.un.org/2030agenda</a>
Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy	<a href="https://environment.ec.europa.eu/topics/water/water-framework-directive_en">https://environment.ec.europa.eu/topics/water/water-framework-directive_en</a>

**C. Methodology references**

<i>Title of the reference document</i>	<i>Link</i>
Metadata of SDG indicator 6.3.1: Proportion of bodies of water with good ambient water quality	<a href="https://unstats.un.org/sdgs/metadata/">https://unstats.un.org/sdgs/metadata/</a>

**D. Data and statistics needed to compile the indicator**

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
273	Water quality status of rivers	1.3.2: Fresh water quality
274	Water quality status of lakes	1.3.2: Fresh water quality
275	Water quality status of groundwater aquifers	1.3.2: Fresh water quality

**E. International databases containing this indicator**

<i>Name of the database</i>	<i>Link</i>
SDG Indicators Database	<a href="https://unstats.un.org/sdgs/dataportal/database">https://unstats.un.org/sdgs/dataportal/database</a>



## 6.17 INDICATOR I-1.4 MATERIAL FOOTPRINT, MATERIAL FOOTPRINT PER CAPITA, AND MATERIAL FOOTPRINT PER GDP (SDG 12.2.1)

### A. General

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	I: Waste
Component (FDES)	2: Environmental resources and their use
Sub-component (FDES)	2.1: Mineral Resources
Indicator topic (FDES)	2.1.2: Production and trade of minerals
ID and name in previous indicator guidelines	N/A
First publication	08/10/2019
Latest update	25/10/2023
Indicator definition	The indicator shows the sum of the material footprint for biomass, fossil fuels, metal ores and non-metal ores.
Unit of measure	Tonnes; Kilograms per constant United States dollar; Tonnes per capita
Coverage	Biomass, fossil fuels, metal ores and non-metal ores
Spatial aggregation	National territory
Reference period	Calendar year
Update frequency	Annual
Purpose	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.
Policy context	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. Per-capita MF describes the average material use for final demand.
Link with SDG indicators	12.2.1 Material footprint, material footprint per capita, and material footprint per GDP

<i>Parameter</i>	<i>Description</i>
Methodology for indicator calculation	<p>Material footprint is calculated as raw material equivalent of imports (RMEIM) plus domestic extraction (DE) minus raw material equivalents of exports (RMEEX). For the attribution of the primary material needs of final demand a global, multi-regional input-output (MRIO).</p> <p>A footprint calculation uses the global Multi-Regional Input Output (MRIO) analysis, which compiles information from many countries national statistics to create a global multi-regional input-output table. This process requires a high level of computing capacity by supercomputers. Therefore, a limited number of countries currently can do the analysis on its own. Main data compilers are the United Nations Environment Programme, OECD and the European Union Statistical Service (Eurostat).</p>
Comments	<p>The global material flows database is based on country material flow accounts from the European Union and Japan and estimated data for the rest of the world.</p>

## B. Policy references

<i>Title of the reference document</i>	<i>Link</i>
Transforming our world: the 2030 Agenda for Sustainable Development	<a href="https://sdgs.un.org/2030agenda">https://sdgs.un.org/2030agenda</a>

## C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
Metadata of SDG indicator 12.2.1: Material footprint, material footprint per capita, and material footprint per GDP	<a href="https://unstats.un.org/sdgs/metadata/">https://unstats.un.org/sdgs/metadata/</a>
Economy-wide material flow accounts handbook	<a href="https://ec.europa.eu/eurostat/web/products-manuals-and-guidelines/-/ks-gq-18-006">https://ec.europa.eu/eurostat/web/products-manuals-and-guidelines/-/ks-gq-18-006</a>
System of Environmental-Economic Accounting 2012 - Central Framework	<a href="https://seea.un.org/content/seea-central-framework">https://seea.un.org/content/seea-central-framework</a>
The use of National Resources in the Economy: a Global Manual on Economy Wide Material Flow Accounting	<a href="https://wedocs.unep.org/bitstream/handle/20.500.11822/36253/UNRE.pdf?sequence=3&amp;isAllowed=y">https://wedocs.unep.org/bitstream/handle/20.500.11822/36253/UNRE.pdf?sequence=3&amp;isAllowed=y</a>

#### D. Data and statistics needed to compile the indicator

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
276	Domestic extraction of materials	2.1.1: Stocks and changes of mineral resources
277	Raw material equivalent of imports	2.1.2: Production and trade of minerals
278	Raw material equivalents of exports	2.1.2: Production and trade of minerals
55	GDP at constant prices	
127	Resident population	5.1.1: Urban and rural population

#### E. International databases containing this indicator

<i>Name of the database</i>	<i>Link</i>
SDG Indicators Database	<a href="https://unstats.un.org/sdgs/dataportal/database">https://unstats.un.org/sdgs/dataportal/database</a>
Global Material Flows Database	<a href="https://www.resourcepanel.org/global-material-flows-database">https://www.resourcepanel.org/global-material-flows-database</a>

### 6.18 INDICATOR I-1.5 DOMESTIC MATERIAL CONSUMPTION, DOMESTIC MATERIAL CONSUMPTION PER CAPITA, AND DOMESTIC MATERIAL CONSUMPTION PER GDP (SDG 12.2.2)

#### A. General

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	I: Waste
Component (FDES)	2: Environmental resources and their use
Sub-component (FDES)	2.1: Mineral Resources
Indicator topic (FDES)	2.1.2: Production and trade of minerals
ID and name in previous indicator guidelines	N/A
First publication	25/10/2023
Latest update	-
Indicator definition	Domestic Material Consumption (DMC) is a standard material flow accounting (MFA) indicator and reports the apparent consumption of materials in a national economy. DMC 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.

<i>Parameter</i>	<i>Description</i>
Unit of measure	Tonnes; Kilograms per constant United States dollar; Tonnes per capita
Coverage	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.
Spatial aggregation	National territory
Reference period	Calendar year
Update frequency	Annual
Purpose	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.
Policy context	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. Per-capita DMC describes the average level of material use in an economy – an environmental pressure indicator – and is also referred to as metabolic profile.
Link with SDG indicators	12.2.2 Domestic material consumption, domestic material consumption per capita, and domestic material consumption per GDP
Methodology for indicator calculation	It is calculated as direct imports (IM) of material plus domestic extraction (DE) of materials minus direct exports (EX) of materials measured in metric tonnes.
Comments	-

## B. Policy references

<i>Title of the reference document</i>	<i>Link</i>
Transforming our world: the 2030 Agenda for Sustainable Development	<a href="https://sdgs.un.org/2030agenda">https://sdgs.un.org/2030agenda</a>

## C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
Economy-wide material flow accounts handbook	<a href="https://ec.europa.eu/eurostat/web/products-manuals-and-guidelines/-/ks-gq-18-006">https://ec.europa.eu/eurostat/web/products-manuals-and-guidelines/-/ks-gq-18-006</a>
The use of National Resources in the Economy: a Global Manual on Economy Wide Material Flow Accounting	<a href="https://wedocs.unep.org/bitstream/handle/20.500.11822/36253/UNRE.pdf?sequence=3&amp;isAllowed=y">https://wedocs.unep.org/bitstream/handle/20.500.11822/36253/UNRE.pdf?sequence=3&amp;isAllowed=y</a>
Metadata of SDG indicator 12.2.2: Domestic material consumption, domestic material consumption per capita, and domestic material consumption per GDP	<a href="https://unstats.un.org/sdgs/metadata/">https://unstats.un.org/sdgs/metadata/</a>

## D. Data and statistics needed to compile the indicator

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
276	Domestic extraction of materials	2.1.1: Stocks and changes of mineral resources
279	Direct imports of materials	2.1.2: Production and trade of minerals
280	Direct exports of materials	2.1.2: Production and trade of minerals
55	GDP at constant prices	

## E. International databases containing this indicator

<i>Name of the database</i>	<i>Link</i>
SDG Indicators Database	<a href="https://unstats.un.org/sdgs/dataportal/database">https://unstats.un.org/sdgs/dataportal/database</a>
Global Material Flows Database	<a href="https://www.resourcepanel.org/global-material-flows-database">https://www.resourcepanel.org/global-material-flows-database</a>

## 6.19 INDICATOR G-1.3 TOTAL ENERGY USE BY THE NATIONAL ECONOMY

### A. General

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	G: Energy
Component (FDES)	2: Environmental resources and their use
Sub-component (FDES)	2.2: Energy Resources
Indicator topic (FDES)	2.2.2: Production, trade and consumption of energy
ID and name in previous indicator guidelines	G1: Final energy consumption
First publication	26/01/2017
Latest update	28/07/2022
Indicator definition	This indicator represents the amount of energy that is end used by resident units of a given economy. End use refers to the final transformation stage of human energy use, i.e. afterwards the energy is no longer available for human use in the respective accounting period.
Unit of measure	Petajoule (PJ)
Coverage	All economic activities (production, consumption, accumulation) undertaken by resident units
Spatial aggregation	National territory
Reference period	Calendar year
Update frequency	Annual
Purpose	Suitable indicator for national and international energy- and climate-related policies. Thanks to its coherence with national accounts it is better suited than 'primary energy supply' to be related to GDP. Moreover, it can be related to gross value added of production activities; i.e. used to compile energy intensities of NACE (or ISIC) industries which is not feasible with 'primary energy supply'.
Policy context	All energy- and climate-related policies
Link with SDG indicators	-

<i>Parameter</i>	<i>Description</i>
Methodology for indicator calculation	<p>This indicator is derived from PEFA Table A (physical supply table). It is the sum of supply by production and consumption activities of two specific residuals classes, namely</p> <ul style="list-style-type: none"> <li>- R30 'Energy losses all kinds of (during extraction, distribution, storage and transformation, and dissipative heat from end use)' and</li> <li>- R31 'Energy incorporated in products for non-energy use'.</li> </ul> <p>This indicator is automatically calculated in Table D: PEFA_IND06 "Net domestic energy use" (see methodological references)</p>
Comments	<p>Identical with indicator 1a of the CES Set of Core Climate Change-related indicators.</p> <p>In PEFA (Table D), this indicator is called 'Net domestic energy use' and it can be considered the resident-equivalent to territorial 'primary energy supply'. Please note that the PEFA indicator includes fuel use related to international water transport while it is excluded from 'primary energy supply'</p>

## B. Policy references

<i>Title of the reference document</i>	<i>Link</i>
United Nations Framework Convention on Climate Change	<a href="https://unfccc.int/">https://unfccc.int/</a>
Paris Agreement	<a href="https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement">https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement</a>
1979 ECE Convention on Long-range Transboundary Air Pollution (CLRTAP)	<a href="https://www.unece.org/environmental-policy/conventions/envlrtapwelcome/the-air-convention-and-its-protocols/the-convention-and-its-achievements.html">https://www.unece.org/environmental-policy/conventions/envlrtapwelcome/the-air-convention-and-its-protocols/the-convention-and-its-achievements.html</a>
Environmental Strategy of countries of Eastern Europe, Caucasus and Central Asia	<a href="https://www.unece.org/env/efe/Kiev/proceedings/html/Item7a.e.html">https://www.unece.org/env/efe/Kiev/proceedings/html/Item7a.e.html</a>
Directive 2012/27/EU of the European Parliament and the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC	<a href="https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2012:315:0001:0056:EN:PDF">https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2012:315:0001:0056:EN:PDF</a>

### C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
Physical Flow Accounts for Energy (PEFA Manual)	<a href="http://ec.europa.eu/eurostat/web/environment/methodology">http://ec.europa.eu/eurostat/web/environment/methodology</a>
System of Environmental-Economic Accounting for Energy (SEEA-Energy)	<a href="http://unstats.un.org/unsd/envaccounting/ceea/meetings/eleventh_meeting/BK-11-3c-3.pdf">http://unstats.un.org/unsd/envaccounting/ceea/meetings/eleventh_meeting/BK-11-3c-3.pdf</a>
International Recommendations for Energy Statistics	<a href="https://unstats.un.org/unsd/energy/ires/">https://unstats.un.org/unsd/energy/ires/</a>

### D. Data and statistics needed to compile the indicator

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
269	Total energy use by the national economy	2.2.2: Production, trade and consumption of energy

### E. International databases containing this indicator

<i>Name of the database</i>	<i>Link</i>
n/a	n/a

## 6.20 INDICATOR G-1.4 ENERGY USE BY RESIDENT HOUSEHOLDS PER CAPITA

### A. General

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	G: Energy
Component (FDES)	2: Environmental resources and their use
Sub-component (FDES)	2.2: Energy Resources
Indicator topic (FDES)	2.2.2: Production, trade and consumption of energy
ID and name in previous indicator guidelines	G1: Final energy consumption
First publication	26/10/2023
Latest update	-
Indicator definition	Total use of energy by resident households (total purposes, i.e. heating/cooling, transport, other) divided by resident population



<i>Parameter</i>	<i>Description</i>
Unit of measure	Terajoule (TJ) per person
Coverage	Resident population
Spatial aggregation	National territory
Reference period	Calendar year
Update frequency	Annual
Purpose	It measures the use of energy for heating, cooling, transport and other purposes by households.
Policy context	Indicator relevant for energy policies, because it informs about structure of energy demand and is also related to sustainable consumption of energy. SDG target 7.3: By 2030, double the global rate of improvement in energy efficiency
Link with SDG indicators	-
Methodology for indicator calculation	This indicator is calculated as consumption of energy products by households for all purposes divided by resident population. Households' consumption includes all possible purposes, namely heating/cooling, transport and other. Resident population is calculated as the average of the population in the reference year.
Comments	Identical with indicator 8a of the CES Set of Core Climate Change-related indicators. Households' energy consumption derived from SEEA energy accounts and Final energy consumption by households derived from energy balances are not comparable as the latter does not include transport.

**B. Policy references**

<i>Title of the reference document</i>	<i>Link</i>
United Nations Framework Convention on Climate Change	<a href="https://unfccc.int/">https://unfccc.int/</a>
Paris Agreement	<a href="https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement">https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement</a>
1979 ECE Convention on Long-range Transboundary Air Pollution (CLRTAP)	<a href="https://www.unece.org/environmental-policy/conventions/envlrtapwelcome/the-air-convention-and-its-protocols/the-convention-and-its-achievements.html">https://www.unece.org/environmental-policy/conventions/envlrtapwelcome/the-air-convention-and-its-protocols/the-convention-and-its-achievements.html</a>
Environmental Strategy of countries of Eastern Europe, Caucasus and Central Asia	<a href="https://www.unece.org/env/efe/Kiev/proceedings/html/Item7a.e.html">https://www.unece.org/env/efe/Kiev/proceedings/html/Item7a.e.html</a>
Directive 2012/27/EU of the European Parliament and the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC	<a href="https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2012:315:0001:0056:EN:PDF">https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2012:315:0001:0056:EN:PDF</a>

**C. Methodology references**

<i>Title of the reference document</i>	<i>Link</i>
Physical Flow Accounts for Energy (PEFA Manual)	<a href="http://ec.europa.eu/eurostat/web/environment/methodology">http://ec.europa.eu/eurostat/web/environment/methodology</a>
System of Environmental-Economic Accounting for Energy (SEEA-Energy)	<a href="http://unstats.un.org/unsd/envaccounting/ceea/meetings/eleventh_meeting/BK-11-3c-3.pdf">http://unstats.un.org/unsd/envaccounting/ceea/meetings/eleventh_meeting/BK-11-3c-3.pdf</a>

**D. Data and statistics needed to compile the indicator**

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
22	Final energy consumption: Households	2.2.2: Production, trade and consumption of energy
127	Resident population	5.1.1: Urban and rural population

**E. International databases containing this indicator**

<i>Name of the database</i>	<i>Link</i>
Eurostat database	<a href="https://ec.europa.eu/eurostat/data/database">https://ec.europa.eu/eurostat/data/database</a>

## 6.21 INDICATOR G-2.1 TOTAL PRIMARY ENERGY SUPPLY (TPES)

### A. General

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	G: Energy
Component (FDES)	2: Environmental resources and their use
Sub-component (FDES)	2.2: Energy Resources
Indicator topic (FDES)	2.2.2: Production, trade and consumption of energy
ID and name in previous indicator guidelines	G2: Total primary energy supply
First publication	03/05/2019
Latest update	26/10/2023
Indicator definition	TPES represents inland demand only and, except for world energy demand, excludes international marine and aviation bunkers (source IEA)
Unit of measure	kilotons of oil equivalent (ktoe)
Coverage	all production and consumption activities
Spatial aggregation	National territory
Reference period	Calendar year
Update frequency	Annual
Purpose	Total primary energy supply, in total and by fuel, is a driving forces indicator describing the development of the energy sector and the corresponding levels of energy supply.
Policy context	Key indicator for almost all national and international energy- and climate-related policies.
Link with SDG indicators	7.3.1 Energy intensity measured in terms of primary energy and GDP
Methodology for indicator calculation	TPES = production + imports - exports - bunkers +/- stock changes

<i>Parameter</i>	<i>Description</i>
Comments	<p>Several organisations (e.g. European Environment Agency, Eurostat) use the indicators “Gross Inland Energy Consumption” or “Total energy consumption”, which are conceptually the same as they also represent the quantity of all energy available for use in a country.</p> <p>Identical with indicator 1b of the CES Set of Core Climate Change-related indicators.</p>

## B. Policy references

<i>Title of the reference document</i>	<i>Link</i>
United Nations Framework Convention on Climate Change	<a href="https://unfccc.int/">https://unfccc.int/</a>
Paris Agreement	<a href="https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement">https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement</a>
1979 ECE Convention on Long-range Transboundary Air Pollution (CLRTAP)	<a href="https://www.unece.org/environmental-policy/conventions/envlrtapwelcome/the-air-convention-and-its-protocols/the-convention-and-its-achievements.html">https://www.unece.org/environmental-policy/conventions/envlrtapwelcome/the-air-convention-and-its-protocols/the-convention-and-its-achievements.html</a>
Environmental Strategy of countries of Eastern Europe, Caucasus and Central Asia	<a href="https://www.unece.org/env/efe/Kiev/proceedings/html/Item7a.e.html">https://www.unece.org/env/efe/Kiev/proceedings/html/Item7a.e.html</a>
Directive 2012/27/EU of the European Parliament and the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC	<a href="https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2012:315:0001:0056:EN:PDF">https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2012:315:0001:0056:EN:PDF</a>

## C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
International Recommendations for Energy Statistics	<a href="https://unstats.un.org/unsd/energy/ires/">https://unstats.un.org/unsd/energy/ires/</a>
Energy Statistics Manual	<a href="https://webstore.iea.org/energy-statistics-manual">https://webstore.iea.org/energy-statistics-manual</a>

#### D. Data and statistics needed to compile the indicator

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
30	Production of energy	2.2.2: Production, trade and consumption of energy
31	Imports of energy	2.2.2: Production, trade and consumption of energy
32	Exports of energy	2.2.2: Production, trade and consumption of energy
33	International marine and aviation bunkers	2.2.2: Production, trade and consumption of energy
34	Stock changes of energy	2.2.2: Production, trade and consumption of energy
35	Total primary energy supply: Coal	2.2.2: Production, trade and consumption of energy
36	Total primary energy supply: Peat	2.2.2: Production, trade and consumption of energy
37	Total primary energy supply: Oil shale and oil sands	2.2.2: Production, trade and consumption of energy
38	Total primary energy supply: Natural gas	2.2.2: Production, trade and consumption of energy
39	Total primary energy supply: Oil	2.2.2: Production, trade and consumption of energy
40	Total primary energy supply: Waste - non-renewable	2.2.2: Production, trade and consumption of energy
41	Total primary energy supply: Nuclear fuels	2.2.2: Production, trade and consumption of energy
42	Total primary energy supply: Other non-renewable fuels	2.2.2: Production, trade and consumption of energy
43	Total primary energy supply: Solid biofuels	2.2.2: Production, trade and consumption of energy
44	Total primary energy supply: Biogases	2.2.2: Production, trade and consumption of energy
45	Total primary energy supply: Liquid biofuels	2.2.2: Production, trade and consumption of energy
46	Total primary energy supply: Hydropower	2.2.2: Production, trade and consumption of energy
47	Total primary energy supply: Geothermal	2.2.2: Production, trade and consumption of energy
48	Total primary energy supply: Solar photovoltaic	2.2.2: Production, trade and consumption of energy

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
49	Total primary energy supply: Solar thermal	2.2.2: Production, trade and consumption of energy
50	Total primary energy supply: Tide/wave/ocean	2.2.2: Production, trade and consumption of energy
51	Total primary energy supply: Wind	2.2.2: Production, trade and consumption of energy
52	Total primary energy supply: Waste - renewable	2.2.2: Production, trade and consumption of energy
53	Total primary energy supply: Other renewable fuels	2.2.2: Production, trade and consumption of energy
54	Imports of energy: of which electricity imported	2.2.2: Production, trade and consumption of energy
56	Total primary energy supply: total	2.2.2: Production, trade and consumption of energy

#### E. International databases containing this indicator

<i>Name of the database</i>	<i>Link</i>
Eurostat database	<a href="https://ec.europa.eu/eurostat/data/database">https://ec.europa.eu/eurostat/data/database</a>
International Energy Agency	<a href="http://www.iea.org/statistics/">http://www.iea.org/statistics/</a>

## 6.22 INDICATOR G-3.1 ENERGY INTENSITY MEASURED IN TERMS OF PRIMARY ENERGY AND GDP (SDG INDICATOR 7.3.1)

### A. General

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	G: Energy
Component (FDES)	2: Environmental resources and their use
Sub-component (FDES)	2.2: Energy Resources
Indicator topic (FDES)	2.2.2: Production, trade and consumption of energy
ID and name in previous indicator guidelines	G3: Energy intensity
First publication	15/07/2019
Latest update	-

<i>Parameter</i>	<i>Description</i>
Indicator definition	<p>Energy intensity is defined as the energy supplied to the economy per unit value of economic output.</p> <p>It presents the ratio between total primary energy supply and the Gross Domestic Product (GDP) calculated for a calendar year at constant prices in purchasing power parity (PPP).</p>
Unit of measure	kilotons of oil equivalent (ktoe) per unit of GDP in international dollars. For internal use, the GDP could supplementary be expressed in the national currency.
Coverage	all production and consumption activities
Spatial aggregation	National territory
Reference period	Calendar year
Update frequency	Annual
Purpose	<p>Energy intensity is an indication of how much energy is used to produce one unit of economic output.</p> <p>It is a proxy of the efficiency with which an economy is able to use energy to produce economic output. A lower ratio indicates that less energy is used to produce one unit of output.</p>
Policy context	<p>Key indicator for almost all national and international energy- and climate-related policies.</p> <p>SDG target 7.3: By 2030, double the global rate of improvement in energy efficiency</p>
Link with SDG indicators	7.3.1 Energy intensity measured in terms of primary energy and GDP
Methodology for indicator calculation	<p>Energy intensity of GDP in terms of total primary energy supply is calculated by dividing total primary energy supply (indicator "G-2.1: Total primary energy supply") by GDP. The GDP figures are taken at constant prices to avoid the impact of inflation and are presented with an indication of the base year (2011). GDP is measured in constant prices in international dollars in PPP, and optionally supplementary in the local currency.</p>
Comments	-

**B. Policy references**

<i>Title of the reference document</i>	<i>Link</i>
United Nations Framework Convention on Climate Change	<a href="https://unfccc.int/">https://unfccc.int/</a>
Paris Agreement	<a href="https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement">https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement</a>
Transforming our world: the 2030 Agenda for Sustainable Development	<a href="https://sdgs.un.org/2030agenda">https://sdgs.un.org/2030agenda</a>
1979 ECE Convention on Long-range Transboundary Air Pollution (CLRTAP)	<a href="https://www.unece.org/environmental-policy/conventions/envlrtapwelcome/the-air-convention-and-its-protocols/the-convention-and-its-achievements.html">https://www.unece.org/environmental-policy/conventions/envlrtapwelcome/the-air-convention-and-its-protocols/the-convention-and-its-achievements.html</a>
Directive 2012/27/EU of the European Parliament and the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC	<a href="https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2012:315:0001:0056:EN:PDF">https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2012:315:0001:0056:EN:PDF</a>

**C. Methodology references**

<i>Title of the reference document</i>	<i>Link</i>
International Recommendations for Energy Statistics	<a href="https://unstats.un.org/unsd/energy/ires/">https://unstats.un.org/unsd/energy/ires/</a>
Metadata of SDG indicator 7.3.1: Energy intensity measured in terms of primary energy and GDP (last update: 31 March 2022)	<a href="https://unstats.un.org/sdgs/metadata/files/Metadata-07-03-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-07-03-01.pdf</a>

**D. Data and statistics needed to compile the indicator**

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
55	GDP at constant prices	
56	Total primary energy supply: total	2.2.2: Production, trade and consumption of energy

**E. International databases containing this indicator**

<i>Name of the database</i>	<i>Link</i>
SDG Indicators Database	<a href="https://unstats.un.org/sdgs/dataportal/database">https://unstats.un.org/sdgs/dataportal/database</a>



## 6.23 INDICATOR G-4.1 RENEWABLE ENERGY SHARE IN THE TOTAL PRIMARY ENERGY SUPPLY

### A. General

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	G: Energy
Component (FDES)	2: Environmental resources and their use
Sub-component (FDES)	2.2: Energy Resources
Indicator topic (FDES)	2.2.2: Production, trade and consumption of energy
ID and name in previous indicator guidelines	G4: Renewable energy consumption
First publication	16/07/2019
Latest update	26/10/2023
Indicator definition	This indicator shows the share of renewable energy supply share in a country's total primary energy supply for a calendar year.
Unit of measure	%
Coverage	all production and consumption activities
Spatial aggregation	National territory
Reference period	Calendar year
Update frequency	Annual
Purpose	This indicator assesses responses aimed at the reduction of the environmental impact of energy consumption.
Policy context	The dependence of the economy on non-renewable energy resources (fossil fuels) cannot be sustainable in the long run, since natural fossil fuel resources are limited, whereas renewable resources can ensure a continuous energy supply. Renewable energy sources can be considered as the best option for reducing the negative environmental impacts of energy production and consumption.
Link with SDG indicators	7.3.1 Energy intensity measured in terms of primary energy and GDP
Methodology for indicator calculation	total primary renewable energy supply divided by total primary energy supply (TPES, indicator G-2.1)
Comments	-

## B. Policy references

<i>Title of the reference document</i>	<i>Link</i>
1979 ECE Convention on Long-range Transboundary Air Pollution (CLRTAP)	<a href="https://www.unece.org/environmental-policy/conventions/envlrtapwelcome/the-air-convention-and-its-protocols/the-convention-and-its-achievements.html">https://www.unece.org/environmental-policy/conventions/envlrtapwelcome/the-air-convention-and-its-protocols/the-convention-and-its-achievements.html</a>
Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources	<a href="https://eur-lex.europa.eu/eli/dir/2018/2001/oj">https://eur-lex.europa.eu/eli/dir/2018/2001/oj</a>

## C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
International Recommendations for Energy Statistics	<a href="https://unstats.un.org/unsd/energy/ires/">https://unstats.un.org/unsd/energy/ires/</a>
Energy Statistics Manual	<a href="https://webstore.iea.org/energy-statistics-manual">https://webstore.iea.org/energy-statistics-manual</a>

## D. Data and statistics needed to compile the indicator

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
43	Total primary energy supply: Solid biofuels	2.2.2: Production, trade and consumption of energy
44	Total primary energy supply: Biogases	2.2.2: Production, trade and consumption of energy
45	Total primary energy supply: Liquid biofuels	2.2.2: Production, trade and consumption of energy
46	Total primary energy supply: Hydropower	2.2.2: Production, trade and consumption of energy
47	Total primary energy supply: Geothermal	2.2.2: Production, trade and consumption of energy
48	Total primary energy supply: Solar photovoltaic	2.2.2: Production, trade and consumption of energy
49	Total primary energy supply: Solar thermal	2.2.2: Production, trade and consumption of energy
50	Total primary energy supply: Tide/wave/ocean	2.2.2: Production, trade and consumption of energy
51	Total primary energy supply: Wind	2.2.2: Production, trade and consumption of energy

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
52	Total primary energy supply: Waste - renewable	2.2.2: Production, trade and consumption of energy
53	Total primary energy supply: Other renewable fuels	2.2.2: Production, trade and consumption of energy
56	Total primary energy supply: total	2.2.2: Production, trade and consumption of energy
57	Total primary energy supply: Total renewable energy supply	2.2.2: Production, trade and consumption of energy

#### **E. International databases containing this indicator**

<i>Name of the database</i>	<i>Link</i>
-	-

## **6.24 INDICATOR E-1.2 NET LAND TAKE**

### **A. General**

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	E: Land and soil
Component (FDES)	2: Environmental resources and their use
Sub-component (FDES)	2.3: Land
Indicator topic (FDES)	2.3.1: Land use
ID and name in previous indicator guidelines	E1: Land uptake
First publication	09/08/2022
Latest update	26/10/2023
Indicator definition	This indicator addresses the change in the areas of agricultural, forest and other semi-natural land taken for urban and other artificial land development. Land take includes areas sealed by construction and urban infrastructure, urban green areas, and sport and leisure facilities.
Unit of measure	Square kilometres or %
Coverage	Land uptake
Spatial aggregation	National territory
Reference period	Calendar year
Update frequency	Annual

<i>Parameter</i>	<i>Description</i>
Purpose	The indicator provides a measure of the impact on the environment and shows trends in the extent of land take from natural and semi-natural land.
Policy context	<p>Land take entails the conversion of land to artificial surfaces, which impairs the valuable ecological functions of lands. This leads to less resilient ecosystems, decreased potential for carbon storage and biodiversity maintenance, increased surface run-off during floods and increased effects of heatwaves in cities. It also results in reduced quality of life via the diminished ecological land functions as well as via the direct loss of natural areas for relaxation, regeneration and outdoor activities.</p> <p>This indicator is a headline indicator for monitoring progress towards the 8th Environment Action Programme (8th EAP). 'No net land take' is also addressed in the land degradation neutrality (LDN) target of the United Nations Convention to Combat Desertification (UNCCD), which aims to maintain the amount and quality of land resources. LDN is promoted by target 15.3 of the UN Sustainable Development Goals (SDGs), which, by 2030, strives to combat desertification and to restore degraded land and soil. Land and soil are also linked to goals that address poverty reduction (SDG 1), health and well-being through reduced pollution (SDG 3), access to clean water and sanitation (SDG 6), the environmental impact of urban sprawl (SDG 11) and climate change (SDG 13).</p> <p>The European Union biodiversity strategy to 2020 calls for the restoration of at least 15% of degraded ecosystems in the European Union and the expansion of the use of green infrastructure, e.g. to help overcome land fragmentation.</p>
Link with SDG indicators	15.3.1 Proportion of land that is degraded over total land area (related indicator)

<i>Parameter</i>	<i>Description</i>
Methodology for indicator calculation	<p>Data should be provided for land take for areas sealed by construction and urban infrastructure, urban green areas, and sport and leisure facilities.</p> <p>The main drivers of land take are grouped as processes resulting in the extension of:</p> <ul style="list-style-type: none"> <li>• housing, services and recreation;</li> <li>• industrial and commercial sites;</li> <li>• transport networks and infrastructure;</li> <li>• mines, quarries and waste dump sites;</li> <li>• construction sites.</li> </ul> <p>Land take changes relate to the extension of urban areas and may also include parcels that were not sealed (e.g. urban green areas, and sport and leisure facilities). Similarly, monitoring the indicator with satellite images leads to the exclusion of some linear transport infrastructure, which are too narrow to be observed directly.</p> <p>Net land take is calculated taking into account the ‘reverse land take process’, i.e. when urban areas are converted to semi-natural land. This can happen as, for example, land cover changes from a mineral extraction site to forest. Net land take is hence the result of land take minus reverse land take, expressed in km<sup>2</sup> area.</p>
Comments	-

## B. Policy references

<i>Title of the reference document</i>	<i>Link</i>
Net land take in cities and commuting zones in Europe	<a href="https://www.eea.europa.eu/en/analysis/indicators/net-land-take-in-cities?activeAccordion=546a7c35-9188-4d23-94ee-005d97c26f2b">https://www.eea.europa.eu/en/analysis/indicators/net-land-take-in-cities?activeAccordion=546a7c35-9188-4d23-94ee-005d97c26f2b</a>
Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. European Union Biodiversity Strategy for 2030. Bringing nature back into our lives.	<a href="https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:52020DC0380">https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:52020DC0380</a>

<i>Title of the reference document</i>	<i>Link</i>
United Nations Convention to Combat Desertification in those Countries experiencing serious Drought and/or Desertification, particularly in Africa	<a href="https://www.unccd.int/">https://www.unccd.int/</a>
Decision (EU) 2022/591 of the European Parliament and of the Council of 6 April 2022 on a General Union Environment Action Programme to 2030	<a href="https://eur-lex.europa.eu/eli/dec/2022/591/oj">https://eur-lex.europa.eu/eli/dec/2022/591/oj</a>

### C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
Net land take in cities and commuting zones in Europe	<a href="https://www.eea.europa.eu/en/analysis/indicators/net-land-take-in-cities?activeAccordion=546a7c35-9188-4d23-94ee-005d97c26f2b">https://www.eea.europa.eu/en/analysis/indicators/net-land-take-in-cities?activeAccordion=546a7c35-9188-4d23-94ee-005d97c26f2b</a>

### D. Data and statistics needed to compile the indicator

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
281	Net land take for housing, services and recreation	2.3.1: Land use
282	Net land take for industrial and commercial sites	2.3.1: Land use
283	Net land take for transport networks and infrastructure	2.3.1: Land use
284	Net land take for mines, quarries and waste dump sites	2.3.1: Land use
285	Net land take for construction sites	2.3.1: Land use

### E. International databases containing this indicator

<i>Name of the database</i>	<i>Link</i>
-	-

## 6.25 INDICATOR D-3.3 SHARE OF NATURAL FOREST OF TOTAL FOREST AREA

### A. General

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	D: Biodiversity
Component (FDES)	2: Environmental resources and their use
Sub-component (FDES)	2.3: Land
Indicator topic (FDES)	2.3.2: Use of forest land
ID and name in previous indicator guidelines	D3: Forests and other wooded land
First publication	26/12/2023
Latest update	-
Indicator definition	The share of natural forests of the total forest area
Unit of measure	%
Coverage	All forest areas of the national territory
Spatial aggregation	National territory
Reference period	Reference date
Update frequency	Annual
Purpose	The indicator shows the share of forest areas which are classified as natural, meaning that it is composed of indigenous trees and not classified as forest plantation.
Policy context	<p>Natural forests provide a range of ecosystem services, including carbon sequestration, water and soil protection etc.</p> <p>The vision of the Kunming-Montreal Global Biodiversity Framework is a world of living in harmony with nature where “by 2050, biodiversity is valued, conserved, restored and wisely used, maintaining ecosystem services, sustaining a healthy planet and delivering benefits essential for all people.” The mission of the Framework for the period up to 2030, towards the 2050 vision is to take urgent action to halt and reverse biodiversity loss to put nature on a path to recovery for the benefit of people and planet by conserving and sustainably using biodiversity and by ensuring the fair and equitable sharing of benefits from the use of genetic resources, while providing the necessary means of implementation.</p>

<i>Parameter</i>	<i>Description</i>
Link with SDG indicators	<p>The EU forest strategy for 2030 is one of the flagship initiatives of the European Green Deal and builds on the EU biodiversity strategy for 2030. The strategy will contribute to achieving the EU's biodiversity objectives as well as greenhouse gas emission reduction target of at least 55% by 2030 and climate neutrality by 2050. It recognises the central and multifunctional role of forests, and the contribution of foresters and the entire forest-based value chain for achieving a sustainable and climate neutral economy by 2050 and preserving lively and prosperous rural areas.</p> <p>15.2.1 Progress towards sustainable forest management (related indicator)</p> <p>15.1.2 Proportion of important sites for terrestrial and freshwater biodiversity that are covered by protected areas, by ecosystem type (related indicator)</p>
Methodology for indicator calculation	<p><math>100 \times \text{total forest area} / \text{natural forest area}</math></p> <p>Definitions according to the Forest Resources Assessment 2000:</p> <p>Forest: Forest includes natural forests and forest plantations. It is used to refer to land with a tree canopy cover of more than 10 percent and area of more than 0.5 ha. Forests are determined both by the presence of trees and the absence of other predominant land uses. The trees should be able to reach a minimum height of 5 m. Young stands that have not yet but are expected to reach a crown density of 10 percent and tree height of 5 m are included under forest, as are temporarily unstocked areas. The term includes forests used for purposes of production, protection, multiple-use or conservation (i.e. forest in national parks, nature reserves and other protected areas), as well as forest stands on agricultural lands (e.g. windbreaks and shelterbelts of trees with a width of more than 20 m), and rubberwood plantations and cork oak stands. The term specifically excludes stands of trees established primarily for agricultural production, for example fruit tree plantations. It also excludes trees planted in agroforestry systems,</p>



<i>Parameter</i>	<i>Description</i>
Comments	<p>Natural forest: A forest composed of indigenous trees and not classified as forest plantation.</p> <p>Could be complemented with an indicator on other wooded land (i.e. land that has either a crown cover (or equivalent stocking level) of 5 to 10 percent of trees able to reach a height of 5 m at maturity; or a crown cover (or equivalent stocking level) of more than 10 percent of trees not able to reach a height of 5 m at maturity; or with shrub or bush cover of more than 10 percent).</p>

## B. Policy references

<i>Title of the reference document</i>	<i>Link</i>
Transforming our world: the 2030 Agenda for Sustainable Development	<a href="https://sdgs.un.org/2030agenda">https://sdgs.un.org/2030agenda</a>
United Nations Convention on Biological Diversity (CBD)	<a href="https://www.cbd.int/convention/text/">https://www.cbd.int/convention/text/</a>
Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. EU Biodiversity Strategy for 2030. Bringing nature back into our lives.	<a href="https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:52020DC0380">https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:52020DC0380</a>
Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions New EU Forest Strategy for 2030	<a href="https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021DC0572">https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021DC0572</a>
Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora	<a href="http://ec.europa.eu/environment/nature/legislation/habitatsdirective/index_en.htm">http://ec.europa.eu/environment/nature/legislation/habitatsdirective/index_en.htm</a>

## C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
Forest Resources Assessment 2025 Supporting Documents	<a href="https://www.fao.org/forest-resources-assessment/en/">https://www.fao.org/forest-resources-assessment/en/</a>

**D. Data and statistics needed to compile the indicator**

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
230	Forest area	1.2.3: Forests
363	Natural forest area	1.2.3: Forests

**E. International databases containing this indicator**

<i>Name of the database</i>	<i>Link</i>
n/a	n/a

**6.26 INDICATOR D-3.12 PROGRESS TOWARDS SUSTAINABLE FOREST MANAGEMENT (SDG INDICATOR 15.2.1)****A. General**

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	D: Biodiversity
Component (FDES)	2: Environmental resources and their use
Sub-component (FDES)	2.3: Land
Indicator topic (FDES)	2.3.2: Use of forest land
ID and name in previous indicator guidelines	D3: Forests and other wooded land
First publication	05/12/2023
Latest update	-
Indicator definition	The indicator is composed of 5 sub-indicators: <ol style="list-style-type: none"> <li>1. Annual forest area change rate</li> <li>2. Above-ground biomass in forest</li> <li>3. Proportion of forest area within legally established protected areas</li> <li>4. Proportion of forest area under a long-term management plan</li> <li>5. Forest area under an independently verified forest management certification scheme</li> </ol>
Unit of measure	Sub-indicator 1: %; Sub-indicator 2: Tonnes per hectare; Sub-indicator 3: %; Sub-indicator 4: %; Sub-indicator 5: 1000 hectares
Coverage	All forest areas of the national territory

<i>Parameter</i>	<i>Description</i>
Spatial aggregation	National territory
Reference period	Calendar year and reference date (depending on sub-indicator)
Update frequency	Annual
Purpose	<p>A simple measure of forest area is insufficient to monitor sustainable forest management as a whole. The significance of the five sub-indicators can be briefly explained as follows:</p> <ol style="list-style-type: none"> <li>1. Trends in forest area are crucial for monitoring SFM. The first sub-indicator focuses on both the direction of change (whether there is a loss or gain in forest area) and how the change rate varies over time; the latter is important to capture progress among countries that are losing forest area but have managed to reduce the rate of annual forest area loss.</li> <li>2. Changes in the above-ground biomass stock in forest indicate the balance between gains in biomass stock due to forest growth and losses due to wood removals, natural losses, fire, wind, pests and diseases. At country level and over a longer period, sustainable forest management would imply a stable or increasing biomass stock per hectare, while a long-term reduction of biomass stock per hectare would imply either unsustainable management of the forests and degradation or unexpected major losses due to fire, wind, pests or diseases.</li> <li>3. The change in forest area within legally protected areas is a proxy for trends in conservation of a forest biodiversity as well as cultural and spiritual values of forests and thus a clear indication of the political will to protect and conserve forests. This indicator is related to the CBD Aichi Target 11 which calls for each country to conserve at least 17 per cent of terrestrial and inland water areas.</li> </ol>

<i>Parameter</i>	<i>Description</i>
Purpose	<p>4. The fourth sub-indicator looks at the forest area that is under a long-term forest management plan. The existence of a documented forest management plan is the basis for long term and sustainable management of the forest resources for a variety of management objectives such as for wood and non-wood forest products, protection of soil and water, biodiversity conservation, social and cultural use, and a combination of two or several of these. An increasing area under forest management plan is therefore an indicator of progress towards sustainable forest management.</p> <p>5. The fifth sub-indicator is the forest area that is certified by an independently verified forest management certification scheme. Such certification schemes apply standards that generally are higher than those established by the countries' own normative frameworks, and compliance is verified by an independent and accredited certifier. An increase in certified forest area therefore provides an additional indication of progress towards sustainable forest management. It should however be noted that there are significant areas of sustainably managed forest which are not certified, either because their owners have chosen not to seek certification (which is voluntary and market-based) or because no credible or affordable certification scheme is in place for that area.</p>
Policy context	<p>"Sustainable forest management" (SFM) is a central concept for Goal 15 and target 15.1 as well as for target 15.2. It has been formally defined, by the UN General Assembly, as follows: [a] dynamic and evolving concept [that] aims to maintain and enhance the economic, social and environmental values of all types of forests, for the benefit of present and future generations" (Resolution A/RES/62/98)</p>
Link with SDG indicators	15.2.1 Progress towards sustainable forest management

<i>Parameter</i>	<i>Description</i>
Methodology for indicator calculation	<ol style="list-style-type: none"> <li>1. Annual forest area change rate (%) = <math>(100 * \text{area at reference date} / \text{forest area at reference date of previous year}) - 100</math></li> <li>2. Above ground biomass in forest (tonnes per hectare) = total ground biomass in forests / forest area</li> <li>3. Proportion of forest area within legally established protected areas (%) = <math>100 * \text{forest area within legally established protected areas} / \text{total land areas under protection (national categories of protected areas)}</math></li> <li>4. Proportion of forest area under a long-term management plan (%) = <math>100 * \text{forest area under a long-term management plan} / \text{forest area}</math></li> <li>5. Forest area under an independently verified forest management certification scheme (1000 hectares) = sum of forest area under an independently verified forest management certification scheme</li> </ol>
Comments	-

## B. Policy references

<i>Title of the reference document</i>	<i>Link</i>
Transforming our world: the 2030 Agenda for Sustainable Development	<a href="https://sdgs.un.org/2030agenda">https://sdgs.un.org/2030agenda</a>
United Nations Convention on Biological Diversity (CBD)	<a href="https://www.cbd.int/convention/text/">https://www.cbd.int/convention/text/</a>

## C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
Forest Resources Assessment 2025 Supporting Documents	<a href="https://www.fao.org/forest-resources-assessment/en/">https://www.fao.org/forest-resources-assessment/en/</a>
Metadata of SDG indicator 15.2.1: Progress towards sustainable forest management	<a href="https://unstats.un.org/sdgs/metadata/">https://unstats.un.org/sdgs/metadata/</a>

**D. Data and statistics needed to compile the indicator**

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
67	Total areas under protection (national categories of protected areas)	1.2.2: Ecosystems and biodiversity
230	Forest area	1.2.3: Forests
336	Above-ground biomass in forest	1.2.3: Forests
337	Forest area within legally established protected areas	1.2.3: Forests
338	Forest area under a long-term management plan	1.2.3: Forests
339	Forest area under an independently verified forest management certification scheme	1.2.3: Forests

**E. International databases containing this indicator**

<i>Name of the database</i>	<i>Link</i>
SDG Indicators Database	<a href="https://unstats.un.org/sdgs/dataportal/database">https://unstats.un.org/sdgs/dataportal/database</a>

**6.27 INDICATOR D-5.2 PROPORTION OF MARINE FISH STOCKS WITHIN BIOLOGICALLY SUSTAINABLE LEVELS (SDG INDICATOR 14.4.1)****A. General**

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	D: Biodiversity
Component (FDES)	2: Environmental resources and their use
Sub-component (FDES)	2.5: Biological Resources
Indicator topic (FDES)	2.5.2: Aquatic resources
ID and name in previous indicator guidelines	D5: Trends in the number and distribution of selected species
First publication	21/07/2023
Latest update	-
Indicator definition	The indicator measures the sustainability of the marine capture fisheries by the abundance of the exploited fish stocks with respect to Maximum Sustainable Yield (MSY) levels.
Unit of measure	%

<i>Parameter</i>	<i>Description</i>
Coverage	Marine capture fishes on the national reference list
Spatial aggregation	National territory
Reference period	Calendar year
Update frequency	Every 2 years beginning in 2020
Purpose	The indicator assesses for marine fish species in the Reference List whether the number of stocks is within biologically sustainable levels.
Policy context	SDG target 14.4: By 2020, effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans, in order to restore fish stocks in the shortest time feasible, at least to levels that can produce maximum sustainable yield as determined by their biological characteristics. CBD headline indicator 5.1
Link with SDG indicators	14.4.1 Proportion of fish stocks within biologically sustainable levels
Methodology for indicator calculation	For each level of reporting (National, Regional, Global) the indicator is calculated as the ratio between the number of exploited fish stocks classified as “within biologically sustainable levels” and the total number of stocks in the Reference List that were classified with a determined status (within/not within “biologically sustainable levels”).
Comments	-

## **B. Policy references**

<i>Title of the reference document</i>	<i>Link</i>
Transforming our world: the 2030 Agenda for Sustainable Development	<a href="https://sdgs.un.org/2030agenda">https://sdgs.un.org/2030agenda</a>
United Nations Convention on Biological Diversity (CBD)	<a href="https://www.cbd.int/convention/text/">https://www.cbd.int/convention/text/</a>

**C. Methodology references**

<i>Title of the reference document</i>	<i>Link</i>
Metadata of SDG indicator 14.4.1: Proportion of fish stocks within biologically sustainable levels	<a href="https://unstats.un.org/sdgs/metadata/">https://unstats.un.org/sdgs/metadata/</a>

**D. Data and statistics needed to compile the indicator**

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
271	Percentage of marine stocks of fish classified as "within biologically sustainable levels" for the Reference List of Stocks	2.5.2: Aquatic resources

**E. International databases containing this indicator**

<i>Name of the database</i>	<i>Link</i>
SDG Indicators Database	<a href="https://unstats.un.org/sdgs/dataportal/database">https://unstats.un.org/sdgs/dataportal/database</a>

**6.28 INDICATOR C-1.1 RENEWABLE FRESHWATER RESOURCES****A. General**

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	C: Water
Component (FDES)	2: Environmental resources and their use
Sub-component (FDES)	2.6: Water Resources
Indicator topic (FDES)	2.6.1: Water resources
ID and name in previous indicator guidelines	C1: Renewable freshwater resources
First publication	10/10/2019
Latest update	15/10/2019
Indicator definition	The total volume of river run-off and groundwater generated over the period of a year, in natural conditions, by precipitation into a territory plus inflow of surface and groundwaters from neighbouring countries
Unit of measure	million m <sup>3</sup>
Coverage	Freshwater



<i>Parameter</i>	<i>Description</i>
Spatial aggregation	National territory
Reference period	Calendar year
Update frequency	Annual
Purpose	<p>The indicator provides a measure of the state of renewable freshwater resources in a country and of its change over time.</p> <p>FAO (Aquastat) refers to this indicator as “Total renewable water resources”</p>
Policy context	<p>Renewable freshwater resources are of major environmental and economic importance. Their distribution varies widely among and within countries. Pressures on freshwater resources are exerted by overexploitation and by degradation of environmental quality. Relating renewable freshwater resources with freshwater abstraction and use is a central issue in sustainable freshwater resource management. If a significant share of a country’s water comes from transboundary rivers, tensions between countries can arise, especially if water availability in the upstream country is smaller than in the country downstream.</p> <p>SDG Target 6.4: By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity</p>
Link with SDG indicators	6.4.2 Level of water stress: freshwater withdrawal as a proportion of available freshwater resources (renewable freshwater resources are part of the calculation of the SDG indicator)
Methodology for indicator calculation	<p>Internal flow = precipitation - actual evapotranspiration</p> <p>Renewable freshwater resources = internal flow + inflow of surface and groundwaters from neighbouring countries</p> <p>It is calculated for annual values and for the long-term annual average (minimum period of 20 years)</p>
Comments	-

## B. Policy references

<i>Title of the reference document</i>	<i>Link</i>
Convention on the Protection and Use of Transboundary Watercourses and International Lakes	<a href="https://www.unece.org/env/water/text/text.html">https://www.unece.org/env/water/text/text.html</a>
Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy	<a href="https://ec.europa.eu/environment/water/water-framework/index_en.html">https://ec.europa.eu/environment/water/water-framework/index_en.html</a>
Integrated Water Resources Management	<a href="http://www.gwp.org/the-challenge/what-is-iwrm/">http://www.gwp.org/the-challenge/what-is-iwrm/</a>

## C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
UNSD/United Nations Environment Programme Questionnaire 2018 on Environment Statistics - section "Water"	<a href="https://unstats.un.org/unsd/envstats/questionnaire">https://unstats.un.org/unsd/envstats/questionnaire</a>
International Recommendations for Water Statistics	<a href="https://seea.un.org/content/seea-water">https://seea.un.org/content/seea-water</a>
System of Environmental-Economic Accounting for Water	<a href="https://seea.un.org/content/seea-water">https://seea.un.org/content/seea-water</a>
The Guide to Hydrological Practices (WMO No.168)	<a href="http://www.whycos.org/hwrrp/guide/index.php">http://www.whycos.org/hwrrp/guide/index.php</a>

## D. Data and statistics needed to compile the indicator

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
160	Precipitation	2.6.1: Water resources
161	Actual evapotranspiration	2.6.1: Water resources
162	Inflow of surface and groundwaters from neighbouring countries	2.6.1: Water resources

## E. International databases containing this indicator

<i>Name of the database</i>	<i>Link</i>
Eurostat database	<a href="https://ec.europa.eu/eurostat/data/database">https://ec.europa.eu/eurostat/data/database</a>
Aquastat database	<a href="http://www.fao.org/nr/water/aquastat/data/query/index.html?lang=en">http://www.fao.org/nr/water/aquastat/data/query/index.html?lang=en</a>

## 6.29 INDICATOR C-2.1 TOTAL FRESHWATER ABSTRACTED BY SOURCE

### A. General

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	C: Water
Component (FDES)	2: Environmental resources and their use
Sub-component (FDES)	2.6: Water Resources
Indicator topic (FDES)	2.6.2: Abstraction, use and returns of water
ID and name in previous indicator guidelines	C2: Freshwater abstraction
First publication	15/10/2019
Latest update	-
Indicator definition	Water removed from any water source (surface water sources, such as rivers, lakes, reservoirs or rainwater; and groundwater sources) either permanently or temporarily. Includes abstraction by the water supply industry for distribution and direct abstraction by other activities for own use. The volume of water abstracted is broken down by main groups of economic activity of the abstractors (according to ISIC Rev.4) and households.
Unit of measure	million m <sup>3</sup>
Coverage	Freshwater resources, all economic activities and private households
Spatial aggregation	National territory
Reference period	Calendar year
Update frequency	Annual
Purpose	The indicator provides important information about the pressure of human activities on freshwater resources. It is also needed for the calculation of various other indicators, for example the water exploitation index or SDG indicator 6.4.2
Policy context	The indicator provides, in relation to total resources available for abstraction, a measure of the pressure on the environment in terms of the abstraction of freshwater resources. It can reflect the extent of water resource scarcity and the distribution of abstracted water among different economic activities.

<i>Parameter</i>	<i>Description</i>
Link with SDG indicators	6.4.2 Level of water stress: freshwater withdrawal as a proportion of available freshwater resources (needed for the calculation of the SDG indicator)
Methodology for indicator calculation	The sum of all abstractions of freshwater from groundwater aquifers and fresh surface waters, and its breakdowns per economic activity and households
Comments	-

## B. Policy references

<i>Title of the reference document</i>	<i>Link</i>
Convention on the Protection and Use of Transboundary Watercourses and International Lakes	<a href="https://www.unece.org/env/water/text/text.html">https://www.unece.org/env/water/text/text.html</a>
Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy	<a href="https://ec.europa.eu/environment/water/water-framework/index_en.html">https://ec.europa.eu/environment/water/water-framework/index_en.html</a>
Integrated Water Resources Management	<a href="http://www.gwp.org/the-challenge/what-is-iwrm/">http://www.gwp.org/the-challenge/what-is-iwrm/</a>
Environmental Strategy of countries of Eastern Europe, Caucasus and Central Asia	<a href="https://www.unece.org/env/efe/Kiev/proceedings/html/Item7a.e.html">https://www.unece.org/env/efe/Kiev/proceedings/html/Item7a.e.html</a>

## C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
UNSD/United Nations Environment Programme Questionnaire 2022 on Environment Statistics - section "Water"	<a href="https://unstats.un.org/unsd/envstats/questionnaire">https://unstats.un.org/unsd/envstats/questionnaire</a>
International Recommendations for Water Statistics	<a href="https://seea.un.org/content/seea-water">https://seea.un.org/content/seea-water</a>
System of Environmental-Economic Accounting for Water	<a href="https://seea.un.org/content/seea-water">https://seea.un.org/content/seea-water</a>

#### D. Data and statistics needed to compile the indicator

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
166	Fresh surface water abstracted: total	2.6.2: Abstraction, use and returns of water
167	Fresh groundwater abstracted: total	2.6.2: Abstraction, use and returns of water
168	Freshwater abstracted: by water supply industry (ISIC 36)	2.6.2: Abstraction, use and returns of water
169	Freshwater abstracted: by households	2.6.2: Abstraction, use and returns of water
170	Freshwater abstracted: by agriculture, forestry and fishing (ISIC 01-03)	2.6.2: Abstraction, use and returns of water
171	Freshwater abstracted: by manufacturing (ISIC 10-33)	2.6.2: Abstraction, use and returns of water
172	Freshwater abstracted: by manufacturing (ISIC 10-33): of which industry cooling	2.6.2: Abstraction, use and returns of water
174	Freshwater abstracted: by production of electricity (cooling) (ISIC 35.11-35.13)	2.6.2: Abstraction, use and returns of water
175	Freshwater abstracted: by construction and other industrial activities	2.6.2: Abstraction, use and returns of water
176	Freshwater abstracted: by services (ISIC 45-96)	2.6.2: Abstraction, use and returns of water
177	Freshwater abstracted: by agriculture, forestry and fishing (ISIC 01-03): of which irrigation	2.6.2: Abstraction, use and returns of water
178	Freshwater abstracted: by agriculture, forestry and fishing (ISIC 01-03): of which aquaculture	2.6.2: Abstraction, use and returns of water

#### E. International databases containing this indicator

<i>Name of the database</i>	<i>Link</i>
Eurostat database	<a href="https://ec.europa.eu/eurostat/data/database">https://ec.europa.eu/eurostat/data/database</a>
Aquastat database	<a href="http://www.fao.org/nr/water/aquastat/data/query/index.html?lang=en">http://www.fao.org/nr/water/aquastat/data/query/index.html?lang=en</a>

### 6.30 INDICATOR C-2.3 WATER EXPLOITATION INDEX (WEI)

#### A. General

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	C: Water
Component (FDES)	2: Environmental resources and their use
Sub-component (FDES)	2.6: Water Resources
Indicator topic (FDES)	2.6.2: Abstraction, use and returns of water
ID and name in previous indicator guidelines	C2: Freshwater abstraction
First publication	15/10/2019
Latest update	-
Indicator definition	The indicator presents the annual total freshwater abstraction in a country as a percentage of its long-term annual average (LTAA) available water from renewable freshwater resources
Unit of measure	%
Coverage	Freshwater bodies (groundwater and surface water), all water abstractions
Spatial aggregation	National territory
Reference period	Calendar year
Update frequency	Annual
Purpose	The indicator provides, in relation to total resources available for abstraction, a measure of the pressure on the environment in terms of the abstraction of freshwater resources. It can reflect the extent of water resource scarcity and the distribution of abstracted water among different economic activities.

<i>Parameter</i>	<i>Description</i>
Policy context	Changes in the WEI help to analyse how changes in abstraction affect freshwater resources by increasing pressure on them or making them more sustainable. In terms of the threshold values of the WEI, areas for which the water exploitation index is above 20% can be considered as stressed regions, while regions where the WEI exceeds 40% can be considered as areas experiencing severe water stress. The WEI provides a good national-level overview of the pressures on resources in an easily understandable format, and shows trends of these pressures over time.
Link with SDG indicators	6.4.2 Level of water stress: freshwater withdrawal as a proportion of available freshwater resources (the SDG indicator is similar to the WEI, but also takes into account environmental water requirements)
Methodology for indicator calculation	$WEI = \text{annual total freshwater abstraction} / \text{long-term annual average available water from renewable freshwater resources}$
Comments	-

## B. Policy references

<i>Title of the reference document</i>	<i>Link</i>
Convention on the Protection and Use of Transboundary Watercourses and International Lakes	<a href="https://www.unece.org/env/water/text/text.html">https://www.unece.org/env/water/text/text.html</a>
Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy	<a href="https://ec.europa.eu/environment/water/water-framework/index_en.html">https://ec.europa.eu/environment/water/water-framework/index_en.html</a>
Integrated Water Resources Management	<a href="http://www.gwp.org/the-challenge/what-is-iwrm/">http://www.gwp.org/the-challenge/what-is-iwrm/</a>
Environmental Strategy of countries of Eastern Europe, Caucasus and Central Asia	<a href="https://www.unece.org/env/efe/Kiev/proceedings/html/Item7a.e.html">https://www.unece.org/env/efe/Kiev/proceedings/html/Item7a.e.html</a>

### C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
UNSD/United Nations Environment Programme Questionnaire 2022 on Environment Statistics - section "Water"	<a href="https://unstats.un.org/unsd/envstats/questionnaire">https://unstats.un.org/unsd/envstats/questionnaire</a>
International Recommendations for Water Statistics	<a href="https://seea.un.org/content/seea-water">https://seea.un.org/content/seea-water</a>
System of Environmental-Economic Accounting for Water	<a href="https://seea.un.org/content/seea-water">https://seea.un.org/content/seea-water</a>
Eurostat metadata "Water exploitation index, plus (WEI+)"	<a href="https://ec.europa.eu/eurostat/cache/metadata/en/sdg_06_60_esmsip2.htm">https://ec.europa.eu/eurostat/cache/metadata/en/sdg_06_60_esmsip2.htm</a>

### D. Data and statistics needed to compile the indicator

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
160	Precipitation	2.6.1: Water resources
161	Actual evapotranspiration	2.6.1: Water resources
162	Inflow of surface and groundwaters from neighbouring countries	2.6.1: Water resources
166	Fresh surface water abstracted: total	2.6.2: Abstraction, use and returns of water
167	Fresh groundwater abstracted: total	2.6.2: Abstraction, use and returns of water

### E. International databases containing this indicator

<i>Name of the database</i>	<i>Link</i>
Eurostat database	<a href="https://ec.europa.eu/eurostat/data/database">https://ec.europa.eu/eurostat/data/database</a>
Aquastat database	<a href="http://www.fao.org/nr/water/aquastat/data/query/index.html?lang=en">http://www.fao.org/nr/water/aquastat/data/query/index.html?lang=en</a>



## 6.31 INDICATOR C-2.4 LEVEL OF WATER STRESS: FRESHWATER WITHDRAWAL AS A PROPORTION OF AVAILABLE FRESHWATER RESOURCES (SDG 6.4.2)

### A. General

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	C: Water
Component (FDES)	2: Environmental resources and their use
Sub-component (FDES)	2.6: Water Resources
Indicator topic (FDES)	2.6.2: Abstraction, use and returns of water
ID and name in previous indicator guidelines	C1: Renewable freshwater resources
First publication	15/10/2019
Latest update	22/11/2023
Indicator definition	Ratio between total freshwater withdrawn by all major sectors and total renewable freshwater resources, after having taken into account environmental water requirements.
Unit of measure	%
Coverage	Freshwater bodies (groundwater and surface water), all water abstractions
Spatial aggregation	National territory
Reference period	Calendar year
Update frequency	Annual
Purpose	This is an SDG indicator. The purpose of this indicator is to show the degree to which water resources are being exploited to meet the country's water demand. It measures a country's pressure on its water resources and therefore the challenge on the sustainability of its water use. It tracks progress in regard to "withdrawals and supply of freshwater to address water scarcity", i.e. the environmental component of target 6.4.

<i>Parameter</i>	<i>Description</i>
Purpose	The indicator shows to what extent water resources are already used, and signals the importance of effective supply and demand management policies. It indicates the likelihood of increasing competition and conflict between different water uses and users in a situation of increasing water scarcity. Increased water stress, shown by an increase in the value of the indicator, has potentially negative effects on the sustainability of the natural resources and on economic development. On the other hand, low values of the indicator indicate that water does not represent a particular challenge for economic development and sustainability.
Policy context	SDG target 6.4: By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity
Link with SDG indicators	6.4.2 Level of water stress: freshwater withdrawal as a proportion of available freshwater resources
Methodology for indicator calculation	<p>The indicator is computed as the total annual freshwater withdrawn (TFWW) by main sectors divided by the difference between the long-term annual total renewable freshwater resources (TRWR) and the environmental water requirements (Env.), multiplied by 100. All variables are expressed in km<sup>3</sup>/year (10<sup>9</sup> m<sup>3</sup>/year).</p> <p>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 direct use of non-conventional water, i.e. direct use of treated wastewater, direct use of agricultural drainage water and desalinated water.</p>

<i>Parameter</i>	<i>Description</i>
Comments	This indicator is similar to the “Water Exploitation Index”, but in addition it considers “environmental water requirements”

## B. Policy references

<i>Title of the reference document</i>	<i>Link</i>
Integrated Water Resources Management	<a href="http://www.gwp.org/the-challenge/what-is-iwrm/">http://www.gwp.org/the-challenge/what-is-iwrm/</a>
Transforming our world: the 2030 Agenda for Sustainable Development	<a href="https://sdgs.un.org/2030agenda">https://sdgs.un.org/2030agenda</a>

## C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
Metadata of SDG indicator 6.4.2: Level of water stress: freshwater withdrawal as a proportion of available freshwater resources	<a href="https://unstats.un.org/sdgs/metadata/files/Metadata-06-04-02.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-06-04-02.pdf</a>
Step-by-step monitoring methodology for indicator 6.4.2	<a href="http://www.fao.org/elearning/Sites/ELC/SampleLessons/en/SDG642/story_content/external_files/Step-by-step%20Methodology%20for%20indicator%206%204%202%20V20170719.pdf">http://www.fao.org/elearning/Sites/ELC/SampleLessons/en/SDG642/story_content/external_files/Step-by-step%20Methodology%20for%20indicator%206%204%202%20V20170719.pdf</a>
Integrated Monitoring Guide for SDG 6	<a href="https://www.unwater.org/publications/integrated-monitoring-guide-sdg-6-2/">https://www.unwater.org/publications/integrated-monitoring-guide-sdg-6-2/</a>

## D. Data and statistics needed to compile the indicator

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
160	Precipitation	2.6.1: Water resources
161	Actual evapotranspiration	2.6.1: Water resources
162	Inflow of surface and groundwaters from neighbouring countries	2.6.1: Water resources
165	Environmental water requirements	
166	Fresh surface water abstracted: total	2.6.2: Abstraction, use and returns of water
167	Fresh groundwater abstracted: total	2.6.2: Abstraction, use and returns of water

## E. International databases containing this indicator

<i>Name of the database</i>	<i>Link</i>
SDG Indicators Database	<a href="https://unstats.un.org/sdgs/dataportal/database">https://unstats.un.org/sdgs/dataportal/database</a>

## 6.32 INDICATOR C-3.2 TOTAL FRESHWATER USE

### A. General

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	C: Water
Component (FDES)	2: Environmental resources and their use
Sub-component (FDES)	2.6: Water Resources
Indicator topic (FDES)	2.6.2: Abstraction, use and returns of water
ID and name in previous indicator guidelines	C3: Total freshwater use
First publication	15/10/2019
Latest update	-
Indicator definition	The indicator measures the quantity of freshwater that is actually used in a year by end users including water delivered by the water supply industry (ISIC 36), water directly abstracted for own use and water received from other parties. The indicator can be broken down by economic activities and households.
Unit of measure	million m <sup>3</sup>
Coverage	freshwater, all economic activities and households, including exports and imports of water
Spatial aggregation	National territory
Reference period	Calendar year
Update frequency	Annual
Purpose	The indicator provides a measure of the pressure on the environment in terms of water abstraction from different sources (including freshwater abstracted, desalinated water, reused water, and with regard to water losses).

<i>Parameter</i>	<i>Description</i>
Policy context	<p>The availability of water for meeting basic human needs is a prerequisite for life, health and economic development. This indicator is important for defining the level of development of water economy services and the degree of water accessibility to cover the needs of population and society. The indicator also helps to identify trends in water use in a particular country.</p> <p>SDGs target 6.4: By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity.</p>
Link with SDG indicators	6.4.1 Change in water-use efficiency over time (needed for the calculation of the SDG indicator)
Methodology for indicator calculation	<p>= Total freshwater available minus losses of water during the transport of water by water supply infrastructure = sum of all net water uses (after losses in distribution)</p> <p>Total freshwater available = freshwater abstracted + desalinated water + reused water + imports of water - exports of water.</p>
Comments	-

## B. Policy references

<i>Title of the reference document</i>	<i>Link</i>
Integrated Water Resources Management	<a href="http://www.gwp.org/the-challenge/what-is-iwrm/">http://www.gwp.org/the-challenge/what-is-iwrm/</a>
Transforming our world: the 2030 Agenda for Sustainable Development	<a href="https://sdgs.un.org/2030agenda">https://sdgs.un.org/2030agenda</a>
Environmental Strategy of countries of Eastern Europe, Caucasus and Central Asia	<a href="https://www.unece.org/env/efe/Kiev/proceedings/html/Item7a.e.html">https://www.unece.org/env/efe/Kiev/proceedings/html/Item7a.e.html</a>
Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy	<a href="https://ec.europa.eu/environment/water/water-framework/index_en.html">https://ec.europa.eu/environment/water/water-framework/index_en.html</a>

### C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
UNSD/United Nations Environment Programme Questionnaire 2022 on Environment Statistics - section "Water"	<a href="https://unstats.un.org/unsd/envstats/questionnaire">https://unstats.un.org/unsd/envstats/questionnaire</a>
International Recommendations for Water Statistics	<a href="https://seea.un.org/content/seea-water">https://seea.un.org/content/seea-water</a>
System of Environmental-Economic Accounting for Water	<a href="https://seea.un.org/content/seea-water">https://seea.un.org/content/seea-water</a>

### D. Data and statistics needed to compile the indicator

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
166	Fresh surface water abstracted: total	2.6.2: Abstraction, use and returns of water
167	Fresh groundwater abstracted: total	2.6.2: Abstraction, use and returns of water
179	Desalinated water	2.6.2: Abstraction, use and returns of water
180	Reused water	2.6.2: Abstraction, use and returns of water
181	Imports of water	2.6.2: Abstraction, use and returns of water
182	Exports of water	2.6.2: Abstraction, use and returns of water
183	Losses of water during transport	2.6.2: Abstraction, use and returns of water
184	Freshwater used: by households	2.6.2: Abstraction, use and returns of water
185	Freshwater used: by agriculture, forestry and fishing (ISIC 01-03)	2.6.2: Abstraction, use and returns of water
186	Freshwater used: by agriculture, forestry and fishing (ISIC 01-03): of which for irrigation in agriculture	2.6.2: Abstraction, use and returns of water
187	Freshwater used: by manufacturing (ISIC 10-33)	2.6.2: Abstraction, use and returns of water
188	Freshwater used: by manufacturing (ISIC 10-33): of which industry cooling	2.6.2: Abstraction, use and returns of water
189	Freshwater used: by mining and quarrying (05-09)	2.6.2: Abstraction, use and returns of water

190	Freshwater used: by production of electricity (cooling) (ISIC 35.11-35.13)	2.6.2: Abstraction, use and returns of water
191	Freshwater used: by construction and other industrial activities	2.6.2: Abstraction, use and returns of water
192	Freshwater used: by services (ISIC 45-96)	2.6.2: Abstraction, use and returns of water
193	Freshwater used: by agriculture, forestry and fishing (ISIC 01-03): of which aquaculture	2.6.2: Abstraction, use and returns of water

## E International databases containing this indicator

<i>Name of the database</i>	<i>Link</i>
Eurostat database	<a href="https://ec.europa.eu/eurostat/data/database">https://ec.europa.eu/eurostat/data/database</a>

## 6.33 INDICATOR C-3.6 CHANGE IN WATER USE EFFICIENCY OVER TIME (SDG INDICATOR 6.4.1)

### A. General

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	C: Water
Component (FDES)	2: Environmental resources and their use
Sub-component (FDES)	2.6: Water Resources
Indicator topic (FDES)	2.6.2: Abstraction, use and returns of water
ID and name in previous indicator guidelines	C3: Total freshwater use
First publication	15/10/2019
Latest update	-
Indicator definition	Change in the ratio of the value added to the volume of water use, over time
Unit of measure	Value/Volume, commonly USD/m <sup>3</sup>
Coverage	Agriculture, forestry, fishing (ISIC A), mining and quarrying; manufacturing; electricity, gas, steam and air conditioning supply; constructions (ISIC B, C, D and F); all the service sectors (ISIC E and ISIC G-T)

<i>Parameter</i>	<i>Description</i>
Spatial aggregation	National territory
Reference period	Calendar year
Update frequency	Annual
Purpose	The indicator provides information on the efficiency of the economic and social usage of water resources.
Policy context	The indicator provides incentives to improve water use efficiency through all sectors, highlighting those sectors where water use efficiency is lagging behind.
Link with SDG indicators	6.4.1 Change in water-use efficiency over time
Methodology for indicator calculation	<p>The indicator measures change in water use efficiency (WUE) over time. WUE is defined as the value added of a given major sector divided by the volume of water used.</p> <p>WUE is computed as the sum of the main sectors (see coverage), weighted according to the proportion of water used by each sector over the total use. In formula: <math>WUE = Awe \times Pa + Mwe \times Pm + Swe \times Ps</math></p> <p>Where:</p> <p>WUE = Water use efficiency</p> <p>Awe = Irrigated agriculture water use efficiency [USD/m<sup>3</sup>]</p> <p>Mwe = MIMEC water use efficiency [USD/m<sup>3</sup>]</p> <p>Swe Services water use efficiency [USD/m<sup>3</sup>]</p> <p>Pa = Proportion of water used by the agricultural sector over the total use</p> <p>Pm = Proportion of water used by the MIMEC sector over the total use</p> <p>Ps = Proportion of water used by the service sector over the total use</p> <p>A detailed description of the computation methodology can be found in the related SDG metadata sheet and the step-by-step monitoring methodology.</p>
Comments	-



## B. Policy references

<i>Title of the reference document</i>	<i>Link</i>
Integrated Water Resources Management	<a href="http://www.gwp.org/the-challenge/what-is-iwrm/">http://www.gwp.org/the-challenge/what-is-iwrm/</a>
Transforming our world: the 2030 Agenda for Sustainable Development	<a href="https://sdgs.un.org/2030agenda">https://sdgs.un.org/2030agenda</a>
Environmental Strategy of countries of Eastern Europe, Caucasus and Central Asia	<a href="https://www.unece.org/env/efe/Kiev/proceedings/html/Item7a.e.html">https://www.unece.org/env/efe/Kiev/proceedings/html/Item7a.e.html</a>
Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy	<a href="https://ec.europa.eu/environment/water/water-framework/index_en.html">https://ec.europa.eu/environment/water/water-framework/index_en.html</a>
Convention on the Protection and Use of Transboundary Watercourses and International Lakes	<a href="https://www.unece.org/env/water/text/text.html">https://www.unece.org/env/water/text/text.html</a>

## C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
Metadata of SDG indicator 6.4.1: Change in water-use efficiency over time	<a href="https://unstats.un.org/sdgs/metadata/files/Metadata-06-04-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-06-04-01.pdf</a>
Step-by-step monitoring methodology for indicator 6.4.1	<a href="http://www.fao.org/fileadmin/user_upload/sustainable_development_goals/docs/Indicator_6.4.1_FAO_2017_full_methodology_CHANGE_IN_WATER_USE EFFICIENCY_OVER_TIME.pdf">http://www.fao.org/fileadmin/user_upload/sustainable_development_goals/docs/Indicator_6.4.1_FAO_2017_full_methodology_CHANGE_IN_WATER_USE EFFICIENCY_OVER_TIME.pdf</a>
Integrated Monitoring Guide for SDG 6	<a href="https://www.unwater.org/publications/integrated-monitoring-guide-sdg-6-2/">https://www.unwater.org/publications/integrated-monitoring-guide-sdg-6-2/</a>

## D. Data and statistics needed to compile the indicator

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
185	Freshwater used: by agriculture, forestry and fishing (ISIC 01-03)	2.6.2: Abstraction, use and returns of water
187	Freshwater used: by manufacturing (ISIC 10-33)	2.6.2: Abstraction, use and returns of water
189	Freshwater used: by mining and quarrying (05-09)	2.6.2: Abstraction, use and returns of water
190	Freshwater used: by production of electricity (cooling) (ISIC 35.11-35.13)	2.6.2: Abstraction, use and returns of water

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
191	Freshwater used: by construction and other industrial activities	2.6.2: Abstraction, use and returns of water
192	Freshwater used: by services (ISIC 45-96)	2.6.2: Abstraction, use and returns of water
195	Value added per economic activity	

## E International databases containing this indicator

<i>Name of the database</i>	<i>Link</i>
SDG Indicators Database	<a href="https://unstats.un.org/sdgs/dataportal/database">https://unstats.un.org/sdgs/dataportal/database</a>

## 6.34 INDICATOR C-4.2 TOTAL HOUSEHOLD WATER USE PER CAPITA

### A. General

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	C: Water
Component (FDES)	2: Environmental resources and their use
Sub-component (FDES)	2.6: Water Resources
Indicator topic (FDES)	2.6.2: Abstraction, use and returns of water
ID and name in previous indicator guidelines	C4: Household water use per capita
First publication	15/10/2019
Latest update	-
Indicator definition	The quantity of water used per capita and year to cover the household and related utility needs of the resident population
Unit of measure	m <sup>3</sup> /capita/year
Coverage	All households
Spatial aggregation	National territory
Reference period	Calendar year
Update frequency	Annual
Purpose	The indicator provides a measure of the pressure on the environment in terms of water abstraction from different water sources through household use.

<i>Parameter</i>	<i>Description</i>
Policy context	The availability of water for meeting basic human needs is a prerequisite for life, health and economic development. This indicator is important for defining the level of development of water economy services and the degree of water accessibility to cover all household needs of the population. The indicator also helps to identify trends in household water use in a particular country. SDG target 6.1: By 2030, achieve universal and equitable access to safe and affordable drinking water for all. SDGs target 6.4 By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity.
Link with SDG indicators	-
Methodology for indicator calculation	= Freshwater used by households / resident population Freshwater used by households = Net freshwater supplied by water supply industry to households + water use by households supplied by self-supply (= self abstraction)
Comments	-

## B. Policy references

<i>Title of the reference document</i>	<i>Link</i>
Transforming our world: the 2030 Agenda for Sustainable Development	<a href="https://sdgs.un.org/2030agenda">https://sdgs.un.org/2030agenda</a>
Integrated Water Resources Management	<a href="http://www.gwp.org/the-challenge/what-is-iwrm/">http://www.gwp.org/the-challenge/what-is-iwrm/</a>
Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy	<a href="https://ec.europa.eu/environment/water/water-framework/index_en.html">https://ec.europa.eu/environment/water/water-framework/index_en.html</a>
Convention on the Protection and Use of Transboundary Watercourses and International Lakes	<a href="https://www.unece.org/env/water/text/text.html">https://www.unece.org/env/water/text/text.html</a>
Directive (EU) 2020/2184 of the European Parliament and of the Council of 16 December 2020 on the quality of water intended for human consumption (recast)	<a href="http://data.europa.eu/eli/dir/2020/2184/oj">http://data.europa.eu/eli/dir/2020/2184/oj</a>

**C. Methodology references**

<i>Title of the reference document</i>	<i>Link</i>
UNSD/United Nations Environment Programme Questionnaire 2022 on Environment Statistics - section "Water"	<a href="https://unstats.un.org/unsd/envstats/questionnaire">https://unstats.un.org/unsd/envstats/questionnaire</a>
International Recommendations for Water Statistics	<a href="https://seea.un.org/content/seea-water">https://seea.un.org/content/seea-water</a>
System of Environmental-Economic Accounting for Water	<a href="https://seea.un.org/content/seea-water">https://seea.un.org/content/seea-water</a>

**D. Data and statistics needed to compile the indicator**

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
127	Resident population	5.1.1: Urban and rural population
184	Freshwater used: by households	2.6.2: Abstraction, use and returns of water

**E. International databases containing this indicator**

<i>Name of the database</i>	<i>Link</i>
n/a	n/a

**6.35 INDICATOR B-3.1 TOTAL GHG EMISSIONS PER CAPITA****A. General**

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	B: Climate change
Component (FDES)	3: Residuals
Sub-component (FDES)	3.1: Emissions to Air
Indicator topic (FDES)	3.1.1: Emissions of greenhouse gases
ID and name in previous indicator guidelines	B3: Greenhouse gas emissions
First publication	25/11/2023
Latest update	-
Indicator definition	This indicator is a measure of total emissions of greenhouse gases (GHGs) in terms of CO <sub>2</sub> equivalents per capita.

<i>Parameter</i>	<i>Description</i>
Unit of measure	t CO <sub>2</sub> eq /capita
Coverage	All greenhouse gas emissions
Spatial aggregation	National territory
Reference period	Calendar year
Update frequency	Annual
Purpose	<p>The indicator provides a measure of the existing and future anthropogenic impact on the earth's climate due to emissions of GHGs into the atmosphere. It shows the extent to which countries have achieved their specified goals for emissions and the response to country policies for achieving the emissions target.</p> <p>Presenting it as per capita value is a way of harmonising the absolute value of GHG emissions for international comparisons.</p>
Policy context	<p>The ultimate objective of the Climate Change Convention (UNFCCC) is to achieve the stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Estimating the levels of greenhouse gas (GHG) emissions and removals is an important element of the efforts to achieve this objective.</p>
Link with SDG indicators	13.2.2 Total greenhouse gas emissions per year
Methodology for indicator calculation	<p>Total GHG emissions per capita = Total GHG emissions including emissions/removals from LULUCF (CO<sub>2</sub> equivalents) divided by resident population.</p> <p>Total GHG emissions are calculated as the sum of emissions of direct GHGs: carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), perfluorocarbons (PFCs), hydrofluorocarbons (HFCs), sulphur hexafluoride (SF<sub>6</sub>) and nitrogen trifluoride (NF<sub>3</sub>), measured in units of CO<sub>2</sub>-equivalent, by using a common weighting factor, the so-called Global Warming Potentials (GWP). In accordance with the latest reporting guidelines for Annex I Parties under the UNFCCC, the GWP values to be used are those for the 100-year time horizon listed in Table 2.14 of the IPCC Fourth Assessment Report.</p>
Comments	-

**B. Policy references**

<i>Title of the reference document</i>	<i>Link</i>
Transforming our world: the 2030 Agenda for Sustainable Development	<a href="https://sdgs.un.org/2030agenda">https://sdgs.un.org/2030agenda</a>
Paris Agreement	<a href="https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement">https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement</a>
United Nations Framework Convention on Climate Change	<a href="https://unfccc.int/">https://unfccc.int/</a>

**C. Methodology references**

<i>Title of the reference document</i>	<i>Link</i>
Metadata of SDG indicator 13.2.2: Total greenhouse gas emissions per year	<a href="https://unstats.un.org/sdgs/metadata/">https://unstats.un.org/sdgs/metadata/</a>
AR4 Climate Change 2007: The Physical Science Basis	<a href="https://www.ipcc.ch/report/ar4/wg1/">https://www.ipcc.ch/report/ar4/wg1/</a>

**D. Data and statistics needed to compile the indicator**

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
127	Resident population	5.1.1: Urban and rural population
286	Air emissions: carbon dioxide (CO <sub>2</sub> )	3.1.1: Emissions of greenhouse gases
287	Air emissions: methane (CH <sub>4</sub> )	3.1.1: Emissions of greenhouse gases
288	Air emissions: nitrous oxide (N <sub>2</sub> O)	3.1.1: Emissions of greenhouse gases
289	Air emissions: perfluorocarbons (PFCs)	3.1.1: Emissions of greenhouse gases
290	Air emissions: hydrofluorocarbons (HFCs)	3.1.1: Emissions of greenhouse gases
291	Air emissions: nitrogen trifluoride (NF <sub>3</sub> )	3.1.1: Emissions of greenhouse gases

**E. International databases containing this indicator**

<i>Name of the database</i>	<i>Link</i>
Statista	<a href="https://www.statista.com/statistics/478783/leading-countries-based-on-per-capita-greenhouse-gas-emissions/">https://www.statista.com/statistics/478783/leading-countries-based-on-per-capita-greenhouse-gas-emissions/</a>

## 6.36 INDICATOR B-3.4 TOTAL GHG EMISSIONS PER SECTOR

### A. General

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	B: Climate change
Component (FDES)	3: Residuals
Sub-component (FDES)	3.1: Emissions to Air
Indicator topic (FDES)	3.1.1: Emissions of greenhouse gases
ID and name in previous indicator guidelines	B3: Greenhouse gas emissions
First publication	25/11/2023
Latest update	-
Indicator definition	This indicator is a measure of the contribution of individual sectors (energy, industrial processes and product use, agriculture, land use and forestry, waste) to the total emission of greenhouse gases (GHGs)
Unit of measure	Mt/year
Coverage	All greenhouse gas emissions
Spatial aggregation	National territory
Reference period	Calendar year
Update frequency	Annual
Purpose	The indicator provides a measure of the contribution of individual sectors (as defined in UNFCCC GHG inventories) to the total emissions of greenhouse gases
Policy context	The ultimate objective of the Climate Change Convention (UNFCCC) is to achieve the stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Estimating the levels of greenhouse gas (GHG) emissions and removals is an important element of the efforts to achieve this objective.
Link with SDG indicators	13.2.2 Total greenhouse gas emissions per year 9.4.1 CO <sub>2</sub> emission per unit of value added

<i>Parameter</i>	<i>Description</i>
Methodology for indicator calculation	Total GHG emissions for each sector are calculated as the sum of emissions of direct GHGs of that sector: carbon dioxide (CO <sub>2</sub> ), methane (CH <sub>4</sub> ), nitrous oxide (N <sub>2</sub> O), perfluorocarbons (PFCs), hydrofluorocarbons (HFCs), sulphur hexafluoride (SF <sub>6</sub> ) and nitrogen trifluoride (NF <sub>3</sub> ), measured in units of CO <sub>2</sub> -equivalent, by using a common weighting factor, the so-called Global Warming Potentials (GWP). In accordance with the latest reporting guidelines for Annex I Parties under the UNFCCC, the GWP values to be used are those for the 100-year time horizon listed in Table 2.14 of the IPCC Fourth Assessment Report.  Sectors are defined in the 2019 refinement of the 2006 IPCC Guidelines for National Greenhouse Gas Inventories
Comments	-

## B. Policy references

<i>Title of the reference document</i>	<i>Link</i>
Transforming our world: the 2030 Agenda for Sustainable Development	<a href="https://sdgs.un.org/2030agenda">https://sdgs.un.org/2030agenda</a>
Paris Agreement	<a href="https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement">https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement</a>
United Nations Framework Convention on Climate Change	<a href="https://unfccc.int/">https://unfccc.int/</a>

## C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
AR4 Climate Change 2007: The Physical Science Basis	<a href="https://www.ipcc.ch/report/ar4/wg1/">https://www.ipcc.ch/report/ar4/wg1/</a>
2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories	<a href="https://www.ipcc-nggip.iges.or.jp/public/2019rf/index.html">https://www.ipcc-nggip.iges.or.jp/public/2019rf/index.html</a>



#### D. Data and statistics needed to compile the indicator

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
292	Air emissions: total GHG emissions of sector "energy"	3.1.1: Emissions of greenhouse gases
293	Air emissions: total GHG emissions of sector "industrial processes and product use"	3.1.1: Emissions of greenhouse gases
294	Air emissions: total GHG emissions of sector "agriculture, forestry and other land use"	3.1.1: Emissions of greenhouse gases
295	Air emissions: total GHG emissions of sector "waste"	3.1.1: Emissions of greenhouse gases

#### E. International databases containing this indicator

<i>Name of the database</i>	<i>Link</i>
UNFCCC GHG inventory data	<a href="https://www4.unfccc.int/sites/br-di/Pages/GHGInventory.aspx">https://www4.unfccc.int/sites/br-di/Pages/GHGInventory.aspx</a>

### 6.37 INDICATOR B-3.7 CO<sub>2</sub> EMISSION PER UNIT OF VALUE ADDED (SDG INDICATOR 9.4.1)

#### A. General

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	B: Climate change
Component (FDES)	3: Residuals
Sub-component (FDES)	3.1: Emissions to Air
Indicator topic (FDES)	3.1.1: Emissions of greenhouse gases
ID and name in previous indicator guidelines	B3: Greenhouse gas emissions
First publication	10/07/2020
Latest update	26/11/2023
Indicator definition	Carbon dioxide (CO <sub>2</sub> ) emissions per unit value added is an indicator computed as ratio between CO <sub>2</sub> emissions from fuel combustion and the value added of the whole economy or associated economic activities (manufacturing industries)

<i>Parameter</i>	<i>Description</i>
Unit of measure	Whole economy: kg CO <sub>2</sub> per constant 2017 USD PPP; Manufacturing industries: kg CO <sub>2</sub> per constant 2015 USD
Coverage	All CO <sub>2</sub> emissions from fuel combustion (whole economy or manufacturing industries)
Spatial aggregation	National territory
Reference period	Calendar year
Update frequency	Annual
Purpose	The indicator CO <sub>2</sub> emissions per unit of value added represents the amount of emissions from fuel combustion produced by an economic activity, per unit of economic output. When computed for the whole economy, it combines effects of the average carbon intensity of the energy mix (linked to the shares of the various fossil fuels in the total); of the structure of an economy (linked to the relative weight of more or less energy-intensive sectors); of the average efficiency in the use of energy. When computed for the manufacturing sector (CO <sub>2</sub> emissions from fuel combustion per unit of manufacturing value added), it measures the carbon intensity of the manufacturing economic output, and its trends result from changes in the average carbon intensity of the energy mix used, the structure of the manufacturing sector, the energy efficiency of production technologies in each subsector and the economic value of the various output. Manufacturing industries are generally improving their emission intensity as countries move to higher levels of industrialization, but it should be noted that emission intensities can also be reduced through structural changes and product diversification in manufacturing.

<i>Parameter</i>	<i>Description</i>
Policy context	<p>SDG Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation; Target 9.4: By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities.</p> <p>CO<sub>2</sub> emission accounts for around 80% of all GHG emission from the manufacturing processes.</p>
Link with SDG indicators	9.4.1 CO <sub>2</sub> emission per unit of value added
Methodology for indicator calculation	<p>Whole economy: CO<sub>2</sub> emissions per GDP = CO<sub>2</sub> emission from all sectors (in kg) / GDP in constant 2017 USD</p> <p>Manufacturing industries: CO<sub>2</sub> emission per unit of value added = CO<sub>2</sub> emission from manufacturing (in kg)/ manufacturing value added (MVA) in constant 2015 USD</p> <p>CO<sub>2</sub> emissions from manufacturing are based on energy data collected across the following subsectors (energy used for transport by industry is not included here but reported under transport):</p> <p>Iron and steel industry [ISIC Group 241 and Class 2431];</p> <p>Chemical and petrochemical industry [ISIC Divisions 20 and 21] excluding petrochemical feedstocks;</p> <p>Non-ferrous metals basic industries [ISIC Group 242 and Class 2432];</p> <p>Non-metallic minerals such as glass, ceramic, cement, etc. [ISIC Division 23];</p> <p>Transport equipment [ISIC Divisions 29 and 30];</p> <p>Machinery comprises fabricated metal products, machinery and equipment other than transport equipment [ISIC Divisions 25 to 28];</p> <p>Food and tobacco [ISIC Divisions 10 to 12];</p> <p>Paper, pulp and printing [ISIC Divisions 17 and 18];</p>

<i>Parameter</i>	<i>Description</i>
	Wood and wood products (other than pulp and paper) [ISIC Division 16]; Textile and leather [ISIC Divisions 13 to 15]; Non-specified (any manufacturing industry not included above) [ISIC Divisions 22, 31 and 32].
Comments	-

## B. Policy references

<i>Title of the reference document</i>	<i>Link</i>
Transforming our world: the 2030 Agenda for Sustainable Development	<a href="https://sdgs.un.org/2030agenda">https://sdgs.un.org/2030agenda</a>
Paris Agreement	<a href="https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement">https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement</a>
United Nations Framework Convention on Climate Change	<a href="https://unfccc.int/">https://unfccc.int/</a>

## C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
Metadata for SDG indicator 9.4.1: CO <sub>2</sub> emission per unit of value added	<a href="https://unstats.un.org/sdgs/metadata/">https://unstats.un.org/sdgs/metadata/</a>

## D. Data and statistics needed to compile the indicator

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
55	GDP at constant prices	
195	Value added per economic activity	
296	Air emissions: carbon dioxide (CO <sub>2</sub> ) from fuel combustion (total and per economic activity (ISIC 4.0))	3.1.1: Emissions of greenhouse gases

## E. International databases containing this indicator

<i>Name of the database</i>	<i>Link</i>
SDG Indicators Database	<a href="https://unstats.un.org/sdgs/dataportal/database">https://unstats.un.org/sdgs/dataportal/database</a>
International Energy Agency: GHG Emissions from Energy	<a href="https://www.iea.org/data-and-statistics/data-product/greenhouse-gas-emissions-from-energy">https://www.iea.org/data-and-statistics/data-product/greenhouse-gas-emissions-from-energy</a>

## 6.38 INDICATOR B-3.10 GREENHOUSE GAS EMISSIONS FROM LAND USE, LAND USE CHANGE AND FORESTRY (LULUCF)

### A. General

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	B: Climate change
Component (FDES)	3: Residuals
Sub-component (FDES)	3.1: Emissions to Air
Indicator topic (FDES)	3.1.1: Emissions of greenhouse gases
ID and name in previous indicator guidelines	B3: Greenhouse gas emissions
First publication	26/11/2023
Latest update	-
Indicator definition	Presents the net emissions of greenhouse gases resulting from direct human-induced land use, land use change and forestry activities.
Unit of measure	Metric tonnes CO <sub>2</sub> equivalent; disaggregation by sub-sector is recommended
Coverage	Changes in forest and other woody biomass stocks, forest and grassland conversion, abandonment of managed lands and CO <sub>2</sub> emissions and removals from soil. Excludes natural undisturbed forests
Spatial aggregation	National territory
Reference period	Calendar year
Update frequency	Annual
Purpose	Land can serve as a carbon sink (absorbing more carbon from the atmosphere than it emits, for example with plants and soil) or carbon source (releasing CO <sub>2</sub> into the atmosphere, for instance through deforestation). The indicator measures the amount of GHGs emitted or removed in the LULUCF sector.  Disaggregation by sub-sector (forest land, cropland, grassland, wetlands, settlements, other land) is recommended.

<i>Parameter</i>	<i>Description</i>
Policy context	The IPCC report finds that the LULUCF sector offers significant near-term mitigation potential while providing food, wood and other renewable resources as well as biodiversity conservation. Mitigation measures in forests and other natural ecosystems provide the largest share of the LULUCF mitigation potential between 2020 and 2050. Among various LULUCF activities, reducing deforestation has the largest potential to reduce anthropogenic GHG emissions, followed by carbon sequestration in agriculture and ecosystem restoration including afforestation and reforestation. However, the main challenges of LULUCF activities are their potential reversibility and non-permanence of carbon stocks. The storage of CO <sub>2</sub> through vegetation and soil management can be reversed by human activities, natural disturbances or a combination of the two, and it is also prone to climate change impacts. Such severe impacts including wildfires, mass mortality of trees and weakening natural land carbon sinks, are already observed and are projected to increase with every additional increment of global warming.
Link with SDG indicators	13.2.2 Total greenhouse gas emissions per year (LULUCF is part of the calculation of the SDG indicator)
Methodology for indicator calculation	Sum of net GHG emissions in terms of CO <sub>2</sub> equivalents (net CO <sub>2</sub> emissions plus emissions of CH <sub>4</sub> , N <sub>2</sub> O, NO <sub>x</sub> , CO and NMVOC) per each LULUCF sub-sector: forest land, cropland, grassland, wetlands, settlements, other land
Comments	-

## B. Policy references

<i>Title of the reference document</i>	<i>Link</i>
Transforming our world: the 2030 Agenda for Sustainable Development	<a href="https://sdgs.un.org/2030agenda">https://sdgs.un.org/2030agenda</a>
Paris Agreement	<a href="https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement">https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement</a>
United Nations Framework Convention on Climate Change	<a href="https://unfccc.int/">https://unfccc.int/</a>
Regulation (EU) 2018/841 of the European Parliament and of the Council of 30 May 2018 on the inclusion of greenhouse gas emissions and removals from land use, land use change and forestry in the 2030 climate and energy framework, and amending Regulation (EU) No 525/2013 and Decision No 529/2013/EU	<a href="http://data.europa.eu/eli/reg/2018/841/2023-05-11">http://data.europa.eu/eli/reg/2018/841/2023-05-11</a>

## C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories	<a href="https://www.ipcc-nggip.iges.or.jp/public/2019rf/index.html">https://www.ipcc-nggip.iges.or.jp/public/2019rf/index.html</a>

## D. Data and statistics needed to compile the indicator

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
297	Air emissions: Net GHG emissions per LULUCF sub-sector (forest land, cropland, grassland, wetlands, settlements, other land)	3.1.1: Emissions of greenhouse gases

## E. International databases containing this indicator

<i>Name of the database</i>	<i>Link</i>
UNFCCC GHG inventory data	<a href="https://www4.unfccc.int/sites/br-di/Pages/GHGInventory.aspx">https://www4.unfccc.int/sites/br-di/Pages/GHGInventory.aspx</a>

## 6.39 INDICATOR B-3.11 CO<sub>2</sub> EMISSIONS FROM FUEL COMBUSTION WITHIN THE NATIONAL TERRITORY

### A. General

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	B: Climate change
Component (FDES)	3: Residuals
Sub-component (FDES)	3.1: Emissions to Air
Indicator topic (FDES)	3.1.1: Emissions of greenhouse gases
ID and name in previous indicator guidelines	B3: Greenhouse gas emissions
First publication	18/12/2023
Latest update	-
Indicator definition	CO <sub>2</sub> emissions from all reported energy use of fuels in the national territory. It excludes emissions from non-energy use of fuels, fugitive emissions, and industrial process emissions.
Unit of measure	Kilotonnes (kt) of CO <sub>2</sub>
Coverage	Industries, governments, institutions and households - excluding sources and sinks from LULUCF activities
Spatial aggregation	National territory
Reference period	Calendar year
Update frequency	Annual
Purpose	CO <sub>2</sub> emissions from fuel combustion represent a very large share of total GHG emissions.



<i>Parameter</i>	<i>Description</i>
Policy context	<p>Specific targets for this indicator do not exist, but limiting emissions from fuel combustion will significantly help to reduce overall GHG emissions.</p> <p>For some Annex I Parties (developed countries), emission limitation or reduction targets exist under the Kyoto Protocol; non-binding targets or pledges for action exist in various forms under the UNFCCC and, since recently, under the Paris Agreement.</p> <p>The EU allocates certain targets to individual EU member States in addition to the definition of the EU-wide emission reduction target under the Kyoto Protocol; EU and some other countries also use targets as part of their emissions trading scheme.</p> <p>Indirect links to SDG 7, 9, 12 and 13.</p>
Link with SDG indicators	13.2.2 Total greenhouse gas emissions per year (part of the calculation of the SDG indicator)
Methodology for indicator calculation	<p>This indicator is calculated as the sum of emissions from the combustion of fuels, where for each fuel:</p> <p>CO<sub>2</sub> emissions = fuel consumption related to energy use in the territory * CO<sub>2</sub> emission factor.</p> <p>CO<sub>2</sub> emissions from fuel combustion can be calculated using national or default methods, national or IEA energy data and country-specific emission factors or emission factors from the 2006 IPCC guidelines.</p> <p>This indicator is identical with CES-CC indicator 10b</p>
Comments	-

## B. Policy references

<i>Title of the reference document</i>	<i>Link</i>
Transforming our world: the 2030 Agenda for Sustainable Development	<a href="https://sdgs.un.org/2030agenda">https://sdgs.un.org/2030agenda</a>
Paris Agreement	<a href="https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement">https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement</a>
United Nations Framework Convention on Climate Change	<a href="https://unfccc.int/">https://unfccc.int/</a>

### C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories	<a href="https://www.ipcc-nggip.iges.or.jp/public/2019rf/index.html">https://www.ipcc-nggip.iges.or.jp/public/2019rf/index.html</a>
CO <sub>2</sub> Emissions from Fuel Combustion (data and metadata)	<a href="https://www.iea.org/data-and-statistics/data-product/co2-emissions-from-fuel-combustion-highlights">https://www.iea.org/data-and-statistics/data-product/co2-emissions-from-fuel-combustion-highlights</a>

### D. Data and statistics needed to compile the indicator

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
296	Air emissions: carbon dioxide (CO <sub>2</sub> ) from fuel combustion (total and per economic activity (ISIC 4.0))	3.1.1: Emissions of greenhouse gases

### E. International databases containing this indicator

<i>Name of the database</i>	<i>Link</i>
UNFCCC GHG inventory data	<a href="https://www4.unfccc.int/sites/br-di/Pages/GHGInventory.aspx">https://www4.unfccc.int/sites/br-di/Pages/GHGInventory.aspx</a>
Eurostat database	<a href="https://ec.europa.eu/eurostat/data/database">https://ec.europa.eu/eurostat/data/database</a>
International Energy Agency	<a href="http://www.iea.org/statistics/">http://www.iea.org/statistics/</a>

## 6.40 INDICATOR B-3.12 TOTAL GREENHOUSE GAS EMISSIONS FROM PRODUCTION ACTIVITIES

### A. General

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	B: Climate change
Component (FDES)	3: Residuals
Sub-component (FDES)	3.1: Emissions to Air
Indicator topic (FDES)	3.1.1: Emissions of greenhouse gases
ID and name in previous indicator guidelines	B3: Greenhouse gas emissions
First publication	11/12/2023
Latest update	-

<i>Parameter</i>	<i>Description</i>
Indicator definition	Total greenhouse gas emissions from production activities of industries, including services, of a national economy. Production activities of industries should be defined consistently with national accounts.
Unit of measure	Kilotonnes (kt) of CO <sub>2</sub> equivalent
Coverage	Production activities (ISIC A-U)
Spatial aggregation	National territory
Reference period	Calendar year
Update frequency	Annual
Purpose	<p>The indicator measures the contribution of GHG emissions of all production activities, based on the residence principle.</p> <p>The indicator is identical with indicator 12 of the CES set of core climate change-related indicators.</p>
Policy context	<p>Excessive greenhouse gas emissions (GHG) by humans are the reason why our climate is changing. Reducing GHG emissions is the main course of action in our efforts to limit the change. High-quality monitoring of GHG emissions is hence essential.</p> <p>In addition, information is needed to better understand who emits, what they emit, and for which purposes. Extensive analyses of emissions are needed to find the most cost-effective methods to reduce them. Air emission accounts and their derived indicators can be used to model and investigate, for example, potential efficiency gains and macro-economic links. These analyses help to work towards the goals set in international agreements, including the Paris Agreement and the UNFCCC. At European level, emissions targets are set in Europe 2030: the EU policy, strategy and legislation for 2030 environmental, energy and climate targets.</p>

<i>Parameter</i>	<i>Description</i>
Link with SDG indicators	<p>Environmental accounts, such as air emission accounts, are used in economic-environmental modelling, for example for studies on eco-efficiency and resource and waste intensities, for environmental indicators, and for trade negotiations related to environmental impacts. Compatibility with the traditional national economic accounts greatly facilitates the integration of the environmental data into macroeconomic models and analysis.</p> <p>Indirect links to SDG 7, 9, 12 and 13.</p>
Methodology for indicator calculation	-
	<p>Total GHG emissions are calculated as the sum of individual greenhouse gas emissions: carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), perfluorocarbons (PFCs), hydrofluorocarbons (HFCs), sulphur hexafluoride (SF<sub>6</sub>) and nitrogen trifluoride (NF<sub>3</sub>), measured in units of CO<sub>2</sub>-equivalent, by using a common weighting factor, the so-called Global Warming Potentials (GWP).</p> <p>The enhanced transparency framework for action and support of the Paris Agreement (see Article 13), further set out in the modalities, procedures and guidelines (see part D. Metrics), establishes that each Party shall use the 100-year time-horizon GWP values from the IPCC Fifth Assessment Report. GWP values are listed in Table 8.A.1 in Appendix 8.A of Chapter 8 – “Anthropogenic and natural radiative forcing”</p> <p>The GWP values for the main direct GHGs are as follows: CO<sub>2</sub> = 1, CH<sub>4</sub> = 28, N<sub>2</sub>O = 265, SF<sub>6</sub> = 23500, NF<sub>3</sub> = 16100. GWP values for HFCs and PFCs vary for individual species. These values are to be used for reporting on GHG emissions under the Paris Agreement.</p> <p>Reporting by Annex I Parties under the UNFCCC is still on the basis of GWP values of the Fourth IPCC AR (see Table 2.14 of the IPCC Fourth Assessment Report). These GWP values are: CO<sub>2</sub> = 1, CH<sub>4</sub> = 25, N<sub>2</sub>O = 298, SF<sub>6</sub> = 22800, NF<sub>3</sub> = 17200.</p>

<i>Parameter</i>	<i>Description</i>
	<p>Note: most non-Annex I Parties still use the Revised 1996 IPCC Guidelines for reporting and therefore use a different set of GWPs (from the IPCC Second Assessment Report).</p> <p>The gases listed in the first paragraph are the so-called direct GHGs. There exist also precursor gases: carbon monoxide (CO), nitrogen oxides (NO<sub>x</sub>), non-methane volatile organic compounds (NMVOCs), as well as sulphur oxides (SO<sub>x</sub>). The emissions of precursor gases are not included in total emissions and are therefore not part of this indicator.</p>
Comments	-

## B. Policy references

<i>Title of the reference document</i>	<i>Link</i>
Paris Agreement	<a href="https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement">https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement</a>
United Nations Framework Convention on Climate Change	<a href="https://unfccc.int/">https://unfccc.int/</a>
European Union Climate Strategies and Targets	<a href="https://climate.ec.europa.eu/eu-action/climate-strategies-targets_en">https://climate.ec.europa.eu/eu-action/climate-strategies-targets_en</a>

## C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
Manual for air emission accounts	<a href="https://ec.europa.eu/eurostat/web/products-manuals-and-guidelines/-/KS-GQ-15-009">https://ec.europa.eu/eurostat/web/products-manuals-and-guidelines/-/KS-GQ-15-009</a>
2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories	<a href="https://www.ipcc-nggip.iges.or.jp/public/2019rf/index.html">https://www.ipcc-nggip.iges.or.jp/public/2019rf/index.html</a>
IPCC Fifth Assessment Report: Climate Change 2014 (Synthesis Report)	<a href="https://www.ipcc.ch/report/ar5/syr/">https://www.ipcc.ch/report/ar5/syr/</a>
Modalities, procedures and guidelines for the transparency framework for action and support referred to in Article 13 of the Paris Agreement	<a href="https://unfccc.int/documents/184700">https://unfccc.int/documents/184700</a>
CES Set of Core Climate Change-Related Indicators and Statistics Using SEEA	<a href="https://unece.org/statistics/ces-set-core-climate-change-related-indicators-and-statistics-using-seea">https://unece.org/statistics/ces-set-core-climate-change-related-indicators-and-statistics-using-seea</a>

**D. Data and statistics needed to compile the indicator**

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
298	Air emissions: GHG emissions of economic activities (total and per activity, ISIC 4.0 A-U)	3.1.1: Emissions of greenhouse gases

**E. International databases containing this indicator**

<i>Name of the database</i>	<i>Link</i>
n/a	n/a

**6.41 INDICATOR B-3.13 GREENHOUSE GAS EMISSION INTENSITY OF PRODUCTION ACTIVITIES****A. General**

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	B: Climate change
Component (FDES)	3: Residuals
Sub-component (FDES)	3.1: Emissions to Air
Indicator topic (FDES)	3.1.1: Emissions of greenhouse gases
ID and name in previous indicator guidelines	B3: Greenhouse gas emissions
First publication	26/11/2023
Latest update	-
Indicator definition	Total greenhouse gas emissions from production activities of industries, including services, of a national economy per unit of real gross domestic product (real GDP (adjusted for inflation, by means of constant prices or chain-linked prices)).
Unit of measure	Kilotonnes (kt) of CO <sub>2</sub> equivalent / monetary unit (in chain linked dollars or national currency)
Coverage	Production activities (ISIC A-U)
Spatial aggregation	National territory
Reference period	Calendar year
Update frequency	Annual

<i>Parameter</i>	<i>Description</i>
Purpose	<p>The indicator is a measure of the intensity of economic production activities in terms of GHG emissions. The indicator is based on the residence principle, thus includes emissions caused by an economic activity also outside the national territory (e.g. navigation or aviation), and excludes GHG emissions caused by an economic activity of another country. This is a major conceptual difference with SDG indicator 9.4.1</p> <p>The indicator is identical with indicator 13 of the CES set of core climate change-related indicators.</p>
Policy context	<p>Excessive greenhouse gas emissions (GHG) by humans are the reason why our climate is changing. Reducing GHG emissions is the main course of action in our efforts to limit the change. High-quality monitoring of GHG emissions is hence essential.</p> <p>In addition, information is needed to better understand who emits, what they emit, and for which purposes. Extensive analyses of emissions are needed to find the most cost-effective methods to reduce them. Air emission accounts and their derived indicators can be used to model and investigate, for example, potential efficiency gains and macro-economic links. These analyses help us to work towards the goals set in international agreements, including the Paris Agreement and the UNFCCC. At European level, emission targets are set in Europe 2030: the European Union policy, strategy and legislation for 2030 environmental, energy and climate targets.</p> <p>Environmental accounts, such as air emission accounts, are used in economic-environmental modelling, for example for studies on eco-efficiency and resource and waste intensities, for environmental indicators, and for trade negotiations related to environmental impacts. Compatibility with the traditional national economic accounts greatly facilitates the integration of the environmental data into macroeconomic models and analysis.</p> <p>Indirect links to SDG goals 7, 12 and 13.</p>

<i>Parameter</i>	<i>Description</i>
Link with SDG indicators	9.4.1 CO <sub>2</sub> emission per unit of value added (the SDG indicator does not apply the residential principle, as it is based on GHG inventories. Also, the SDG indicator includes CO <sub>2</sub> emissions only, whereas the indicator defined in this metadata sheet covers total GHG emissions.
Methodology for indicator calculation	<p>Calculated as total GHG emissions reported for ISIC A-U industries divided by real gross domestic product (adjusted for inflation, by means of constant prices or chain-linked prices).</p> <p>Total GHG emissions are calculated as the sum of individual greenhouse gas emissions: carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), perfluorocarbons (PFCs), hydrofluorocarbons (HFCs), sulphur hexafluoride (SF<sub>6</sub>) and nitrogen trifluoride (NF<sub>3</sub>), measured in units of CO<sub>2</sub>-equivalent, by using a common weighting factor, the so-called Global Warming Potentials (GWP).</p> <p>The enhanced transparency framework for action and support of the Paris Agreement (see Article 13), further set out in the modalities, procedures and guidelines (see part D. Metrics), establishes that each Party shall use the 100-year time-horizon GWP values from the IPCC Fifth Assessment Report.</p> <p>There exist also precursor gases: carbon monoxide (CO), nitrogen oxides (NO<sub>x</sub>), non-methane volatile organic compounds (NMVOCs), as well as sulphur oxides (SO<sub>x</sub>). The emissions of precursor gases are not included in total emissions and are therefore not part of this indicator.</p>
Comments	-



## B. Policy references

<i>Title of the reference document</i>	<i>Link</i>
Transforming our world: the 2030 Agenda for Sustainable Development	<a href="https://sdgs.un.org/2030agenda">https://sdgs.un.org/2030agenda</a>
Paris Agreement	<a href="https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement">https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement</a>
United Nations Framework Convention on Climate Change	<a href="https://unfccc.int/">https://unfccc.int/</a>
European Union Climate Strategies and Targets	<a href="https://climate.ec.europa.eu/eu-action/climate-strategies-targets_en">https://climate.ec.europa.eu/eu-action/climate-strategies-targets_en</a>

## C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
Manual for air emission accounts	<a href="https://ec.europa.eu/eurostat/web/products-manuals-and-guidelines/-/KS-GQ-15-009">https://ec.europa.eu/eurostat/web/products-manuals-and-guidelines/-/KS-GQ-15-009</a>
2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories	<a href="https://www.ipcc-nggip.iges.or.jp/public/2019rf/index.html">https://www.ipcc-nggip.iges.or.jp/public/2019rf/index.html</a>
IPCC Fifth Assessment Report: Climate Change 2014 (Synthesis Report)	<a href="https://www.ipcc.ch/report/ar5/syr/">https://www.ipcc.ch/report/ar5/syr/</a>
Modalities, procedures and guidelines for the transparency framework for action and support referred to in Article 13 of the Paris Agreement	<a href="https://unfccc.int/documents/184700">https://unfccc.int/documents/184700</a>
CES Set of Core Climate Change-Related Indicators and Statistics Using SEEA	<a href="https://unece.org/statistics/ces-set-core-climate-change-related-indicators-and-statistics-using-seea">https://unece.org/statistics/ces-set-core-climate-change-related-indicators-and-statistics-using-seea</a>

## D. Data and statistics needed to compile the indicator

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
55	GDP at constant prices	
298	Air emissions: GHG emissions of economic activities (total and per activity, ISIC 4.0 A-U)	3.1.1: Emissions of greenhouse gases

## E. International databases containing this indicator

<i>Name of the database</i>	<i>Link</i>
n/a	n/a

## 6.42 INDICATOR A-1.19 TOTAL EMISSIONS OF SULFUR OXIDES (SO<sub>x</sub>)

### A. General

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	A: Air pollution and ozone depletion
Component (FDES)	3: Residuals
Sub-component (FDES)	3.1: Emissions to Air
Indicator topic (FDES)	3.1.1: Emissions of greenhouse gases
ID and name in previous indicator guidelines	A1: Emissions of pollutants into the atmospheric air
First publication	26/11/2023
Latest update	-
Indicator definition	Emissions of all types of sulfur oxides (major part is SO <sub>2</sub> ) from all economic activities
Unit of measure	metric tonnes (as SO <sub>2</sub> )
Coverage	All sources of air emissions (mobile and stationary)
Spatial aggregation	National territory
Reference period	Calendar year
Update frequency	Annual
Purpose	The indicator provides a measure of existing pressure on the environment in terms of emissions of harmful substances into the atmospheric air. It measures the emissions of all types of sulfur oxides (major part is SO <sub>2</sub> ) from all economic activities. Sulfur dioxide (SO <sub>2</sub> ) is a gas created by combustion of sulphurous matter, particularly oil and coal, and which also arises in a number of industrial processes.
Policy context	Human activities such as agriculture, fuel combustion and industrial processes are increasing the amount of sulfur oxides in the atmosphere with catastrophic results in the acidification of oceans and air pollution that is harmful to humans.  Sulfur dioxide is a major air pollutant and has significant impacts upon human health. In addition, the concentration of sulfur dioxide in the atmosphere can influence the habitat suitability for plant communities, as well as animal life. Sulfur dioxide emissions are a precursor to acid rain and atmospheric particulates.

<i>Parameter</i>	<i>Description</i>
	<p>The ECE Convention on Long-range Transboundary Air Pollution (CLRTAP) requires implementation of measures to prevent, control and reduce emissions of air pollutants and to exchange information on them. The Convention and its eight protocols together set targets for the reduction of specific emissions, prescribe stringent emission limit values for emission sources, propose concrete pollution reduction measures and establish requirements regarding the submission of data on emissions of the above-mentioned pollutants.</p> <p>CLRTAP Protocols:</p> <ul style="list-style-type: none"> <li>• 1999 Protocol to Abate Acidification, Eutrophication and Ground-level Ozone and its 2012 amended version</li> <li>• 1998 Protocol on Persistent Organic Pollutants (POPs) and its 2009 amended version</li> <li>• 1998 Protocol on Heavy Metals and its 2012 amended version</li> <li>• 1994 Protocol on Further Reduction of Sulphur Emissions</li> <li>• 1991 Protocol concerning the Control of Emissions of Volatile Organic Compounds or their Transboundary Fluxes</li> <li>• 1988 Protocol concerning the Control of Nitrogen Oxides or their Transboundary Fluxes</li> <li>• 1985 Protocol on the Reduction of Sulphur Emissions or their Transboundary Fluxes by at least 30 per cent</li> <li>• 1984 Protocol on Long-term Financing of the Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe (EMEP)</li> </ul>
Link with SDG indicators	3.9.1 Mortality rate attributed to household and ambient air pollution
Methodology for indicator calculation	The indicator is the sum of all SO <sub>x</sub> emissions (including SO <sub>2</sub> , SO <sub>3</sub> and others) from all activities, following the methodology laid down in the EMEP/EEA Guidelines
Comments	-

## B. Policy references

<i>Title of the reference document</i>	<i>Link</i>
Transforming our world: the 2030 Agenda for Sustainable Development	<a href="https://sdgs.un.org/2030agenda">https://sdgs.un.org/2030agenda</a>
1979 ECE Convention on Long-range Transboundary Air Pollution (CLRTAP)	<a href="https://www.unece.org/environmental-policy/conventions/envlirtapwelcome/the-air-convention-and-its-protocols/the-convention-and-its-achievements.html">https://www.unece.org/environmental-policy/conventions/envlirtapwelcome/the-air-convention-and-its-protocols/the-convention-and-its-achievements.html</a>
1994 Protocol on Further Reduction of Sulphur Emissions	<a href="https://unece.org/protocols">https://unece.org/protocols</a>
Protocol on Pollutant Release and Transfer Registers	<a href="https://www.unece.org/env/pp/prtr.html">https://www.unece.org/env/pp/prtr.html</a>
Green Economy Transition in Eastern Europe, the Caucasus and Central Asia: Progress and ways forward	<a href="https://unece.org/sites/default/files/2022-09/ece.nicosia.conf_.2022.inf_.8.pdf">https://unece.org/sites/default/files/2022-09/ece.nicosia.conf_.2022.inf_.8.pdf</a>
Directive 2005/55/EC of the European Parliament and of the Council of 28 September 2005 on the approximation of the laws of the Member States relating to the measures to be taken against the emission of gaseous and particulate pollutants from compression-ignition engines for use in vehicles, and the emission of gaseous pollutants from positive-ignition engines fuelled with natural gas or liquefied petroleum gas for use in vehicles	<a href="https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32005L0055">https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32005L0055</a>
Directive 2001/81/EC of the European Parliament and of the Council of 23 October 2001 on national emission ceilings for certain atmospheric pollutants	<a href="https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32001L0081">https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32001L0081</a>
Directive 2002/88/EC of the European Parliament and of the Council of 9 December 2002 amending Directive 97/68/EC on the approximation of the laws of the Member States relating to measures against the emission of gaseous and particulate pollutants from internal combustion engines to be installed in non-road mobile machinery	<a href="https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32002L0088">https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32002L0088</a>
Directive 98/70/EC of the European Parliament and of the Council of 13 October 1998 relating to the quality of petrol and diesel fuels and amending Council Directive 93/12/EEC	<a href="https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A31998L0070">https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A31998L0070</a>

### C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
EMEP/EEA air pollutant emission inventory guidebook 2023	<a href="https://www.eea.europa.eu/publications/emep-eea-guidebook-2023">https://www.eea.europa.eu/publications/emep-eea-guidebook-2023</a>
Guidance to the Protocol on Pollutant Release and Transfer Registers	<a href="https://www.unece.org/env/pp/prtr.guidancedev.html">https://www.unece.org/env/pp/prtr.guidancedev.html</a>
Guidelines for Reporting Emissions and Projections Data under the Convention on Long-range Transboundary Air Pollution	<a href="https://unece.org/emissions-reporting">https://unece.org/emissions-reporting</a>

### D. Data and statistics needed to compile the indicator

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
199	Air emissions: Sulphur oxide (SO <sub>x</sub> ) total	3.1.1: Emissions of greenhouse gases

### E. International databases containing this indicator

<i>Name of the database</i>	<i>Link</i>
EMEP database	<a href="https://www.ceip.at/webdab-emission-database/reported-emissiondata">https://www.ceip.at/webdab-emission-database/reported-emissiondata</a>

## 6.43 INDICATOR A-1.1 EMISSIONS OF SULPHUR OXIDE PER CAPITA

### A. General

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	A: Air pollution and ozone depletion
Component (FDES)	3: Residuals
Sub-component (FDES)	3.1: Emissions to Air
Indicator topic (FDES)	3.1.1: Emissions of greenhouse gases
ID and name in previous indicator guidelines	A1: Emissions of pollutants into the atmospheric air
First publication	17/10/2019
Latest update	26/11/2023
Indicator definition	Emissions of sulphur oxide per capita and year
Unit of measure	kg/capita/year (as SO <sub>2</sub> )

<i>Parameter</i>	<i>Description</i>
Coverage	All sources of air emissions (mobile and stationary) and resident population
Spatial aggregation	National territory
Reference period	Calendar year
Update frequency	Annual
Purpose	The indicator provides a measure of existing and expected pressure on the environment in terms of emissions of harmful substances into the atmospheric air per capita and year.
Policy context	<p>Human activities such as agriculture, fuel combustion and industrial processes are increasing the amount of sulfurous oxides in the atmosphere with catastrophic results in the acidification of oceans and air pollution that is harmful to humans.</p> <p>Sulfur dioxide is a major air pollutant and has significant impacts upon human health. In addition, the concentration of sulfur dioxide in the atmosphere can influence the habitat suitability for plant communities, as well as animal life. Sulfur dioxide emissions are a precursor to acid rain and atmospheric particulates.</p> <p>The ECE Convention on Long-range Transboundary Air Pollution (CLRTAP) requires implementation of measures to prevent, control and reduce emissions of air pollutants and to exchange information on them. The Convention and its eight protocols together set targets for the reduction of specific emissions, prescribe stringent emission limit values for emission sources, propose concrete pollution reduction measures and establish requirements regarding the submission of data on emissions of the above-mentioned pollutants.</p> <p>CLRTAP Protocols:</p> <ul style="list-style-type: none"> <li>• 1999 Protocol to Abate Acidification, Eutrophication and Ground-level Ozone and its 2012 amended version</li> <li>• 1998 Protocol on Persistent Organic Pollutants (POPs) and its 2009 amended version</li> </ul>

<i>Parameter</i>	<i>Description</i>
	<ul style="list-style-type: none"> <li>• 1998 Protocol on Heavy Metals and its 2012 amended version</li> <li>• 1994 Protocol on Further Reduction of Sulphur Emissions</li> <li>• 1991 Protocol concerning the Control of Emissions of Volatile Organic Compounds or their Transboundary Fluxes</li> <li>• 1988 Protocol concerning the Control of Nitrogen Oxides or their Transboundary Fluxes</li> <li>• 1985 Protocol on the Reduction of Sulphur Emissions or their Transboundary Fluxes by at least 30 per cent</li> <li>• 1984 Protocol on Long-term Financing of the Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe (EMEP)</li> </ul>
Link with SDG indicators	3.9.1 Mortality rate attributed to household and ambient air pollution
Methodology for indicator calculation	Total mass of annual sulphur oxide emissions divided by the number of resident population
Comments	-

## B. Policy references

<i>Title of the reference document</i>	<i>Link</i>
Transforming our world: the 2030 Agenda for Sustainable Development	<a href="https://sdgs.un.org/2030agenda">https://sdgs.un.org/2030agenda</a>
1979 ECE Convention on Long-range Transboundary Air Pollution (CLRTAP)	<a href="https://www.unece.org/environmental-policy/conventions/envlrtapwelcome/the-air-convention-and-its-protocols/the-convention-and-its-achievements.html">https://www.unece.org/environmental-policy/conventions/envlrtapwelcome/the-air-convention-and-its-protocols/the-convention-and-its-achievements.html</a>
1994 Protocol on Further Reduction of Sulphur Emissions	<a href="https://unece.org/protocols">https://unece.org/protocols</a>
Protocol on Pollutant Release and Transfer Registers	<a href="https://www.unece.org/env/pp/prtr.html">https://www.unece.org/env/pp/prtr.html</a>
Green Economy Transition in Eastern Europe, the Caucasus and Central Asia: Progress and ways forward	<a href="https://unece.org/sites/default/files/2022-09/ece.nicosia.conf_.2022.inf_8.pdf">https://unece.org/sites/default/files/2022-09/ece.nicosia.conf_.2022.inf_8.pdf</a>

<i>Title of the reference document</i>	<i>Link</i>
Directive 2005/55/EC of the European Parliament and of the Council of 28 September 2005 on the approximation of the laws of the Member States relating to the measures to be taken against the emission of gaseous and particulate pollutants from compression-ignition engines for use in vehicles, and the emission of gaseous pollutants from positive-ignition engines fuelled with natural gas or liquefied petroleum gas for use in vehicles	<a href="https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32005L0055">https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32005L0055</a>
Directive 2001/81/EC of the European Parliament and of the Council of 23 October 2001 on national emission ceilings for certain atmospheric pollutants	<a href="https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32001L0081">https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32001L0081</a>
Directive 2002/88/EC of the European Parliament and of the Council of 9 December 2002 amending Directive 97/68/EC on the approximation of the laws of the Member States relating to measures against the emission of gaseous and particulate pollutants from internal combustion engines to be installed in non-road mobile machinery	<a href="https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32002L0088">https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32002L0088</a>
Directive 98/70/EC of the European Parliament and of the Council of 13 October 1998 relating to the quality of petrol and diesel fuels and amending Council Directive 93/12/EEC	<a href="https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A31998L0070">https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A31998L0070</a>

### C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
EMEP/EEA air pollutant emission inventory guidebook 2023	<a href="https://www.eea.europa.eu/publications/emep-eea-guidebook-2023">https://www.eea.europa.eu/publications/emep-eea-guidebook-2023</a>
Guidance to the Protocol on Pollutant Release and Transfer Registers	<a href="https://www.unece.org/env/pp/prtr.guidancedev.html">https://www.unece.org/env/pp/prtr.guidancedev.html</a>
Guidelines for Reporting Emissions and Projections Data under the Convention on Long-range Transboundary Air Pollution	<a href="https://unece.org/emissions-reporting">https://unece.org/emissions-reporting</a>



#### D. Data and statistics needed to compile the indicator

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
199	Air emissions: Sulphur oxide (SO <sub>x</sub> ) total	3.1.1: Emissions of greenhouse gases
127	Resident population	5.1.1: Urban and rural population

#### E. International databases containing this indicator

<i>Name of the database</i>	<i>Link</i>
n/a	n/a

### 6.44 INDICATOR A-1.20 TOTAL EMISSIONS OF NITROGEN OXIDES (NO<sub>x</sub>)

#### A. General

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	A: Air pollution and ozone depletion
Component (FDES)	3: Residuals
Sub-component (FDES)	3.1: Emissions to Air
Indicator topic (FDES)	3.1.1: Emissions of greenhouse gases
ID and name in previous indicator guidelines	A1: Emissions of pollutants into the atmospheric air
First publication	26/11/2023
Latest update	-
Indicator definition	Total emissions of nitrogen oxides (NO and NO <sub>2</sub> ) per year
Unit of measure	metric tonnes (as NO <sub>2</sub> )
Coverage	All sources of air emissions (mobile and stationary)
Spatial aggregation	National territory
Reference period	Calendar year
Update frequency	Annual
Purpose	The indicator provides a measure of existing pressure on the environment in terms of emissions of harmful substances into the atmospheric air. It measures the emissions of all types of nitrogen oxides from all economic activities.

<i>Parameter</i>	<i>Description</i>
Policy context	<p>The ECE Convention on Long-range Transboundary Air Pollution (CLRTAP) requires implementation of measures to prevent, control and reduce emissions of air pollutants and to exchange information on them. The Convention and its eight protocols together set targets for the reduction of specific emissions, prescribe stringent emission limit values for emission sources, propose concrete pollution reduction measures and establish requirements regarding the submission of data on emissions of the above-mentioned pollutants.</p> <p>CLRTAP Protocols:</p> <ul style="list-style-type: none"> <li>• 1999 Protocol to Abate Acidification, Eutrophication and Ground-level Ozone and its 2012 amended version</li> <li>• 1998 Protocol on Persistent Organic Pollutants (POPs) and its 2009 amended version</li> <li>• 1998 Protocol on Heavy Metals and its 2012 amended version</li> <li>• 1994 Protocol on Further Reduction of Sulphur Emissions</li> <li>• 1991 Protocol concerning the Control of Emissions of Volatile Organic Compounds or their Transboundary Fluxes</li> <li>• 1988 Protocol concerning the Control of Nitrogen Oxides or their Transboundary Fluxes</li> <li>• 1985 Protocol on the Reduction of Sulphur Emissions or their Transboundary Fluxes by at least 30 per cent</li> <li>• 1984 Protocol on Long-term Financing of the Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe (EMEP)</li> </ul>
Link with SDG indicators	3.9.1 Mortality rate attributed to household and ambient air pollution
Methodology for indicator calculation	The indicator is the sum of all SO <sub>x</sub> emissions (including SO <sub>2</sub> , SO <sub>3</sub> and others) from all activities, following the methodology laid down in the EMEP/EEA Guidelines
Comments	-

## B. Policy references

<i>Title of the reference document</i>	<i>Link</i>
Transforming our world: the 2030 Agenda for Sustainable Development	<a href="https://sdgs.un.org/2030agenda">https://sdgs.un.org/2030agenda</a>
1979 ECE Convention on Long-range Transboundary Air Pollution (CLRTAP)	<a href="https://www.unece.org/environmental-policy/conventions/envlrtapwelcome/the-air-convention-and-its-protocols/the-convention-and-its-achievements.html">https://www.unece.org/environmental-policy/conventions/envlrtapwelcome/the-air-convention-and-its-protocols/the-convention-and-its-achievements.html</a>
1988 Protocol concerning the Control of Nitrogen Oxides or their Transboundary Fluxes	<a href="https://unece.org/protocols">https://unece.org/protocols</a>
Protocol on Pollutant Release and Transfer Registers	<a href="https://www.unece.org/env/pp/prtr.html">https://www.unece.org/env/pp/prtr.html</a>
Green Economy Transition in Eastern Europe, the Caucasus and Central Asia: Progress and ways forward	<a href="https://unece.org/sites/default/files/2022-09/ece.nicosia.conf_.2022.inf_.8.pdf">https://unece.org/sites/default/files/2022-09/ece.nicosia.conf_.2022.inf_.8.pdf</a>
Directive 2005/55/EC of the European Parliament and of the Council of 28 September 2005 on the approximation of the laws of the Member States relating to the measures to be taken against the emission of gaseous and particulate pollutants from compression-ignition engines for use in vehicles, and the emission of gaseous pollutants from positive-ignition engines fuelled with natural gas or liquefied petroleum gas for use in vehicles	<a href="https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32005L0055">https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32005L0055</a>
Directive 2001/81/EC of the European Parliament and of the Council of 23 October 2001 on national emission ceilings for certain atmospheric pollutants	<a href="https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32001L0081">https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32001L0081</a>
Directive 2002/88/EC of the European Parliament and of the Council of 9 December 2002 amending Directive 97/68/EC on the approximation of the laws of the Member States relating to measures against the emission of gaseous and particulate pollutants from internal combustion engines to be installed in non-road mobile machinery	<a href="https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32002L0088">https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32002L0088</a>
Directive 98/70/EC of the European Parliament and of the Council of 13 October 1998 relating to the quality of petrol and diesel fuels and amending Council Directive 93/12/EEC	<a href="https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A31998L0070">https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A31998L0070</a>

### C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
EMEP/EEA air pollutant emission inventory guidebook 2023	<a href="https://www.eea.europa.eu/publications/emep-eea-guidebook-2023">https://www.eea.europa.eu/publications/emep-eea-guidebook-2023</a>
Guidance to the Protocol on Pollutant Release and Transfer Registers	<a href="https://www.unece.org/env/pp/prtr.guidancedev.html">https://www.unece.org/env/pp/prtr.guidancedev.html</a>
Guidelines for Reporting Emissions and Projections Data under the Convention on Long-range Transboundary Air Pollution	<a href="https://unece.org/emissions-reporting">https://unece.org/emissions-reporting</a>

### D. Data and statistics needed to compile the indicator

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
202	Air emissions: Nitrogen oxides (NO <sub>x</sub> ) total	3.1.1: Emissions of greenhouse gases

### E. International databases containing this indicator

<i>Name of the database</i>	<i>Link</i>
EMEP database	<a href="https://www.ceip.at/webdab-emission-database/reported-emissiondata">https://www.ceip.at/webdab-emission-database/reported-emissiondata</a>

## 6.45 INDICATOR A-1.7 EMISSIONS OF NON-METHANE VOLATILE ORGANIC COMPOUNDS (NMVOC) PER CAPITA

### A. General

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	A: Air pollution and ozone depletion
Component (FDES)	3: Residuals
Sub-component (FDES)	3.1: Emissions to Air
Indicator topic (FDES)	3.1.1: Emissions of greenhouse gases
ID and name in previous indicator guidelines	A1: Emissions of pollutants into the atmospheric air
First publication	18/10/2019
Latest update	26/11/2023
Indicator definition	Emissions of non-methane volatile organic compounds per capita and year
Unit of measure	kg/capita/year

<i>Parameter</i>	<i>Description</i>
Coverage	All sources of air emissions (mobile and stationary) and resident population
Spatial aggregation	National territory
Reference period	Calendar year
Update frequency	Annual
Purpose	The indicator provides a measure of existing and expected pressure on the environment in terms of emissions of harmful substances into the atmospheric air per capita and year.
Policy context	<p>The ECE Convention on Long-range Transboundary Air Pollution (CLRTAP) requires implementation of measures to prevent, control and reduce emissions of air pollutants and to exchange information on them. The Convention and its eight protocols together set targets for the reduction of specific emissions, prescribe stringent emission limit values for emission sources, propose concrete pollution reduction measures and establish requirements regarding the submission of data on emissions of the above-mentioned pollutants.</p> <p>CLRTAP Protocols:</p> <ul style="list-style-type: none"> <li>• 1999 Protocol to Abate Acidification, Eutrophication and Ground-level Ozone and its 2012 amended version</li> <li>• 1998 Protocol on Persistent Organic Pollutants (POPs) and its 2009 amended version</li> <li>• 1998 Protocol on Heavy Metals and its 2012 amended version</li> <li>• 1994 Protocol on Further Reduction of Sulphur Emissions</li> <li>• 1991 Protocol concerning the Control of Emissions of Volatile Organic Compounds or their Transboundary Fluxes</li> <li>• 1988 Protocol concerning the Control of Nitrogen Oxides or their Transboundary Fluxes</li> <li>• 1985 Protocol on the Reduction of Sulphur Emissions or their Transboundary Fluxes by at least 30 per cent</li> </ul>

<i>Parameter</i>	<i>Description</i>
	<ul style="list-style-type: none"> <li>1984 Protocol on Long-term Financing of the Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe (EMEP)</li> </ul>
Link with SDG indicators	3.9.1 Mortality rate attributed to household and ambient air pollution
Methodology for indicator calculation	Total mass of NMVOCs emissions divided by the number of resident population
Comments	-

## B. Policy references

<i>Title of the reference document</i>	<i>Link</i>
Transforming our world: the 2030 Agenda for Sustainable Development	<a href="https://sdgs.un.org/2030agenda">https://sdgs.un.org/2030agenda</a>
1979 ECE Convention on Long-range Transboundary Air Pollution (CLRTAP)	<a href="https://www.unece.org/environmental-policy/conventions/envlrtapwelcome/the-air-convention-and-its-protocols/the-convention-and-its-achievements.html">https://www.unece.org/environmental-policy/conventions/envlrtapwelcome/the-air-convention-and-its-protocols/the-convention-and-its-achievements.html</a>
Protocol on Pollutant Release and Transfer Registers	<a href="https://www.unece.org/env/pp/prtr.html">https://www.unece.org/env/pp/prtr.html</a>
Green Economy Transition in Eastern Europe, the Caucasus and Central Asia: Progress and ways forward	<a href="https://unece.org/sites/default/files/2022-09/ece.nicosia.conf_2022_inf_8.pdf">https://unece.org/sites/default/files/2022-09/ece.nicosia.conf_2022_inf_8.pdf</a>
Directive 2005/55/EC of the European Parliament and of the Council of 28 September 2005 on the approximation of the laws of the Member States relating to the measures to be taken against the emission of gaseous and particulate pollutants from compression-ignition engines for use in vehicles, and the emission of gaseous pollutants from positive-ignition engines fuelled with natural gas or liquefied petroleum gas for use in vehicles	<a href="https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32005L0055">https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32005L0055</a>
Directive 2001/81/EC of the European Parliament and of the Council of 23 October 2001 on national emission ceilings for certain atmospheric pollutants	<a href="https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32001L0081">https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32001L0081</a>

<i>Title of the reference document</i>	<i>Link</i>
Directive 2002/88/EC of the European Parliament and of the Council of 9 December 2002 amending Directive 97/68/EC on the approximation of the laws of the Member States relating to measures against the emission of gaseous and particulate pollutants from internal combustion engines to be installed in non-road mobile machinery	<a href="https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32002L0088">https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32002L0088</a>
Directive 98/70/EC of the European Parliament and of the Council of 13 October 1998 relating to the quality of petrol and diesel fuels and amending Council Directive 93/12/EEC	<a href="https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A31998L0070">https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A31998L0070</a>

### C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
EMEP/EEA air pollutant emission inventory guidebook 2023	<a href="https://www.eea.europa.eu/publications/emep-eea-guidebook-2023">https://www.eea.europa.eu/publications/emep-eea-guidebook-2023</a>
Guidance to the Protocol on Pollutant Release and Transfer Registers	<a href="https://www.unece.org/env/pp/prtr.guidancedev.html">https://www.unece.org/env/pp/prtr.guidancedev.html</a>
Guidelines for Reporting Emissions and Projections Data under the Convention on Long-range Transboundary Air Pollution	<a href="https://unece.org/emissions-reporting">https://unece.org/emissions-reporting</a>

### D. Data and statistics needed to compile the indicator

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
205	Air emissions: Non-methane volatile organic compounds (NMVOCs) total	3.1.1: Emissions of greenhouse gases
127	Resident population	5.1.1: Urban and rural population

### E. International databases containing this indicator

<i>Name of the database</i>	<i>Link</i>
n/a	n/a

## 6.46 INDICATOR A-3.1 TOTAL CONSUMPTION OF OZONE-DEPLETING SUBSTANCES (ODS)

### A. General

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	A: Air pollution and ozone depletion
Component (FDES)	3: Residuals
Sub-component (FDES)	3.1: Emissions to Air
Indicator topic (FDES)	3.1.2: Consumption of ozone depleting substances
ID and name in previous indicator guidelines	A3: Consumption of ozone-depleting substances
First publication	18/10/2019
Latest update	26/11/2023
Indicator definition	The indicator measures total consumption of ozone-depleting substances.
Unit of measure	ODP tonnes or CO <sub>2</sub> equivalent tonnes
Coverage	Controlled ozone depleting substances
Spatial aggregation	National territory
Reference period	Calendar year
Update frequency	Annual
Purpose	The indicator is a measure of the pressure on the environment through substances that deplete the ozone layer.
Policy context	The ozone layer in the stratosphere is an essential component of the Earth's atmosphere. It protects humans, animals and plants from damaging short wave ultraviolet (UV) radiation. Ozone is destroyed (dissociated) by reactions with certain ODS in the presence of UV radiation. Substances that cause significant ozone depletion include chlorofluorocarbons (CFCs), halons, carbon tetrachloride, 1,1,1-trichloroethane (methyl chloroform), hydrochlorofluorocarbons



<i>Parameter</i>	<i>Description</i>
	(HCFCs), and methyl bromide. Additional to the impact of ODS on the ozone layer, certain ODS are potent greenhouse gases, which can contribute to accelerated climate change. The Vienna Convention for the Protection of the Ozone Layer (1985), its Montreal Protocol on Substances that Deplete the Ozone Layer (1987) and the London, Copenhagen, Montreal, Beijing and Montreal amendments to the Montreal Protocol.
Link with SDG indicators	-
Methodology for indicator calculation	Consumption is calculated as production plus imports minus exports, destroyed quantities, and feedstock uses of a controlled substance. Destruction and feedstock uses both take ODS out of the system (opposite of production), hence the reason for subtracting them when calculating consumption. The Montreal Protocol also specifies that consumption shall not include the amounts used for quarantine and pre-shipment applications of methyl bromide, and further specifies that exports to non-Parties will count as consumption in the exporting Party.
Comments	-

## **B. Policy references**

<i>Title of the reference document</i>	<i>Link</i>
The Montreal Protocol on Substances that Deplete the Ozone Layer	<a href="https://ozone.unep.org/treaties/montreal-protocol">https://ozone.unep.org/treaties/montreal-protocol</a>

## **C. Methodology references**

<i>Title of the reference document</i>	<i>Link</i>
Handbook for the Montreal Protocol, Fourteenth Edition (2020)	<a href="https://ozone.unep.org/sites/default/files/Handbooks/MP-Handbook-2020-English.pdf">https://ozone.unep.org/sites/default/files/Handbooks/MP-Handbook-2020-English.pdf</a>

**D. Data and statistics needed to compile the indicator**

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
299	Consumption of ODS: CFCs	3.1.2: Consumption of ozone depleting substances
300	Consumption of ODS: Halons	3.1.2: Consumption of ozone depleting substances
301	Consumption of ODS: Other fully halogenated CFCs	3.1.2: Consumption of ozone depleting substances
302	Consumption of ODS: Carbon tetrachloride	3.1.2: Consumption of ozone depleting substances
303	Consumption of ODS: 1,1,1-trichloroethane (methyl chloroform)	3.1.2: Consumption of ozone depleting substances
304	Consumption of ODS: Hydrochlorofluorocarbons	3.1.2: Consumption of ozone depleting substances
305	Consumption of ODS: Hydrobromofluorocarbons	3.1.2: Consumption of ozone depleting substances
306	Consumption of ODS: Methyl bromide	3.1.2: Consumption of ozone depleting substances
307	Consumption of ODS: Bromochloromethane	3.1.2: Consumption of ozone depleting substances
308	Consumption of ODS: Hydrofluorocarbons	3.1.2: Consumption of ozone depleting substances

**E. International databases containing this indicator**

<i>Name of the database</i>	<i>Link</i>
Ozone Secretariat Data Centre	<a href="https://ozone.unep.org/countries/data-table">https://ozone.unep.org/countries/data-table</a>

## 6.47 INDICATOR A-1.28 EMISSIONS OF AMMONIA PER CAPITA

### A. General

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	A: Air pollution and ozone depletion
Component (FDES)	3: Residuals
Sub-component (FDES)	3.1: Emissions to Air
Indicator topic (FDES)	3.1.3: Emissions of other substances
ID and name in previous indicator guidelines	A1: Emissions of pollutants into the atmospheric air
First publication	18/10/2019
Latest update	26/11/2023
Indicator definition	Emissions of ammonia (NH <sub>3</sub> ) per capita and year
Unit of measure	kg/capita/year
Coverage	All sources of air emissions (mobile and stationary) and resident population
Spatial aggregation	National territory
Reference period	Calendar year
Update frequency	Annual
Purpose	The indicator provides a measure of existing and expected pressure on the environment in terms of emissions of harmful substances into the atmospheric air per capita and year.
Policy context	<p>The ECE Convention on Long-range Transboundary Air Pollution (CLRTAP) requires implementation of measures to prevent, control and reduce emissions of air pollutants and to exchange information on them. The Convention and its eight protocols together set targets for the reduction of specific emissions, prescribe stringent emission limit values for emission sources, propose concrete pollution reduction measures and establish requirements regarding the submission of data on emissions of the above-mentioned pollutants.</p> <p>CLRTAP Protocols:</p> <ul style="list-style-type: none"> <li>• 1999 Protocol to Abate Acidification, Eutrophication and Ground-level Ozone and its 2012 amended version</li> </ul>

<i>Parameter</i>	<i>Description</i>
	<ul style="list-style-type: none"> <li>• 1998 Protocol on Persistent Organic Pollutants (POPs) and its 2009 amended version</li> <li>• 1998 Protocol on Heavy Metals and its 2012 amended version</li> <li>• 1994 Protocol on Further Reduction of Sulphur Emissions</li> <li>• 1991 Protocol concerning the Control of Emissions of Volatile Organic Compounds or their Transboundary Fluxes</li> <li>• 1988 Protocol concerning the Control of Nitrogen Oxides or their Transboundary Fluxes</li> <li>• 1985 Protocol on the Reduction of Sulphur Emissions or their Transboundary Fluxes by at least 30 per cent</li> <li>• 1984 Protocol on Long-term Financing of the Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe (EMEP)</li> </ul>
Link with SDG indicators	3.9.1 Mortality rate attributed to household and ambient air pollution
Methodology for indicator calculation	Total mass of NH <sub>3</sub> emissions divided by the number of resident population
Comments	-

## B. Policy references

<i>Title of the reference document</i>	<i>Link</i>
Transforming our world: the 2030 Agenda for Sustainable Development	<a href="https://sdgs.un.org/2030agenda">https://sdgs.un.org/2030agenda</a>
1979 ECE Convention on Long-range Transboundary Air Pollution (CLRTAP)	<a href="https://www.unece.org/environmental-policy/conventions/envlrtapwelcome/the-air-convention-and-its-protocols/the-convention-and-its-achievements.html">https://www.unece.org/environmental-policy/conventions/envlrtapwelcome/the-air-convention-and-its-protocols/the-convention-and-its-achievements.html</a>
Protocol on Pollutant Release and Transfer Registers (PRTR)	<a href="https://www.unece.org/env/pp/prtr.html">https://www.unece.org/env/pp/prtr.html</a>
Green Economy Transition in Eastern Europe, the Caucasus and Central Asia: Progress and ways forward	<a href="https://unece.org/sites/default/files/2022-09/ece.nicosia.conf_.2022.inf_8.pdf">https://unece.org/sites/default/files/2022-09/ece.nicosia.conf_.2022.inf_8.pdf</a>

### C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
EMEP/EEA air pollutant emission inventory guidebook 2023	<a href="https://www.eea.europa.eu/publications/emep-eea-guidebook-2023">https://www.eea.europa.eu/publications/emep-eea-guidebook-2023</a>
Guidance to the Protocol on Pollutant Release and Transfer Registers	<a href="https://www.unece.org/env/pp/prtr.guidancedev.html">https://www.unece.org/env/pp/prtr.guidancedev.html</a>
Guidelines for Reporting Emissions and Projections Data under the Convention on Long-range Transboundary Air Pollution	<a href="https://unece.org/emissions-reporting">https://unece.org/emissions-reporting</a>

### D. Data and statistics needed to compile the indicator

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
208	Air emissions: Ammonia (NH <sub>3</sub> ) total	3.1.3: Emissions of other substances
127	Resident population	5.1.1: Urban and rural population

### E. International databases containing this indicator

<i>Name of the database</i>	<i>Link</i>
n/a	n/a

## 6.48 INDICATOR A-1.21 TOTAL EMISSIONS OF PM<sub>2.5</sub>

### A. General

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	A: Air pollution and ozone depletion
Component (FDES)	3: Residuals
Sub-component (FDES)	3.1: Emissions to Air
Indicator topic (FDES)	3.1.3: Emissions of other substances
ID and name in previous indicator guidelines	A1: Emissions of pollutants into the atmospheric air
First publication	19/12/2023
Latest update	-
Indicator definition	Total emissions of PM <sub>2.5</sub> generated by stationary and mobile sources
Unit of measure	1000 tonnes

<i>Parameter</i>	<i>Description</i>
Coverage	All sources of air emissions (mobile and stationary)
Spatial aggregation	National territory
Reference period	Calendar year
Update frequency	Annual
Purpose	The indicator presents the total emissions of PM <sub>2.5</sub> and its developments over time.
Policy context	<p>The ECE Convention on Long-range Transboundary Air Pollution (CLRTAP) requires implementation of measures to prevent, control and reduce emissions of air pollutants and to exchange information on them. The Convention and its eight protocols together set targets for the reduction of specific emissions, prescribe stringent emission limit values for emission sources, propose concrete pollution reduction measures and establish requirements regarding the submission of data on emissions of the above-mentioned pollutants.</p> <p>CLRTAP Protocols:</p> <ul style="list-style-type: none"> <li>• 1999 Protocol to Abate Acidification, Eutrophication and Ground-level Ozone and its 2012 amended version</li> <li>• 1998 Protocol on Persistent Organic Pollutants (POPs) and its 2009 amended version</li> <li>• 1998 Protocol on Heavy Metals and its 2012 amended version</li> <li>• 1994 Protocol on Further Reduction of Sulphur Emissions</li> <li>• 1991 Protocol concerning the Control of Emissions of Volatile Organic Compounds or their Transboundary Fluxes</li> <li>• 1988 Protocol concerning the Control of Nitrogen Oxides or their Transboundary Fluxes</li> <li>• 1985 Protocol on the Reduction of Sulphur Emissions or their Transboundary Fluxes by at least 30 per cent</li> </ul>

<i>Parameter</i>	<i>Description</i>
Link with SDG indicators	<ul style="list-style-type: none"> <li>1984 Protocol on Long-term Financing of the Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe (EMEP)</li> </ul> SDG target 3.9: By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination 3.9.1 Mortality rate attributed to household and ambient air pollution (indirectly related)
Methodology for indicator calculation	The sum of all PM <sub>2.5</sub> emissions of all stationary and mobile sources.
Comments	-

## B. Policy references

<i>Title of the reference document</i>	<i>Link</i>
Transforming our world: the 2030 Agenda for Sustainable Development	<a href="https://sdgs.un.org/2030agenda">https://sdgs.un.org/2030agenda</a>
1979 ECE Convention on Long-range Transboundary Air Pollution (CLRTAP)	<a href="https://www.unece.org/environmental-policy/conventions/envlrtapwelcome/the-air-convention-and-its-protocols/the-convention-and-its-achievements.html">https://www.unece.org/environmental-policy/conventions/envlrtapwelcome/the-air-convention-and-its-protocols/the-convention-and-its-achievements.html</a>
Protocol on Pollutant Release and Transfer Registers (PRTR)	<a href="https://www.unece.org/env/pp/prtr.html">https://www.unece.org/env/pp/prtr.html</a>
Green Economy Transition in Eastern Europe, the Caucasus and Central Asia: Progress and ways forward	<a href="https://unece.org/sites/default/files/2022-09/ece.nicosia.conf_.2022.inf_.8.pdf">https://unece.org/sites/default/files/2022-09/ece.nicosia.conf_.2022.inf_.8.pdf</a>
Directive 2005/55/EC of the European Parliament and of the Council of 28 September 2005 on the approximation of the laws of the Member States relating to the measures to be taken against the emission of gaseous and particulate pollutants from compression-ignition engines for use in vehicles, and the emission of gaseous pollutants from positive-ignition engines fuelled with natural gas or liquefied petroleum gas for use in vehicles	<a href="https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32005L0055">https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32005L0055</a>

<i>Title of the reference document</i>	<i>Link</i>
Directive 2001/81/EC of the European Parliament and of the Council of 23 October 2001 on national emission ceilings for certain atmospheric pollutants	<a href="https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32001L0081">https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32001L0081</a>
Directive 2002/88/EC of the European Parliament and of the Council of 9 December 2002 amending Directive 97/68/EC on the approximation of the laws of the Member States relating to measures against the emission of gaseous and particulate pollutants from internal combustion engines to be installed in non-road mobile machinery	<a href="https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32002L0088">https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32002L0088</a>
Directive 98/70/EC of the European Parliament and of the Council of 13 October 1998 relating to the quality of petrol and diesel fuels and amending Council Directive 93/12/EEC	<a href="https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A31998L0070">https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A31998L0070</a>

### C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
EMEP/EEA air pollutant emission inventory guidebook 2023	<a href="https://www.eea.europa.eu/publications/emep-eea-guidebook-2023">https://www.eea.europa.eu/publications/emep-eea-guidebook-2023</a>
Guidance to the Protocol on Pollutant Release and Transfer Registers	<a href="https://www.unece.org/env/pp/prtr.guidancedev.html">https://www.unece.org/env/pp/prtr.guidancedev.html</a>
Guidelines for Reporting Emissions and Projections Data under the Convention on Long-range Transboundary Air Pollution	<a href="https://unece.org/emissions-reporting">https://unece.org/emissions-reporting</a>

### D. Data and statistics needed to compile the indicator

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
224	Air emissions: PM <sub>2.5</sub> - of which from stationary sources	3.1.3: Emissions of other substances
225	Air emissions: PM <sub>2.5</sub> - of which from mobile sources	3.1.3: Emissions of other substances

### E. International databases containing this indicator

<i>Name of the database</i>	<i>Link</i>
n/a	n/a



## 6.49 INDICATOR A-1.17 SHARE OF PM<sub>10</sub> EMISSIONS FROM STATIONARY OR MOBILE SOURCES

### A. General

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	A: Air pollution and ozone depletion
Component (FDES)	3: Residuals
Sub-component (FDES)	3.1: Emissions to Air
Indicator topic (FDES)	3.1.3: Emissions of other substances
ID and name in previous indicator guidelines	A1: Emissions of pollutants into the atmospheric air
First publication	18/10/2019
Latest update	26/11/2023
Indicator definition	Percentage of PM <sub>10</sub> emissions generated by stationary or mobile sources
Unit of measure	%
Coverage	All sources of air emissions (mobile and stationary)
Spatial aggregation	National territory
Reference period	Calendar year
Update frequency	Annual
Purpose	The indicator presents the main sources of the pollutant, and thus gives an indication for the type of measures needed to reduce its pollution.
Policy context	The ECE Convention on Long-range Transboundary Air Pollution (CLRTAP) requires implementation of measures to prevent, control and reduce emissions of air pollutants and to exchange information on them. The Convention and its eight protocols together set targets for the reduction of specific emissions, prescribe stringent emission limit values for emission sources, propose concrete pollution reduction measures and establish requirements regarding the submission of data on emissions of the above-mentioned pollutants.

<i>Parameter</i>	<i>Description</i>
	<p>CLRTAP Protocols:</p> <ul style="list-style-type: none"> <li>• 1999 Protocol to Abate Acidification, Eutrophication and Ground-level Ozone and its 2012 amended version</li> <li>• 1998 Protocol on Persistent Organic Pollutants (POPs) and its 2009 amended version</li> <li>• 1998 Protocol on Heavy Metals and its 2012 amended version</li> <li>• 1994 Protocol on Further Reduction of Sulphur Emissions</li> <li>• 1991 Protocol concerning the Control of Emissions of Volatile Organic Compounds or their Transboundary Fluxes</li> <li>• 1988 Protocol concerning the Control of Nitrogen Oxides or their Transboundary Fluxes</li> <li>• 1985 Protocol on the Reduction of Sulphur Emissions or their Transboundary Fluxes by at least 30 per cent</li> <li>• 1984 Protocol on Long-term Financing of the Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe (EMEP)</li> </ul>
Link with SDG indicators	3.9.1 Mortality rate attributed to household and ambient air pollution
Methodology for indicator calculation	<p>Share of PM<sub>10</sub> emissions from stationary sources = <math>100 \times \text{PM}_{10} \text{ emissions from stationary sources} / \text{total emissions of PM}_{10}</math></p> <p>Share of PM<sub>10</sub> emissions from mobile sources = <math>100 \times \text{PM}_{10} \text{ emissions from mobile sources} / \text{total emissions of PM}_{10}</math></p>
Comments	-

## B. Policy references

<i>Title of the reference document</i>	<i>Link</i>
Transforming our world: the 2030 Agenda for Sustainable Development	<a href="https://sdgs.un.org/2030agenda">https://sdgs.un.org/2030agenda</a>
1979 ECE Convention on Long-range Transboundary Air Pollution (CLRTAP)	<a href="https://www.unece.org/environmental-policy/conventions/envlrtapwelcome/the-air-convention-and-its-protocols/the-convention-and-its-achievements.html">https://www.unece.org/environmental-policy/conventions/envlrtapwelcome/the-air-convention-and-its-protocols/the-convention-and-its-achievements.html</a>
Protocol on Pollutant Release and Transfer Registers (PRTR)	<a href="https://www.unece.org/env/pp/prtr.html">https://www.unece.org/env/pp/prtr.html</a>
Green Economy Transition in Eastern Europe, the Caucasus and Central Asia: Progress and ways forward	<a href="https://unece.org/sites/default/files/2022-09/ece.nicosia.conf_.2022.inf_8.pdf">https://unece.org/sites/default/files/2022-09/ece.nicosia.conf_.2022.inf_8.pdf</a>
Directive 2005/55/EC of the European Parliament and of the Council of 28 September 2005 on the approximation of the laws of the Member States relating to the measures to be taken against the emission of gaseous and particulate pollutants from compression-ignition engines for use in vehicles, and the emission of gaseous pollutants from positive-ignition engines fuelled with natural gas or liquefied petroleum gas for use in vehicles	<a href="https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32005L0055">https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32005L0055</a>
Directive 2001/81/EC of the European Parliament and of the Council of 23 October 2001 on national emission ceilings for certain atmospheric pollutants	<a href="https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32001L0081">https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32001L0081</a>
Directive 2002/88/EC of the European Parliament and of the Council of 9 December 2002 amending Directive 97/68/EC on the approximation of the laws of the Member States relating to measures against the emission of gaseous and particulate pollutants from internal combustion engines to be installed in non-road mobile machinery	<a href="https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32002L0088">https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32002L0088</a>
Directive 98/70/EC of the European Parliament and of the Council of 13 October 1998 relating to the quality of petrol and diesel fuels and amending Council Directive 93/12/EEC	<a href="https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A31998L0070">https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A31998L0070</a>

### C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
EMEP/EEA air pollutant emission inventory guidebook 2023	<a href="https://www.eea.europa.eu/publications/emep-eea-guidebook-2023">https://www.eea.europa.eu/publications/emep-eea-guidebook-2023</a>
Guidance to the Protocol on Pollutant Release and Transfer Registers	<a href="https://www.unece.org/env/pp/prtr.guidancedev.html">https://www.unece.org/env/pp/prtr.guidancedev.html</a>
Guidelines for Reporting Emissions and Projections Data under the Convention on Long-range Transboundary Air Pollution	<a href="https://unece.org/emissions-reporting">https://unece.org/emissions-reporting</a>

### D. Data and statistics needed to compile the indicator

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
220	Air emissions: PM <sub>10</sub> total	3.1.3: Emissions of other substances
221	Air emissions: PM <sub>10</sub> - of which from stationary sources	3.1.3: Emissions of other substances
222	Air emissions: PM <sub>10</sub> - of which from mobile sources	3.1.3: Emissions of other substances

### E. International databases containing this indicator

<i>Name of the database</i>	<i>Link</i>
n/a	n/a

## 6.50 INDICATOR A-1.18 SHARE OF PM<sub>2.5</sub> EMISSIONS FROM STATIONARY OR MOBILE SOURCES

### A. General

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	A: Air pollution and ozone depletion
Component (FDES)	3: Residuals
Sub-component (FDES)	3.1: Emissions to Air
Indicator topic (FDES)	3.1.3: Emissions of other substances
ID and name in previous indicator guidelines	A1: Emissions of pollutants into the atmospheric air
First publication	18/10/2019
Latest update	26/11/2023

<i>Parameter</i>	<i>Description</i>
Indicator definition	Percentage of PM <sub>2.5</sub> emissions generated by stationary or mobile sources
Unit of measure	%
Coverage	All sources of air emissions (mobile and stationary)
Spatial aggregation	National territory
Reference period	Calendar year
Update frequency	Annual
Purpose	The indicator presents the main sources of the pollutant, and thus gives an indication for the type of measures needed to reduce its pollution.
Policy context	<p>The ECE Convention on Long-range Transboundary Air Pollution (CLRTAP) requires implementation of measures to prevent, control and reduce emissions of air pollutants and to exchange information on them. The Convention and its eight protocols together set targets for the reduction of specific emissions, prescribe stringent emission limit values for emission sources, propose concrete pollution reduction measures and establish requirements regarding the submission of data on emissions of the above-mentioned pollutants.</p> <p>CLRTAP Protocols:</p> <ul style="list-style-type: none"> <li>• 1999 Protocol to Abate Acidification, Eutrophication and Ground-level Ozone and its 2012 amended version</li> <li>• 1998 Protocol on Persistent Organic Pollutants (POPs) and its 2009 amended version</li> <li>• 1998 Protocol on Heavy Metals and its 2012 amended version</li> <li>• 1994 Protocol on Further Reduction of Sulphur Emissions</li> <li>• 1991 Protocol concerning the Control of Emissions of Volatile Organic Compounds or their Transboundary Fluxes</li> <li>• 1988 Protocol concerning the Control of Nitrogen Oxides or their Transboundary Fluxes</li> </ul>

<i>Parameter</i>	<i>Description</i>
	<ul style="list-style-type: none"> <li>• 1985 Protocol on the Reduction of Sulphur Emissions or their Transboundary Fluxes by at least 30 per cent</li> <li>• 1984 Protocol on Long-term Financing of the Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe (EMEP)</li> </ul>
Link with SDG indicators	SDG target 3.9: By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination 3.9.1 Mortality rate attributed to household and ambient air pollution (indirectly related)
Methodology for indicator calculation	Share of PM <sub>2.5</sub> emissions from stationary sources = 100 x PM <sub>2.5</sub> emissions from stationary sources / total emissions of PM <sub>2.5</sub> Share of PM <sub>2.5</sub> emissions from mobile sources = 100 x PM <sub>2.5</sub> emissions from mobile sources / total emissions of PM <sub>2.5</sub>
Comments	-

## B. Policy references

<i>Title of the reference document</i>	<i>Link</i>
Transforming our world: the 2030 Agenda for Sustainable Development	<a href="https://sdgs.un.org/2030agenda">https://sdgs.un.org/2030agenda</a>
1979 ECE Convention on Long-range Transboundary Air Pollution (CLRTAP)	<a href="https://www.unece.org/environmental-policy/conventions/envlrtapwelcome/the-air-convention-and-its-protocols/the-convention-and-its-achievements.html">https://www.unece.org/environmental-policy/conventions/envlrtapwelcome/the-air-convention-and-its-protocols/the-convention-and-its-achievements.html</a>
Protocol on Pollutant Release and Transfer Registers (PRTR)	<a href="https://www.unece.org/env/pp/prtr.html">https://www.unece.org/env/pp/prtr.html</a>
Green Economy Transition in Eastern Europe, the Caucasus and Central Asia: Progress and ways forward	<a href="https://unece.org/sites/default/files/2022-09/ece.nicosia.conf_.2022_inf_.8.pdf">https://unece.org/sites/default/files/2022-09/ece.nicosia.conf_.2022_inf_.8.pdf</a>

<i>Title of the reference document</i>	<i>Link</i>
Directive 2005/55/EC of the European Parliament and of the Council of 28 September 2005 on the approximation of the laws of the Member States relating to the measures to be taken against the emission of gaseous and particulate pollutants from compression-ignition engines for use in vehicles, and the emission of gaseous pollutants from positive-ignition engines fuelled with natural gas or liquefied petroleum gas for use in vehicles	<a href="https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32005L0055">https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32005L0055</a>
Directive 2001/81/EC of the European Parliament and of the Council of 23 October 2001 on national emission ceilings for certain atmospheric pollutants	<a href="https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32001L0081">https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32001L0081</a>
Directive 2002/88/EC of the European Parliament and of the Council of 9 December 2002 amending Directive 97/68/EC on the approximation of the laws of the Member States relating to measures against the emission of gaseous and particulate pollutants from internal combustion engines to be installed in non-road mobile machinery	<a href="https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32002L0088">https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32002L0088</a>
Directive 98/70/EC of the European Parliament and of the Council of 13 October 1998 relating to the quality of petrol and diesel fuels and amending Council Directive 93/12/EEC	<a href="https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A31998L0070">https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A31998L0070</a>

### C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
EMEP/EEA air pollutant emission inventory guidebook 2023	<a href="https://www.eea.europa.eu/publications/emep-eea-guidebook-2023">https://www.eea.europa.eu/publications/emep-eea-guidebook-2023</a>
Guidance to the Protocol on Pollutant Release and Transfer Registers	<a href="https://www.unece.org/env/pp/prtr.guidancedev.html">https://www.unece.org/env/pp/prtr.guidancedev.html</a>
Guidelines for Reporting Emissions and Projections Data under the Convention on Long-range Transboundary Air Pollution	<a href="https://unece.org/emissions-reporting">https://unece.org/emissions-reporting</a>

**D. Data and statistics needed to compile the indicator**

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
223	Air emissions: PM <sub>2.5</sub> total	3.1.3: Emissions of other substances
224	Air emissions: PM <sub>2.5</sub> - of which from stationary sources	3.1.3: Emissions of other substances
225	Air emissions: PM <sub>2.5</sub> - of which from mobile sources	3.1.3: Emissions of other substances

**E. International databases containing this indicator**

<i>Name of the database</i>	<i>Link</i>
n/a	n/a

**6.51 INDICATOR C-15.1 TREATMENT CAPACITY OF URBAN WASTEWATER TREATMENT PLANTS IN TERMS OF POPULATION EQUIVALENTS (P.E.)****A. General**

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	C: Water
Component (FDES)	3: Residuals
Sub-component (FDES)	3.2: Generation and Management of Wastewater
Indicator topic (FDES)	3.2.2: Collection and treatment of wastewater
ID and name in previous indicator guidelines	C15: Wastewater treatment facilities
First publication	30/11/2023
Latest update	-
Indicator definition	Measures the total design capacity of urban wastewater treatment plants in terms of population equivalents (p.e.)
Unit of measure	population equivalents (p.e.)
Coverage	Urban wastewater treatment plants
Spatial aggregation	National territory
Reference period	Reference date
Update frequency	Annual



<i>Parameter</i>	<i>Description</i>
Purpose	The indicator provides a measure of response for the protection of water bodies and human health from urban wastewater. It also allows to evaluate the measures taken to improve the efficiency of the wastewater management system.
Policy context	<p>Wastewater treatment is a basic prerequisite for minimizing pressure on both surface and groundwaters in terms of freshwater pollution by discharged waters. As both groundwaters and surface waters are abstracted for the production of drinking water or even for direct use as drinking water (self-supply), the reduction of water pollution represents one of the basic preconditions for human health and the prevention of water related diseases.</p> <p>In the European Union the requirements for urban wastewater treatment are laid down in the EU Urban Wastewater Treatment Directive, and the need for achieving good water quality status in the EU Water Framework Directive.</p> <p>Global policy context: Target 6.2: By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations</p>
Link with SDG indicators	<p>6.2.1 Proportion of population using (a) safely managed sanitation services and (b) a hand-washing facility with soap and water (related indicator)</p> <p>6.3.1 Proportion of domestic and industrial wastewater flows safely treated (related indicator)</p>
Methodology for indicator calculation	Urban wastewater treatment is all treatment of wastewater in urban wastewater treatment plants (UWWTP's). UWWTP's are usually operated by public authorities or by private companies working by order of public authorities. Includes wastewater delivered to treatment plants by trucks. UWWTP's are classified under ISIC 37 (Sewerage).

<i>Parameter</i>	<i>Description</i>
	<p>If the design capacities of UWWTPs is reported in terms of BOD<sub>5</sub> a conversation into population equivalents (p.e.) is necessary as follows: 1 p.e. (population equivalent) means the organic biodegradable load having a five-day biochemical oxygen demand (BOD<sub>5</sub>) of 60 g of oxygen per day.</p> <p>For disaggregation of the indicator by treatment type, the follow criteria should be applied (to avoid double counting, water subjected to more than one type of treatment should be reported under the highest level of treatment only):</p> <ul style="list-style-type: none"> <li>• Primary wastewater treatment: Treatment of wastewater by a physical and/or chemical process involving settlement of suspended solids, or other process in which the Biochemical Oxygen Demand (BOD<sub>5</sub>) of the incoming wastewater is reduced by at least 20% before discharge and the total suspended solids of the incoming wastewater are reduced by at least 50%.</li> <li>• Secondary wastewater treatment: Post-primary treatment of wastewater by a process generally involving biological or other treatment with a secondary settlement or other process, resulting in a Biochemical Oxygen Demand (BOD<sub>5</sub>) removal of at least 70% and a Chemical Oxygen Demand (COD) removal of at least 75%.</li> <li>• Tertiary wastewater treatment: Treatment (additional to secondary treatment) of nitrogen and/or phosphorous and/or any other pollutant affecting the quality or a specific use of water: microbiological pollution, colour etc. The different possible treatment efficiencies ('organic pollution removal' of at least 95% for BOD<sub>5</sub>, 85% for COD, 'nitrogen removal' of at least 70%, 'phosphorous removal' of at least 80% and 'microbiological removal') cannot be added and are exclusive.</li> </ul>

<i>Parameter</i>	<i>Description</i>
Comments	To cover the full range of urban wastewater treatment in a country, it is recommended to present the capacity of independent treatment facilities and other treatment facilities (i.e. industrial plants also treating urban wastewater) in addition.

## B. Policy references

<i>Title of the reference document</i>	<i>Link</i>
Transforming our world: the 2030 Agenda for Sustainable Development	<a href="https://sdgs.un.org/2030agenda">https://sdgs.un.org/2030agenda</a>
Council Directive of 21 May 1991 concerning urban waste water treatment(91/271/EEC)	<a href="http://data.europa.eu/eli/dir/1991/271/2014-01-01">http://data.europa.eu/eli/dir/1991/271/2014-01-01</a>
Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy	<a href="https://ec.europa.eu/environment/water/water-framework/index_en.html">https://ec.europa.eu/environment/water/water-framework/index_en.html</a>

## C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
UNSD/United Nations Environment Programme Questionnaire 2022 on Environment Statistics - section "Water"	<a href="https://unstats.un.org/unsd/envstats/questionnaire">https://unstats.un.org/unsd/envstats/questionnaire</a>
Council Directive of 21 May 1991 concerning urban waste water treatment (91/271/EEC)	<a href="http://data.europa.eu/eli/dir/1991/271/2014-01-01">http://data.europa.eu/eli/dir/1991/271/2014-01-01</a>

## D. Data and statistics needed to compile the indicator

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
312	Wastewater treatment: UWWTP with primary treatment – organic design capacity	3.2.2: Collection and treatment of wastewater
313	Wastewater treatment: UWWTP with secondary treatment - organic design capacity	3.2.2: Collection and treatment of wastewater
314	Wastewater treatment: UWWTP with tertiary treatment – organic design capacity	3.2.2: Collection and treatment of wastewater

## E. International databases containing this indicator

<i>Name of the database</i>	<i>Link</i>
Water Information System for Europe (WISE) - Freshwater	<a href="https://water.europa.eu/freshwater">https://water.europa.eu/freshwater</a>

## 6.52 INDICATOR C-16.2 PROPORTION OF DOMESTIC AND INDUSTRIAL WASTEWATER FLOWS SAFELY TREATED (SDG INDICATOR 6.3.1)

### A. General

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	C: Water
Component (FDES)	3: Residuals
Sub-component (FDES)	3.2: Generation and Management of Wastewater
Indicator topic (FDES)	3.2.2: Collection and treatment of wastewater
ID and name in previous indicator guidelines	C16: Polluted (non-treated) wastewaters
First publication	30/11/2023
Latest update	-
Indicator definition	Measures the share of the volume of wastewater generated which is treated at least at the level of secondary treatment
Unit of measure	%
Coverage	Wastewater generated by all economic activities and households
Spatial aggregation	National territory
Reference period	Calendar year
Update frequency	Annual
Purpose	<p>SDG indicator 6.3.1 tracks the proportion of wastewater flows from households, services and industrial economic activities that are safely treated at the source or through centralized wastewater treatment plants before being discharged into the environment, out of the total volume of wastewater generated.</p> <p>The purpose of monitoring progress using SDG indicator 6.3.1 is to provide necessary and timely information to decision makers and stakeholders to make informed decisions to accelerate progress towards reducing water pollution, minimizing release of hazardous chemicals and increasing wastewater treatment and reuse. The target wording covers wastewater recycling and safe reuse with implication on water use efficiency, although it is not fully addressed by the global indicator and methodology.</p>

<i>Parameter</i>	<i>Description</i>
Policy context	<p>Wastewater treatment is a basic prerequisite for minimizing pressure on both surface and groundwaters in terms of freshwater pollution by discharged waters. As both groundwaters and surface waters are abstracted for the production of drinking water or even for direct use as drinking water (self-supply), the reduction of water pollution represents one of the basic preconditions for human health and the prevention of water related diseases.</p> <p>In the European Union the requirements for urban wastewater treatment are laid down in the EU Urban Wastewater Treatment Directive, and the need for achieving good water quality status in the EU Water Framework Directive.</p> <p>Sustainable Development Goal 6 (SDG 6) is about ensuring the availability and sustainability of water and sanitation for all by 2030. SDG Target 6.3 sets out to improve ambient water quality, which is essential to protecting both ecosystem and human health, by eliminating, minimizing and significantly reducing different streams of pollution into water bodies.</p>
Link with SDG indicators	<p>6.2.1 Proportion of population using (a) safely managed sanitation services and (b) a hand-washing facility with soap and water (related indicator)</p> <p>6.3.1 Proportion of domestic and industrial wastewater flows safely treated</p>
Methodology for indicator calculation	<p>The amount of wastewater generated is calculated by summing all of the wastewater generated by different economic activities and households.</p> <p>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.</p> <p>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.</p>

<i>Parameter</i>	<i>Description</i>
Comments	<p>Differentiating between the different wastewater streams is important as policy decisions need to be guided by the polluter pays principle. However, wastewater conveyed by combined sewers usually combines both hazardous and non-hazardous substances discharged from different sources, but also runoff and urban stormwater, which cannot be separately tracked and monitored. As a consequence, although the flow of wastewater generated can be disaggregated by sources (domestic, services, industrial), the treated wastewater statistics are most commonly disaggregated by type (e.g. urban and industrial) and/or level of treatment (e.g. secondary) rather than by sources.</p> <p>Total wastewater flows can be classified into three main categories:</p> <ul style="list-style-type: none"> <li>Industrial (ISIC divisions 05-35)</li> <li>Services (ISIC divisions 45-96)</li> <li>Domestic (private households)</li> </ul> <p>Disaggregation by these sectors and also presenting absolute values of wastewater safely treated versus wastewater not treated is recommended.</p>

## B. Policy references

<i>Title of the reference document</i>	<i>Link</i>
Transforming our world: the 2030 Agenda for Sustainable Development	<a href="https://sdgs.un.org/2030agenda">https://sdgs.un.org/2030agenda</a>
Council Directive of 21 May 1991 concerning urban waste water treatment(91/271/EEC)	<a href="http://data.europa.eu/eli/dir/1991/271/2014-01-01">http://data.europa.eu/eli/dir/1991/271/2014-01-01</a>
Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy	<a href="https://ec.europa.eu/environment/water/water-framework/index_en.html">https://ec.europa.eu/environment/water/water-framework/index_en.html</a>

### C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
Metadata of SDG indicator 6.3.1: Proportion of domestic and industrial wastewater flows safely treated	<a href="https://unstats.un.org/sdgs/metadata/">https://unstats.un.org/sdgs/metadata/</a>
UNSD/United Nations Environment Programme Questionnaire 2022 on Environment Statistics - section "Water"	<a href="https://unstats.un.org/unsd/envstats/questionnaire">https://unstats.un.org/unsd/envstats/questionnaire</a>

### D. Data and statistics needed to compile the indicator

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
316	Wastewater generated: Agriculture, forestry and fishing (ISIC 01-03)	3.2.1: Generation and pollutant content of wastewater
317	Wastewater generated: Mining and quarrying (ISIC 05-09)	3.2.1: Generation and pollutant content of wastewater
318	Wastewater generated: Manufacturing (ISIC 10-33)	3.2.1: Generation and pollutant content of wastewater
319	Wastewater generated: Electricity, gas, steam and air conditioning supply (ISIC 35)	3.2.1: Generation and pollutant content of wastewater
320	Wastewater generated: Construction (ISIC 41-43)	3.2.1: Generation and pollutant content of wastewater
321	Wastewater generated: Other economic activities	3.2.1: Generation and pollutant content of wastewater
322	Wastewater generated: Households	3.2.1: Generation and pollutant content of wastewater
323	Wastewater treated: UWWTPs with primary treatment	3.2.2: Collection and treatment of wastewater
324	Wastewater treated: UWWTPs with secondary treatment	3.2.2: Collection and treatment of wastewater
325	Wastewater treated: UWWTPs with tertiary treatment	3.2.2: Collection and treatment of wastewater
326	Wastewater treated: Other treatment plants with primary treatment	3.2.2: Collection and treatment of wastewater
327	Wastewater treated: Other treatment plants with secondary treatment	3.2.2: Collection and treatment of wastewater
328	Wastewater treated: Other treatment plants with tertiary treatment	3.2.2: Collection and treatment of wastewater
329	Wastewater treated: Independent treatment facilities with at least secondary treatment	3.2.2: Collection and treatment of wastewater

### E. International databases containing this indicator

<i>Name of the database</i>	<i>Link</i>
SDG Indicators Database	<a href="https://unstats.un.org/sdgs/dataportal/database">https://unstats.un.org/sdgs/dataportal/database</a>

## 6.53 INDICATOR C-15.5 PERCENTAGE OF BOD<sub>5</sub> REMOVED FROM GENERATED WASTEWATER BEFORE DISCHARGE INTO THE ENVIRONMENT

### A. General

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	C: Water
Component (FDES)	3: Residuals
Sub-component (FDES)	3.2: Generation and Management of Wastewater
Indicator topic (FDES)	3.2.2: Collection and treatment of wastewater
ID and name in previous indicator guidelines	C15: Wastewater treatment facilities
First publication	27/12/2023
Latest update	-
Indicator definition	The indicator measures the removal of biological oxygen demand (BOD <sub>5</sub> ) load of all wastewater generated through wastewater treatment before it is being discharged into the environment.
Unit of measure	%
Coverage	Wastewater generated by all economic activities and households
Spatial aggregation	National territory
Reference period	Calendar year
Update frequency	Annual
Purpose	BOD <sub>5</sub> is a measure for organic pollution of wastewater. The decay of organic matter in water can lessen the amount of oxygen, which is harmful to the environment. The overall removal of BOD <sub>5</sub> from wastewater generated is a measure for the degree of wastewater treatment.



<i>Parameter</i>	<i>Description</i>
Policy context	<p>Wastewater treatment is a basic prerequisite for minimizing pressure on both surface and groundwaters in terms of freshwater pollution by discharged waters. As both groundwaters and surface waters are abstracted for the production of drinking water or even for direct use as drinking water (self-supply), the reduction of water pollution represents one of the basic preconditions for human health and the prevention of water related diseases.</p> <p>In the European Union the requirements for urban wastewater treatment are laid down in the EU Urban Wastewater Treatment Directive, and the need for achieving good water quality status in the EU Water Framework Directive.</p> <p>Sustainable Development Goal 6 (SDG 6) is about ensuring the availability and sustainability of water and sanitation for all by 2030. SDG Target 6.3 sets out to improve ambient water quality, which is essential to protecting both ecosystem and human health, by eliminating, minimizing and significantly reducing different streams of pollution into water bodies.</p>
Link with SDG indicators	6.3.1 Proportion of domestic and industrial wastewater flows safely treated (related indicator)
Methodology for indicator calculation	<p>BOD<sub>5</sub> is an analytical parameter representing the amount of dissolved oxygen (DO) consumed by aerobic bacteria growing on the organic material present in a water sample at a specific temperature over a specific time period. The BOD<sub>5</sub> value is expressed in milligrams of oxygen consumed per liter of sample during 5 days of incubation at 20 °C and is often used as a surrogate of the degree of organic water pollution.</p> <p>BOD<sub>5</sub> generated = sum of BOD<sub>5</sub> load generated by all economic activities and households</p> <p>BOD<sub>5</sub> removed = sum of BOD<sub>5</sub> load removed by all types of wastewater treatment (urban, independent and other)</p> <p>Percentage of BOD<sub>5</sub> removed before discharge into the environment  = 100 x BOD<sub>5</sub> removed / BOD<sub>5</sub> generated</p>
Comments	-

## B. Policy references

<i>Title of the reference document</i>	<i>Link</i>
Transforming our world: the 2030 Agenda for Sustainable Development	<a href="https://sdgs.un.org/2030agenda">https://sdgs.un.org/2030agenda</a>
Council Directive of 21 May 1991 concerning urban waste water treatment(91/271/EEC)	<a href="http://data.europa.eu/eli/dir/1991/271/2014-01-01">http://data.europa.eu/eli/dir/1991/271/2014-01-01</a>
Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy	<a href="https://ec.europa.eu/environment/water/water-framework/index_en.html">https://ec.europa.eu/environment/water/water-framework/index_en.html</a>

## C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
Council Directive of 21 May 1991 concerning urban waste water treatment(91/271/EEC)	<a href="http://data.europa.eu/eli/dir/1991/271/2014-01-01">http://data.europa.eu/eli/dir/1991/271/2014-01-01</a>
Data Collection Manual for the OECD/ Eurostat Joint Questionnaire on Inland Waters and Eurostat Regional Water Questionnaire, Version 4.1	<a href="https://ec.europa.eu/eurostat/documents/1798247/6664269/Data+Collection+Manual+for+the+OECD+Eurostat+Joint+Questionnaire+on+Inland+Waters+%28version+3.0%2C+2014%29.pdf/f5f60d49-e88c-4e3c-bc23-c1ec26a01b2a">https://ec.europa.eu/eurostat/documents/1798247/6664269/Data+Collection+Manual+for+the+OECD+Eurostat+Joint+Questionnaire+on+Inland+Waters+%28version+3.0%2C+2014%29.pdf/f5f60d49-e88c-4e3c-bc23-c1ec26a01b2a</a>

## D. Data and statistics needed to compile the indicator

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
368	Wastewater generated: Agriculture, forestry and fishing (ISIC 01-03) - BOD <sub>5</sub> load	3.2.1: Generation and pollutant content of wastewater
369	Wastewater generated: Mining and quarrying (ISIC 05-09) - BOD <sub>5</sub> load	3.2.1: Generation and pollutant content of wastewater
370	Wastewater generated: Manufacturing (ISIC 10-33) - BOD <sub>5</sub> load	3.2.1: Generation and pollutant content of wastewater
371	Wastewater generated: Electricity, gas, steam and air conditioning supply (ISIC 35) - BOD <sub>5</sub> load	3.2.1: Generation and pollutant content of wastewater
372	Wastewater generated: Construction (ISIC 41-43) - BOD <sub>5</sub> load	3.2.1: Generation and pollutant content of wastewater
373	Wastewater generated: Other economic activities - BOD <sub>5</sub> load	3.2.1: Generation and pollutant content of wastewater
374	Wastewater generated: Households - BOD <sub>5</sub> load	3.2.1: Generation and pollutant content of wastewater

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
375	Wastewater treated: UWWTPs with primary treatment - BOD <sub>5</sub> load removed	3.2.2: Collection and treatment of wastewater
376	Wastewater treated: UWWTPs with secondary treatment - BOD <sub>5</sub> load removed	3.2.2: Collection and treatment of wastewater
377	Wastewater treated: UWWTPs with tertiary treatment - BOD <sub>5</sub> load removed	3.2.2: Collection and treatment of wastewater
378	Wastewater treated: Other treatment plants with primary treatment - BOD <sub>5</sub> load removed	3.2.2: Collection and treatment of wastewater
379	Wastewater treated: Other treatment plants with secondary treatment - BOD <sub>5</sub> load removed	3.2.2: Collection and treatment of wastewater
380	Wastewater treated: Other treatment plants with tertiary treatment - BOD <sub>5</sub> load removed	3.2.2: Collection and treatment of wastewater
381	Wastewater treated: Independent treatment facilities with primary treatment only - BOD <sub>5</sub> load removed	3.2.2: Collection and treatment of wastewater
382	Wastewater treated: Independent treatment facilities with at least secondary treatment - BOD <sub>5</sub> load removed	3.2.2: Collection and treatment of wastewater

#### **E. International databases containing this indicator**

<i>Name of the database</i>	<i>Link</i>
n/a	n/a

## 6.54 INDICATOR C-16.1 SHARE OF TOTAL WASTEWATER DISCHARGED TO THE ENVIRONMENT AFTER TREATMENT

### A. General

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	C: Water
Component (FDES)	3: Residuals
Sub-component (FDES)	3.2: Generation and Management of Wastewater
Indicator topic (FDES)	3.2.3: Discharge of wastewater to the environment
ID and name in previous indicator guidelines	C16: Polluted (non-treated) wastewaters
First publication	19/12/2023
Latest update	-
Indicator definition	The indicator measures the share of wastewater discharged after treatment in relation with all wastewater generated
Unit of measure	%
Coverage	Wastewater generated by all economic activities and households
Spatial aggregation	National territory
Reference period	Calendar year
Update frequency	Annual
Purpose	This indicator tracks the proportion of wastewater flows from households, services and industrial economic activities that are discharged to the environment after treatment.
Policy context	Wastewater treatment is a basic prerequisite for minimizing pressure on both surface and groundwaters in terms of freshwater pollution by discharged waters. As both groundwaters and surface waters are abstracted for the production of drinking water or even for direct use as drinking water (self-supply), the reduction of water pollution represents one of the basic preconditions for human health and the prevention of water related diseases.

<i>Parameter</i>	<i>Description</i>
	<p>In the European Union the requirements for urban wastewater treatment are laid down in the EU Urban Wastewater Treatment Directive, and the need for achieving good water quality status in the EU Water Framework Directive.</p> <p>Sustainable Development Goal 6 (SDG 6) is about ensuring the availability and sustainability of water and sanitation for all by 2030. SDG Target 6.3 sets out to improve ambient water quality, which is essential to protecting both ecosystem and human health, by eliminating, minimizing and significantly reducing different streams of pollution into water bodies.</p>
Link with SDG indicators	6.3.1 Proportion of domestic and industrial wastewater flows safely treated (similar, but not identical)
Methodology for indicator calculation	<p>Total wastewater discharged to the environment after treatment = sum of all wastewater treated in wastewater treatment plants - wastewater re-used (e.g. for watering of urban green spaces)</p> <p>Total wastewater discharged to the environment without treatment = sum of wastewater generated (from all sectors) - (total wastewater discharged to the environment after treatment + wastewater reused after treatment)</p> <p>Total wastewater discharged = total wastewater discharged to the environment after treatment + total wastewater discharged to the environment without treatment</p> <p>Share of total wastewater discharged to the environment after treatment = <math>100 * \frac{\text{total wastewater discharged to the environment after treatment}}{\text{total wastewater discharged}}</math></p>

<i>Parameter</i>	<i>Description</i>
Comments	<p>Note that the indicator can get close to zero if a large proportion of the treated wastewater is re-used by other economic sectors (instead of being discharged to the environment). Therefore, it is recommended to calculate in addition the proportion of wastewater discharged to the environment without treatment, which is calculated as <math>100 * \text{total wastewater discharged to the environment without treatment} / \text{sum of wastewater generated (from all sectors)}</math></p> <p>Disaggregation by type of treatment and level of treatment is recommended.</p> <p>This indicator is very similar to SDG indicator 6.3.1 (C-16.2). The main difference is that considers any kind of treatment (also lower than secondary) as treated. It also takes into account wastewater which is re-used after treatment (and thus not discharged into the environment).</p>

## B. Policy references

<i>Title of the reference document</i>	<i>Link</i>
Transforming our world: the 2030 Agenda for Sustainable Development	<a href="https://sdgs.un.org/2030agenda">https://sdgs.un.org/2030agenda</a>
Council Directive of 21 May 1991 concerning urban waste water treatment(91/271/EEC)	<a href="http://data.europa.eu/eli/dir/1991/271/2014-01-01">http://data.europa.eu/eli/dir/1991/271/2014-01-01</a>
Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy	<a href="https://ec.europa.eu/environment/water/water-framework/index_en.html">https://ec.europa.eu/environment/water/water-framework/index_en.html</a>

## C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
International Recommendations for Water Statistics	<a href="https://seea.un.org/content/seea-water">https://seea.un.org/content/seea-water</a>
UNSD/United Nations Environment Programme Questionnaire 2022 on Environment Statistics - section "Water"	<a href="https://unstats.un.org/unsd/envstats/questionnaire">https://unstats.un.org/unsd/envstats/questionnaire</a>

#### D. Data and statistics needed to compile the indicator

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
316	Wastewater generated: Agriculture, forestry and fishing (ISIC 01-03)	3.2.1: Generation and pollutant content of wastewater
317	Wastewater generated: Mining and quarrying (ISIC 05-09)	3.2.1: Generation and pollutant content of wastewater
318	Wastewater generated: Manufacturing (ISIC 10-33)	3.2.1: Generation and pollutant content of wastewater
319	Wastewater generated: Electricity, gas, steam and air conditioning supply (ISIC 35)	3.2.1: Generation and pollutant content of wastewater
320	Wastewater generated: Construction (ISIC 41-43)	3.2.1: Generation and pollutant content of wastewater
321	Wastewater generated: Other economic activities	3.2.1: Generation and pollutant content of wastewater
322	Wastewater generated: Households	3.2.1: Generation and pollutant content of wastewater
323	Wastewater treated: UWWTPs with primary treatment	3.2.2: Collection and treatment of wastewater
324	Wastewater treated: UWWTPs with secondary treatment	3.2.2: Collection and treatment of wastewater
325	Wastewater treated: UWWTPs with tertiary treatment	3.2.2: Collection and treatment of wastewater
326	Wastewater treated: Other treatment plants with primary treatment	3.2.2: Collection and treatment of wastewater
327	Wastewater treated: Other treatment plants with secondary treatment	3.2.2: Collection and treatment of wastewater
328	Wastewater treated: Other treatment plants with tertiary treatment	3.2.2: Collection and treatment of wastewater
329	Wastewater treated: Independent treatment facilities with at least secondary treatment	3.2.2: Collection and treatment of wastewater
360	Wastewater treated: Independent treatment facilities with primary treatment only	3.2.2: Collection and treatment of wastewater
180	Wastewater re-used after treatment	2.6.2: Abstraction, use and returns of water

#### E. International databases containing this indicator

<i>Name of the database</i>	<i>Link</i>
n/a	n/a

## 6.55 INDICATOR I-1.2 TOTAL WASTE GENERATION

### A. General

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	I: Waste
Component (FDES)	3: Residuals
Sub-component (FDES)	3.3: Generation and Management of Waste
Indicator topic (FDES)	3.3.1: Generation of waste
ID and name in previous indicator guidelines	I1: Waste generation
First publication	08/10/2019
Latest update	28/11/2023
Indicator definition	The total amount of waste generated by all production and consumption activities in a country per year.
Unit of measure	kg/capita
Coverage	All consumption and production activities
Spatial aggregation	National territory
Reference period	Calendar year
Update frequency	Annual
Purpose	The main purpose is to provide a measure of the pressure on the environment of the total amount of generated waste and waste by category (by economic activity and households).
Policy context	Sound and efficient use of natural resources is an important part of sustainable development. Waste represents a considerable loss of resources in the form of materials and energy. The treatment and disposal of the generated waste may cause environmental pollution and expose humans to harmful substances and infectious organisms. Waste generation is closely linked to the level of economic activity in a country and reflects society's production and consumption patterns. Implementation of a circular economy strategy may result in lower generation of households waste per capita.



<i>Parameter</i>	<i>Description</i>
Link with SDG indicators	Even if this is not a SDG indicator, it is closely related to the measuring of the following SDG targets: SDG target 12.2.: By 2030, achieve the sustainable management and efficient use of natural resources. SDGs target 12.5 By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse. SDG target 12.5: By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse
Methodology for indicator calculation	-
Comments	The sum of the waste generated by economic activities and by households.
	-

## B. Policy references

<i>Title of the reference document</i>	<i>Link</i>
Transforming our world: the 2030 Agenda for Sustainable Development	<a href="https://sdgs.un.org/2030agenda">https://sdgs.un.org/2030agenda</a>
Green Economy Transition in Eastern Europe, the Caucasus and Central Asia: Progress and ways forward	<a href="https://unece.org/sites/default/files/2022-09/ece.nicosia.conf_.2022_inf_8.pdf">https://unece.org/sites/default/files/2022-09/ece.nicosia.conf_.2022_inf_8.pdf</a>
Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives	<a href="http://data.europa.eu/eli/dir/2008/98/2018-07-05">http://data.europa.eu/eli/dir/2008/98/2018-07-05</a>

## C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
Conference of European Statisticians Framework on Waste Statistics	<a href="https://unece.org/statistics/publications/conference-european-statisticians-framework-waste-statistics">https://unece.org/statistics/publications/conference-european-statisticians-framework-waste-statistics</a>
UNSD/United Nations Environment Programme Questionnaire 2022 on Environment Statistics - section "Waste"	<a href="https://unstats.un.org/unsd/envstats/questionnaire">https://unstats.un.org/unsd/envstats/questionnaire</a>

**D. Data and statistics needed to compile the indicator**

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
128	Waste generation: Agriculture, forestry and fishing (ISIC 01-03)	3.3.1: Generation of waste
129	Waste generation: Mining and quarrying (ISIC 05-09)	3.3.1: Generation of waste
130	Waste generation: Electricity, gas, steam and air conditioning supply (ISIC 35)	3.3.1: Generation of waste
131	Waste generation: Construction (ISIC 41 - 43)	3.3.1: Generation of waste
132	Waste generation: Other economic activities excluding ISIC 38	3.3.1: Generation of waste
133	Waste generation: Households	3.3.1: Generation of waste

**E. International databases containing this indicator**

<i>Name of the database</i>	<i>Link</i>
Eurostat database	<a href="https://ec.europa.eu/eurostat/data/database">https://ec.europa.eu/eurostat/data/database</a>

**6.56 INDICATOR I-1.1 MUNICIPAL WASTE GENERATED BY CAPITA****A. General**

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	I: Waste
Component (FDES)	3: Residuals
Sub-component (FDES)	3.3: Generation and Management of Waste
Indicator topic (FDES)	3.3.1: Generation of waste
ID and name in previous indicator guidelines	I1: Waste generation
First publication	08/10/2019
Latest update	28/11/2023
Indicator definition	The amount of municipal waste generated per capita per year
Unit of measure	kg/capita
Coverage	Municipal waste
Spatial aggregation	National territory
Reference period	Calendar year

<i>Parameter</i>	<i>Description</i>
Update frequency	Annual
Purpose	Municipal waste generation represents a driving force indicator. A declining trend could be interpreted as the result of measures to reduce waste generation (e.g. by repair or re-use of products that would be otherwise discarded).
Policy context	<p>Sound and efficient use of natural resources is an important part of sustainable development. Waste represents a considerable loss of resources in the form of materials and energy. The treatment and disposal of the generated waste may cause environmental pollution and expose humans to harmful substances and infectious organisms. Waste generation is closely linked to the level of economic activity in a country and reflects society's production and consumption patterns. Implementation of a circular economy strategy may result in lower generation of municipal waste per capita.</p> <p>Even if this is not a SDG indicator, it is closely related to the measuring of the following SDG targets:</p> <p>SDG target 12.2.: By 2030, achieve the sustainable management and efficient use of natural resources.</p> <p>SDGs target 12.5 By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse.</p> <p>SDG target 12.5: By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse</p>
Link with SDG indicators	-
Methodology for indicator calculation	Total municipal waste generated divided by the population of the country

<i>Parameter</i>	<i>Description</i>
	Municipal waste, collected by or on behalf of municipalities, by public or private enterprises, 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., white goods, 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. The definition excludes waste from municipal sewage network and treatment, municipal construction and demolition waste. (Definition used by UNSD (2022) and in the CES Waste Statistics Framework).
Comments	-

## B. Policy references

<i>Title of the reference document</i>	<i>Link</i>
Transforming our world: the 2030 Agenda for Sustainable Development	<a href="https://sdgs.un.org/2030agenda">https://sdgs.un.org/2030agenda</a>
Green Economy Transition in Eastern Europe, the Caucasus and Central Asia: Progress and ways forward	<a href="https://unece.org/sites/default/files/2022-09/ece.nicosia.conf_.2022.inf_8.pdf">https://unece.org/sites/default/files/2022-09/ece.nicosia.conf_.2022.inf_8.pdf</a>
Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives	<a href="http://data.europa.eu/eli/dir/2008/98/2018-07-05">http://data.europa.eu/eli/dir/2008/98/2018-07-05</a>

## C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
Conference of European Statisticians Framework on Waste Statistics	<a href="https://unece.org/statistics/publications/conference-european-statisticians-framework-waste-statistics">https://unece.org/statistics/publications/conference-european-statisticians-framework-waste-statistics</a>
UNSD/United Nations Environment Programme Questionnaire 2022 on Environment Statistics - section "Waste"	<a href="https://unstats.un.org/unsd/envstats/questionnaire">https://unstats.un.org/unsd/envstats/questionnaire</a>

**D. Data and statistics needed to compile the indicator**

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
127	Resident population	5.1.1: Urban and rural population
144	Municipal waste generated	3.3.1: Generation of waste

**E. International databases containing this indicator**

<i>Name of the database</i>	<i>Link</i>
Eurostat database	<a href="https://ec.europa.eu/eurostat/data/database">https://ec.europa.eu/eurostat/data/database</a>

**6.57 INDICATOR I-1.3 WASTE GENERATION INTENSITY PER UNIT OF GDP****A. General**

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	I: Waste
Component (FDES)	3: Residuals
Sub-component (FDES)	3.3: Generation and Management of Waste
Indicator topic (FDES)	3.3.1: Generation of waste
ID and name in previous indicator guidelines	I1: Waste generation
First publication	08/10/2019
Latest update	-
Indicator definition	The indicator measures the waste generation intensity of all economic activities per unit of GDP
Unit of measure	kg/1000 international dollars
Coverage	All economic activities
Spatial aggregation	National territory
Reference period	Calendar year
Update frequency	Annual

<i>Parameter</i>	<i>Description</i>
Purpose	The main purpose is to provide a measure of the pressure on the environment of the total amount of generated waste and waste by category (by economic activity and households). The waste generation intensity represents a driving force indicator and shows response to anthropogenic activities. Waste generated per unit of GDP will show whether there has been any decoupling of waste generation from economic growth of the country.
Policy context	<p>Sound and efficient use of natural resources is an important part of sustainable development. Waste represents a considerable loss of resources in the form of materials and energy. The treatment and disposal of the generated waste may cause environmental pollution and expose humans to harmful substances and infectious organisms. Waste generation is closely linked to the level of economic activity in a country and reflects society's production and consumption patterns. Implementation of a circular economy strategy may result in lower generation of waste per GDP.</p> <p>Even if this is not a SDG indicator, it is closely related to the measuring of the following SDG targets:</p> <ul style="list-style-type: none"> <li>• SDG target 12.2.: By 2030, achieve the sustainable management and efficient use of natural resources.</li> <li>• SDGs target 12.5 By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse.</li> <li>• SDG target 12.5: By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse</li> </ul>
Link with SDG indicators	-
Methodology for indicator calculation	The sum of the waste generated by economic activities and by households divided by GDP at PPP at constant prices
Comments	-

## B. Policy references

<i>Title of the reference document</i>	<i>Link</i>
Transforming our world: the 2030 Agenda for Sustainable Development	<a href="https://sdgs.un.org/2030agenda">https://sdgs.un.org/2030agenda</a>
Green Economy Transition in Eastern Europe, the Caucasus and Central Asia: Progress and ways forward	<a href="https://unece.org/sites/default/files/2022-09/ece.nicosia.conf_.2022_inf_.8.pdf">https://unece.org/sites/default/files/2022-09/ece.nicosia.conf_.2022_inf_.8.pdf</a>
Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives	<a href="http://data.europa.eu/eli/dir/2008/98/2018-07-05">http://data.europa.eu/eli/dir/2008/98/2018-07-05</a>

## C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
Conference of European Statisticians Framework on Waste Statistics	<a href="https://unece.org/statistics/publications/conference-european-statisticians-framework-waste-statistics">https://unece.org/statistics/publications/conference-european-statisticians-framework-waste-statistics</a>
UNSD/United Nations Environment Programme Questionnaire 2022 on Environment Statistics - section "Waste"	<a href="https://unstats.un.org/unsd/envstats/questionnaire">https://unstats.un.org/unsd/envstats/questionnaire</a>

## D. Data and statistics needed to compile the indicator

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
55	GDP at constant prices	
128	Waste generation: Agriculture, forestry and fishing (ISIC 01-03)	3.3.1: Generation of waste
129	Waste generation: Mining and quarrying (ISIC 05-09)	3.3.1: Generation of waste
130	Waste generation: Electricity, gas, steam and air conditioning supply (ISIC 35)	3.3.1: Generation of waste
131	Waste generation: Construction (ISIC 41-43)	3.3.1: Generation of waste
132	Waste generation: Other economic activities excluding ISIC 38	3.3.1: Generation of waste

## E. International databases containing this indicator

<i>Name of the database</i>	<i>Link</i>
n/a	n/a

## 6.58 INDICATOR I-2.1 HAZARDOUS WASTE GENERATED PER CAPITA (SDG INDICATOR 12.4.2)

### A. General

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	I: Waste
Component (FDES)	3: Residuals
Sub-component (FDES)	3.3: Generation and Management of Waste
Indicator topic (FDES)	3.3.1: Generation of waste
ID and name in previous indicator guidelines	I2: Management of hazardous waste
First publication	08/10/2019
Latest update	28/11/2023
Indicator definition	The amount of hazardous waste generated per capita per year
Unit of measure	kg/capita
Coverage	All economic activities and households
Spatial aggregation	National territory
Reference period	Calendar year
Update frequency	Annual
Purpose	Generation of hazardous waste represents a driving force indicator. Trends in a country's generation, import and export of hazardous waste, as well as its treatment, show its response to the need to minimize the generation of hazardous waste and to recycle it domestically.
Policy context	The uncontrolled transboundary movement and dumping of this waste can cause severe health problems and can poison water and land for decades. Recycling of hazardous waste within a country reduces the need for its transboundary movement and prevents risks to human health and the environment. In some instances transboundary movement is required for environmentally sound waste recovery and disposal. Transboundary hazardous waste movement may also be justified when waste is going to be used as a secondary raw material or for energy generation.



<i>Parameter</i>	<i>Description</i>
Link with SDG indicators	SDG target 12.4: By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment; SDG target 12.5: By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse.  12.4.2 Hazardous waste generated per capita and proportion of hazardous waste treated, by type of treatment
Methodology for indicator calculation	The total amount of hazardous waste generated in a country divided by the number of resident population.  Hazardous waste refers to the categories of waste to be controlled according to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (Article 1 and Annexes I and III).
Comments	Includes breakdown of hazardous waste generated by key type of waste, including e-waste.

## **B. Policy references**

<i>Title of the reference document</i>	<i>Link</i>
Transforming our world: the 2030 Agenda for Sustainable Development	<a href="https://sdgs.un.org/2030agenda">https://sdgs.un.org/2030agenda</a>
Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal	<a href="http://www.basel.int/default.aspx">http://www.basel.int/default.aspx</a>
Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives	<a href="http://data.europa.eu/eli/dir/2008/98/2018-07-05">http://data.europa.eu/eli/dir/2008/98/2018-07-05</a>

### C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
Conference of European Statisticians Framework on Waste Statistics	<a href="https://unece.org/statistics/publications/conference-european-statisticians-framework-waste-statistics">https://unece.org/statistics/publications/conference-european-statisticians-framework-waste-statistics</a>
Metadata of SDG indicator 12.4.2: (a) Hazardous waste generated per capita; and (b) proportion of hazardous waste treated, by type of treatment	<a href="https://unstats.un.org/sdgs/metadata/">https://unstats.un.org/sdgs/metadata/</a>
UNSD/United Nations Environment Programme Questionnaire 2022 on Environment Statistics - section "Waste"	<a href="https://unstats.un.org/unsd/envstats/questionnaire">https://unstats.un.org/unsd/envstats/questionnaire</a>
Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal	<a href="http://www.basel.int/default.aspx">http://www.basel.int/default.aspx</a>

### D. Data and statistics needed to compile the indicator

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
127	Resident population	5.1.1: Urban and rural population
136	Hazardous waste: Generated during the year	3.3.1: Generation of waste

### E. International databases containing this indicator

<i>Name of the database</i>	<i>Link</i>
SDG Indicators Database	<a href="https://unstats.un.org/sdgs/dataportal/database">https://unstats.un.org/sdgs/dataportal/database</a>

## 6.59 INDICATOR I-3.2 NATIONAL RECYCLING RATE, TONS OF MATERIAL RECYCLED (SDG INDICATOR 12.5.1)

### A. General

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	I: Waste
Component (FDES)	3: Residuals
Sub-component (FDES)	3.3: Generation and Management of Waste
Indicator topic (FDES)	3.3.1: Generation of waste
ID and name in previous indicator guidelines	I3: Waste reuse and recycling
First publication	29/11/2023
Latest update	-
Indicator definition	National Recycling Rate is defined as the quantity of material recycled in the country plus quantities exported for recycling minus material imported intended for recycling out of total waste generated in the country
Unit of measure	%
Coverage	Waste from all economic activities (excluding ISIC 38), including municipal waste
Spatial aggregation	National territory
Reference period	Calendar year
Update frequency	Annual
Purpose	The national recycling rate is an important indicator for measuring progress towards sustainable consumption and production.

<i>Parameter</i>	<i>Description</i>
Policy context	<p>Minimizing waste generation and maximizing the recycling of waste is central to the concept of circular economy. However, currently, the total amount of produced materials that are recycled are estimated to be low (based on academic literature). If countries better understand how waste are generated, collected and recycled, this will enable countries and other stakeholders to better determine how to deal with major waste streams, for example e-waste or plastic.</p> <p>SDG Goal 12. Ensure sustainable consumption and production patterns: Target 12.5: By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse.</p>
Link with SDG indicators	12.5.1 National recycling rate, tons of material recycled
Methodology for indicator calculation	<p>National Recycling Rate is defined as the quantity of material recycled in the country plus quantities exported for recycling minus material imported intended for recycling out of total waste generated in the country. Note that recycling includes codigestion/anaerobic digestion and composting/aerobic process, but not controlled combustion (incineration) or land application.</p> <p>National recycling rate can be presented by type of waste, including e-waste, plastic waste, municipal waste, and others.</p> <p>Recycling rate = ((material recycled + material exported intended for recycling - material imported intended for recycling) x 100) / Total waste generated</p>
Comments	It is proposed that recycling rate is disaggregated by type of waste, including e-waste and other waste types (such as packaging waste and metals). For the disaggregation by waste stream, the formula will be the same but particular waste types will be evaluated.

## B. Policy references

<i>Title of the reference document</i>	<i>Link</i>
Transforming our world: the 2030 Agenda for Sustainable Development	<a href="https://sdgs.un.org/2030agenda">https://sdgs.un.org/2030agenda</a>
Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: A new Circular Economy Action Plan For a cleaner and more competitive Europe	<a href="https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52020DC0098">https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52020DC0098</a>
Green Economy Transition in Eastern Europe, the Caucasus and Central Asia: Progress and ways forward	<a href="https://unece.org/sites/default/files/2022-09/ece.nicosia.conf_.2022.inf_8.pdf">https://unece.org/sites/default/files/2022-09/ece.nicosia.conf_.2022.inf_8.pdf</a>

## C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
Conference of European Statisticians Framework on Waste Statistics	<a href="https://unece.org/statistics/publications/conference-european-statisticians-framework-waste-statistics">https://unece.org/statistics/publications/conference-european-statisticians-framework-waste-statistics</a>
Metadata of SDG indicator 12.5.1: National recycling rate, tons of material recycled	<a href="https://unstats.un.org/sdgs/metadata/">https://unstats.un.org/sdgs/metadata/</a>

## D. Data and statistics needed to compile the indicator

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
309	Material recycled	3.3.2: Management of waste
310	Material exported intended for recycling	3.3.2: Management of waste
311	Material imported intended for recycling	3.3.2: Management of waste
134	Total waste generation	3.3.1: Generation of waste

## E. International databases containing this indicator

<i>Name of the database</i>	<i>Link</i>
SDG Indicators Database	<a href="https://unstats.un.org/sdgs/dataportal/database">https://unstats.un.org/sdgs/dataportal/database</a>

## 6.60 INDICATOR I-2.2 PROPORTION OF HAZARDOUS WASTE TREATED, BY TYPE OF TREATMENT (SDG INDICATOR 12.4.2)

### A. General

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	I: Waste
Component (FDES)	3: Residuals
Sub-component (FDES)	3.3: Generation and Management of Waste
Indicator topic (FDES)	3.3.1: Generation of waste
ID and name in previous indicator guidelines	I2: Management of hazardous waste
First publication	29/11/2023
Latest update	-
Indicator definition	The percentage of hazardous waste treated by type of treatment
Unit of measure	%
Coverage	All economic activities and households
Spatial aggregation	National territory
Reference period	Calendar year
Update frequency	Annual
Purpose	The management of hazardous waste represents a driving force indicator. Trends in a country's generation, import and export of hazardous waste, as well as its treatment, show its response to the need to minimize the generation of hazardous waste and to recycle it domestically.
Policy context	The uncontrolled transboundary movement and dumping of this waste can cause severe health problems and can poison water and land for decades. Recycling of hazardous waste within a country reduces the need for its transboundary movement and prevents risks to human health and the environment. In some instances transboundary movement is required for environmentally sound waste recovery and disposal. Transboundary hazardous waste movement may also be justified when waste is going to be used as a secondary raw material or for energy generation.

<i>Parameter</i>	<i>Description</i>
	SDG target 12.4: By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment; SDG target 12.5: By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse.
Link with SDG indicators	12.4.2 Hazardous waste generated per capita and proportion of hazardous waste treated, by type of treatment
Methodology for indicator calculation	<p>The total quantity of hazardous waste treated during the reported year in the reporting country is calculated by adding quantities of hazardous waste treated, per type of treatment (recycling, incineration with/without energy recovery, landfilling or other), including exports and excluding imports. This matches with the definition of recycling in SDG indicator 12.5.1.</p> <p>Proportion of hazardous waste treated (%) = <math>\frac{\text{Quantity of hazardous waste treated during the reporting year} \times 100}{\text{Total quantity of hazardous waste generated during the reporting year}}</math></p> <p>Quantity of hazardous waste treated during the reporting year = Hazardous waste treated in the country plus materials exported for treatment minus the materials imported for treatment</p> <p>Hazardous waste refers to the categories of waste to be controlled according to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (Article 1 and Annexes I and III).</p>
Comments	Includes breakdown of hazardous waste generated by key type of waste, including e-waste.

## B. Policy references

<i>Title of the reference document</i>	<i>Link</i>
Transforming our world: the 2030 Agenda for Sustainable Development	<a href="https://sdgs.un.org/2030agenda">https://sdgs.un.org/2030agenda</a>
Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal	<a href="http://www.basel.int/default.aspx">http://www.basel.int/default.aspx</a>
Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives	<a href="http://data.europa.eu/eli/dir/2008/98/2018-07-05">http://data.europa.eu/eli/dir/2008/98/2018-07-05</a>

## C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
Conference of European Statisticians Framework on Waste Statistics	<a href="https://unece.org/statistics/publications/conference-european-statisticians-framework-waste-statistics">https://unece.org/statistics/publications/conference-european-statisticians-framework-waste-statistics</a>
Metadata of SDG indicator 12.4.2: (a) Hazardous waste generated per capita; and (b) proportion of hazardous waste treated, by type of treatment	<a href="https://unstats.un.org/sdgs/metadata/">https://unstats.un.org/sdgs/metadata/</a>
UNSD/United Nations Environment Programme Questionnaire 2022 on Environment Statistics - section "Waste"	<a href="https://unstats.un.org/unsd/envstats/questionnaire">https://unstats.un.org/unsd/envstats/questionnaire</a>
Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal	<a href="http://www.basel.int/default.aspx">http://www.basel.int/default.aspx</a>

## D. Data and statistics needed to compile the indicator

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
136	Hazardous waste: Generated during the year	3.3.1: Generation of waste
140	Hazardous waste: Total amount treated or disposed during the year - of which recycled	3.3.2: Management of waste
141	Hazardous waste: Total amount treated or disposed during the year - of which incinerated	3.3.2: Management of waste



<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
142	Hazardous waste: Total amount treated or disposed during the year - of which landfilled	3.3.2: Management of waste
143	Hazardous waste: Total amount treated or disposed during the year - of which other disposal	3.3.2: Management of waste

#### **E. International databases containing this indicator**

<i>Name of the database</i>	<i>Link</i>
SDG Indicators Database	<a href="https://unstats.un.org/sdgs/dataportal/database">https://unstats.un.org/sdgs/dataportal/database</a>

### **6.61 INDICATOR F-2.1 CONSUMPTION OF MINERAL FERTILIZERS PER UNIT OF AGRICULTURAL AREA**

#### **A. General**

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	F: Agriculture
Component (FDES)	3: Residuals
Sub-component (FDES)	3.4: Release of Chemical Substances
Indicator topic (FDES)	3.4.1: Release of chemical substances
ID and name in previous indicator guidelines	F2: Fertilizer consumption
First publication	18/12/2023
Latest update	-
Indicator definition	The indicator measures consumption of mineral fertilizers per unit of agricultural area.
Unit of measure	kg N, P2O5 and K2O / hectare
Coverage	Mineral fertilizers, agricultural area
Spatial aggregation	National territory
Reference period	Calendar year
Update frequency	Annual

<i>Parameter</i>	<i>Description</i>
Purpose	The indicator makes it possible to assess the pressure on the environment arising through the use of fertilizers: the accumulation of nutrients in the soil, the resulting pollution of surface and groundwater, and the movement of nutrients through trophic chains and other parts of the environment.
Policy context	<p>The use of mineral and organic fertilizers in agriculture to increase the efficiency of cropping increases environmental hazards, such as water and soil pollution, and has negative effects on other environmental components, interfering with the natural balance of soil microflora. High levels of nitrate and nitrite in drinking water are a hazard to human health. The actual environmental effects depend on pollution abatement methods, soil and plant types, and meteorological conditions.</p> <p>The European Union (EU) Directive 91/676/EEC on water pollution by nitrates establishes requirements covering the use of nitrogen in fertilizers; the placing on the market of fertilizers is regulated by Regulation (EU) 2019/1009.</p> <p>The European Common Agricultural Policy (CAP), is the European Union agricultural policy, established under Article 33 of the Treaty establishing the European Community. The CAP is aimed at helping European farmers meet the need to feed more than 500 million Europeans. Its main objectives are to provide a stable, sustainably produced supply of safe food at affordable prices for consumers, while also ensuring a decent standard of living for 22 million farmers and agricultural workers. The CAP 2023-2027 has 10 key objectives. Objective "efficient natural resource management" fosters sustainable development and efficient management of natural resources such as water, soil and air, including by reducing chemical dependency.</p>
Link with SDG indicators	-

<i>Parameter</i>	<i>Description</i>
Methodology for indicator calculation	To produce this indicator it is necessary to collect data on mineral fertilizer use or, if such are not available, on fertilizer sales as well as fertilizers' basic characteristics. The indicator is assessed annually. Data on the quantities of fertilizers used or sold to the final consumer are converted into the three basic nutrient components Nitrogen (N), phosphate (P2O5), and potash (K2O) and aggregated.  Consumption of mineral fertilizers per unit of agricultural area = Total consumption of mineral fertilizers (expressed as total nitrogen, P2O5 and K2O) / agricultural area
Comments	-

## B. Policy references

<i>Title of the reference document</i>	<i>Link</i>
Council Directive of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources (91/676/EEC)	<a href="http://data.europa.eu/eli/dir/1991/676/2008-12-11">http://data.europa.eu/eli/dir/1991/676/2008-12-11</a>
Regulation (EU) 2019/1009 of the European Parliament and of the Council of 5 June 2019 laying down rules on the making available on the market of EU fertilising products and amending Regulations (EC) No 1069/2009 and (EC) No 1107/2	<a href="http://data.europa.eu/eli/reg/2019/1009/oj">http://data.europa.eu/eli/reg/2019/1009/oj</a>
EU Common Agricultural Policy 2023-2027	<a href="https://agriculture.ec.europa.eu/common-agricultural-policy_en">https://agriculture.ec.europa.eu/common-agricultural-policy_en</a>

## C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
Regulation (EU) 2019/1009 of the European Parliament and of the Council of 5 June 2019 laying down rules on the making available on the market of EU fertilising products and amending Regulations (EC) No 1069/2009 and (EC) No 1107/2	<a href="http://data.europa.eu/eli/reg/2019/1009/oj">http://data.europa.eu/eli/reg/2019/1009/oj</a>
Eurostat metadata "Consumption of inorganic fertilizers (aei_fm_usefert)"	<a href="https://ec.europa.eu/eurostat/cache/metadata/en/aei_fm_usefert_esms.htm">https://ec.europa.eu/eurostat/cache/metadata/en/aei_fm_usefert_esms.htm</a>

**D. Data and statistics needed to compile the indicator**

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
355	Fertilizer consumption: Nitrogen	3.4.1: Release of chemical substances
356	Fertilizer consumption: Phosphorus	3.4.1: Release of chemical substances
357	Fertilizer consumption: Potassium	3.4.1: Release of chemical substances
358	Agricultural area	2.3.1: Land use

**E. International databases containing this indicator**

<i>Name of the database</i>	<i>Link</i>
Eurostat database	<a href="https://ec.europa.eu/eurostat/data/database">https://ec.europa.eu/eurostat/data/database</a>

**6.62 INDICATOR F-2.3 CONSUMPTION OF ORGANIC FERTILIZERS PER UNIT OF AGRICULTURAL AREA****A. General**

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	F: Agriculture
Component (FDES)	3: Residuals
Sub-component (FDES)	3.4: Release of Chemical Substances
Indicator topic (FDES)	3.4.1: Release of chemical substances
ID and name in previous indicator guidelines	F2: Fertilizer consumption
First publication	18/12/2023
Latest update	-
Indicator definition	The indicator measures consumption of organic fertilizers per unit of agricultural area.
Unit of measure	kg/hectare
Coverage	Organic fertilizers, agricultural area
Spatial aggregation	National territory
Reference period	Calendar year
Update frequency	Annual
Purpose	The indicator makes it possible to assess the pressure on the environment arising through the use of fertilizers: the accumulation of nutrients in the soil, the resulting pollution of surface and groundwater, and the movement of nutrients through trophic chains and other parts of the environment.

<i>Parameter</i>	<i>Description</i>
Policy context	<p>The use of mineral and organic fertilizers in agriculture to increase the efficiency of cropping increases environmental hazards, such as water and soil pollution, and has negative effects on other environmental components, interfering with the natural balance of soil microflora. High levels of nitrate and nitrite in drinking water are a hazard to human health. The actual environmental effects depend on pollution abatement methods, soil and plant types, and meteorological conditions.</p> <p>The European Union (EU) Directive 91/676/EEC on water pollution by nitrates establishes requirements covering the use of nitrogen in fertilizers; the placing on the market of fertilizers is regulated by Regulation (EU) 2019/1009.</p> <p>The European Common Agricultural Policy (CAP), is the European Union agricultural policy, established under Article 33 of the Treaty establishing the European Community. The CAP is aimed at helping European farmers meet the need to feed more than 500 million Europeans. Its main objectives are to provide a stable, sustainably produced supply of safe food at affordable prices for consumers, while also ensuring a decent standard of living for 22 million farmers and agricultural workers. The CAP 2023-2027 has 10 key objectives. Objective “efficient natural resource management” fosters sustainable development and efficient management of natural resources such as water, soil and air, including by reducing chemical dependency.</p>
Link with SDG indicators	-
Methodology for indicator calculation	Total consumption of organic fertilizers / agricultural area
Comments	-

**B. Policy references**

<i>Title of the reference document</i>	<i>Link</i>
Council Directive of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources (91/676/EEC)	<a href="http://data.europa.eu/eli/dir/1991/676/2008-12-11">http://data.europa.eu/eli/dir/1991/676/2008-12-11</a>
Regulation (EU) 2019/1009 of the European Parliament and of the Council of 5 June 2019 laying down rules on the making available on the market of EU fertilising products and amending Regulations (EC) No 1069/2009 and (EC) No 1107/2	<a href="http://data.europa.eu/eli/reg/2019/1009/oj">http://data.europa.eu/eli/reg/2019/1009/oj</a>
EU Common Agricultural Policy 2023-2027	<a href="https://agriculture.ec.europa.eu/common-agricultural-policy_en">https://agriculture.ec.europa.eu/common-agricultural-policy_en</a>

**C. Methodology references**

<i>Title of the reference document</i>	<i>Link</i>
Regulation (EU) 2019/1009 of the European Parliament and of the Council of 5 June 2019 laying down rules on the making available on the market of EU fertilising products and amending Regulations (EC) No 1069/2009 and (EC) No 1107/2	<a href="http://data.europa.eu/eli/reg/2019/1009/oj">http://data.europa.eu/eli/reg/2019/1009/oj</a>

**D. Data and statistics needed to compile the indicator**

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
359	Fertilizer consumption: Organic fertilizers	3.4.1: Release of chemical substances
358	Agricultural area	2.3.1: Land use

**E. International databases containing this indicator**

<i>Name of the database</i>	<i>Link</i>
n/a	n/a

## 6.63 INDICATOR K-1.6 DIRECT ECONOMIC LOSS ATTRIBUTED TO DISASTERS IN RELATION TO GDP (SDG INDICATOR 1.5.2/11.5.2, SENDAI FRAMEWORK INDICATOR C-1)

### A. General

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	n/a
Component (FDES)	4: Extreme events and disasters
Sub-component (FDES)	4.1: Natural Extreme Events and Disasters
Indicator topic (FDES)	4.1.2: Impact of natural extreme events and disasters
ID and name in previous indicator guidelines	n/a
First publication	12/12/2023
Latest update	-
Indicator definition	This indicator measures the ratio of direct economic loss attributed to disasters in relation to GDP.
Unit of measure	%
Coverage	Direct economic losses related to agriculture, productive assets, housing sector, critical infrastructure and cultural heritage
Spatial aggregation	National territory
Reference period	Calendar year
Update frequency	Annual
Purpose	<p>The indicator is a measure of the direct economic loss caused by all kind of disasters in a given year.</p> <p>Important concepts:</p> <p>Economic Loss: Total economic impact that consists of direct economic loss and indirect economic loss.</p> <p>Direct economic loss: the monetary value of total or partial destruction of physical assets existing in the affected area. Direct economic loss is nearly equivalent to physical damage.</p> <p>Indirect economic loss: a decline in economic value added as a consequence of direct economic loss and/or human and environmental impacts.</p>

<i>Parameter</i>	<i>Description</i>
Policy context	<p>The Sendai Framework for Disaster Risk Reduction 2015-2030 was adopted by UN Member States in March 2015 as a global policy of disaster risk reduction. Among the global targets, "Target C: Reduce direct disaster economic loss in relation to global gross domestic product (GDP) by 2030" will contribute to sustainable development and strengthen economic, social, health and environmental resilience. The economic, environmental and social perspectives would include poverty eradication, urban resilience, and climate change adaptation.</p> <p>SDG target 1.5: By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters.</p> <p>SDG target 11.5: By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations.</p>
Link with SDG indicators	1.5.2 Direct economic loss attributed to disasters in relation to global gross domestic product (GDP)
Methodology for indicator calculation	$X=(C2+C3+C4+C5+C6)/GDP$ <p>Where:</p> <p>C2 Direct agricultural loss attributed to disasters;</p> <p>C3 Direct economic loss to all other damaged or destroyed productive assets attributed to disasters;</p> <p>C4 Direct economic loss in the housing sector attributed to disasters;</p> <p>C5 Direct economic loss resulting from damaged or destroyed critical infrastructure attributed to disasters;</p> <p>C6 Direct economic loss to cultural heritage damaged or destroyed attributed to disasters.</p>



<i>Parameter</i>	<i>Description</i>
Comments	<p>An important challenge to take into account is the methodology for adding price adjustment (i.e. PPP). Possibilities are:</p> <p>Option 1: Proportion of loss to GDP allows an estimate of the possible impact of disaster loss on the global economy. Therefore, the nominal loss and GDP value is recommended to monitor progress.</p> <p>Option 2: Countries may also want to monitor trends of direct economic loss. In which case, UNDRR suggests comparing inflation-adjusted loss and GDP values by dividing nominal value by GDP deflator.</p> <p>Disaggregation of the indicator (also in absolute monetary terms) for its sub-elements (Sendai-Framework sub-indicators) is recommended:</p> <p>C2 Direct agricultural loss attributed to disasters;</p> <p>C3 Direct economic loss to all other damaged or destroyed productive assets attributed to disasters;</p> <p>C4 Direct economic loss in the housing sector attributed to disasters;</p> <p>C5 Direct economic loss resulting from damaged or destroyed critical infrastructure attributed to disasters;</p> <p>C6 Direct economic loss to cultural heritage damaged or destroyed attributed to disasters.</p> <p>Further disaggregation by type of hazard and administrative unit is recommended.</p>

## **B. Policy references**

<i>Title of the reference document</i>	<i>Link</i>
Transforming our world: the 2030 Agenda for Sustainable Development	<a href="https://sdgs.un.org/2030agenda">https://sdgs.un.org/2030agenda</a>
Sendai Framework for Disaster Risk Reduction 2015-2030	<a href="https://www.unisdr.org/we/inform/publications/43291">https://www.unisdr.org/we/inform/publications/43291</a>

### C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
Technical Guidance for Monitoring and Reporting on Progress in Achieving the Global Targets of the Sendai Framework for Disaster Risk Reduction	<a href="https://www.unisdr.org/files/54970_techguidancefdigitalhr.pdf">https://www.unisdr.org/files/54970_techguidancefdigitalhr.pdf</a>
Metadata of SDG indicator 11.5.2: Direct economic loss attributed to disasters in relation to global gross domestic product (GDP)	<a href="https://unstats.un.org/sdgs/metadata/">https://unstats.un.org/sdgs/metadata/</a>

### D. Data and statistics needed to compile the indicator

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
341	Direct agricultural loss attributed to disasters	4.1.2: Impact of natural extreme events and disasters
342	Direct economic loss to all other damaged or destroyed productive assets attributed to disasters	4.1.2: Impact of natural extreme events and disasters
343	Direct economic loss in the housing sector attributed to disasters	4.1.2: Impact of natural extreme events and disasters
344	Direct economic loss resulting from damaged or destroyed critical infrastructure attributed to disasters	4.1.2: Impact of natural extreme events and disasters
345	Direct economic loss to cultural heritage damaged or destroyed attributed to disasters	4.1.2: Impact of natural extreme events and disasters
126	GDP (nominal)	

### E. International databases containing this indicator

<i>Name of the database</i>	<i>Link</i>
SDG Indicators Database	<a href="https://unstats.un.org/sdgs/dataportal/database">https://unstats.un.org/sdgs/dataportal/database</a>
Sendai Framework Monitor	<a href="https://sendaimonitor.undrr.org/">https://sendaimonitor.undrr.org/</a>

## 6.64 INDICATOR K-1.7 NUMBER OF DEATHS ATTRIBUTED TO DISASTERS, PER 100,000 POPULATION (SENDAI FRAMEWORK INDICATOR A-2)

### A. General

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	n/a
Component (FDES)	4: Extreme events and disasters
Sub-component (FDES)	4.1: Natural Extreme Events and Disasters
Indicator topic (FDES)	4.1.2: Impact of natural extreme events and disasters
ID and name in previous indicator guidelines	n/a
First publication	13/12/2023
Latest update	-
Indicator definition	This indicator measures the number of people who died by disasters per 100,000 population.
Unit of measure	Share (number per 100,000)
Coverage	Resident population
Spatial aggregation	National territory
Reference period	Calendar year
Update frequency	Annual
Purpose	The indicator measures progress of the efforts of reducing disaster risk for human lives.
Policy context	The Sendai Framework for Disaster Risk Reduction 2015-2030 was adopted by UN Member States in March 2015 as a global policy of disaster risk reduction. Among the global targets, "Target A: Substantially reduce global disaster mortality by 2030, aiming to lower average per 100,000 global mortality between 2020-2030 compared with 2005-2015" and "Target B: Substantially reduce the number of affected people globally by 2030, aiming to lower the average global figure per 100,000 between 2020-2030 compared with 2005-2015" will contribute to sustainable development and strengthen economic, social, health and environmental resilience. The economic, environmental and social perspectives would include poverty eradication, urban resilience, and climate change adaptation.

<i>Parameter</i>	<i>Description</i>
	<p>The open-ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction (OIEWG) established by the General Assembly (resolution 69/284) has developed a set of indicators to measure global progress in the implementation of the Sendai Framework, which was endorsed by the UNGA (OIEWG report A/71/644). The relevant global indicators for the Sendai Framework will be used to report for this indicator.</p> <p>Disaster loss data is greatly influenced by large-scale catastrophic events, which represent important outliers. UNISDR recommends countries report the data by event, so that complementary analysis can be undertaken to obtain trends and patterns in which such catastrophic events (that can represent outliers) can be included or excluded.</p>
Link with SDG indicators	11.5.1 Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population (needed to calculate this SDG indicator)
Methodology for indicator calculation	<p>Death: The number of people who died during the disaster, or directly after, as a direct result of the hazardous event.</p> <p>Calculation of the indicator: number of death x 100,000 / resident population</p>
Comments	Disaggregation by individual events, type of hazard, cause of death and administrative unit is recommended.

## B. Policy references

<i>Title of the reference document</i>	<i>Link</i>
Transforming our world: the 2030 Agenda for Sustainable Development	<a href="https://sdgs.un.org/2030agenda">https://sdgs.un.org/2030agenda</a>
Sendai Framework for Disaster Risk Reduction 2015-2030	<a href="https://www.unisdr.org/we/inform/publications/43291">https://www.unisdr.org/we/inform/publications/43291</a>

### C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
Technical Guidance for Monitoring and Reporting on Progress in Achieving the Global Targets of the Sendai Framework for Disaster Risk Reduction	<a href="https://www.unisdr.org/files/54970_techguidancefdigitalhr.pdf">https://www.unisdr.org/files/54970_techguidancefdigitalhr.pdf</a>
11.5.1 Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population	<a href="https://unstats.un.org/sdgs/metadata/">https://unstats.un.org/sdgs/metadata/</a>

### D. Data and statistics needed to compile the indicator

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
346	Number of deaths attributed to disasters	4.1.2: Impact of natural extreme events and disasters
127	Resident population	5.1.1: Urban and rural population

### E. International databases containing this indicator

<i>Name of the database</i>	<i>Link</i>
SDG Indicators Database	<a href="https://unstats.un.org/sdgs/dataportal/database">https://unstats.un.org/sdgs/dataportal/database</a>
Sendai Framework Monitor	<a href="https://sendaimonitor.undrr.org/">https://sendaimonitor.undrr.org/</a>

## 6.65 INDICATOR C-6.1 SHARE OF TOTAL POPULATION (URBAN AND RURAL) CONNECTED TO THE WATER SUPPLY INDUSTRY

### A. General

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	C: Water
Component (FDES)	5: Human settlements and environmental health
Sub-component (FDES)	5.1: Human Settlements
Indicator topic (FDES)	5.1.2: Access to selected basic services
ID and name in previous indicator guidelines	C6: Connection of population to public water supply
First publication	21/12/2023
Latest update	-
Indicator definition	The indicator measures the percentage of the total resident population using water supplied by the water supply industry (ISIC 36).
Unit of measure	%
Coverage	Water users supplied by public or private bodies whose main functions are water collection, treatment and distribution activities for domestic and industrial needs.
Spatial aggregation	National territory
Reference period	Reference date
Update frequency	Annual
Purpose	The indicator measures the proportion of the resident population connected to central water supply systems. They usually can be considered as safely managed and thus are important for human health and well-being.
Policy context	SDGs target 3.9 By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination. SDGs target 6.1 By 2030, achieve universal and equitable access to safe and affordable drinking water for all.

<i>Parameter</i>	<i>Description</i>
	<p>The main pillars of EU drinking water policy are to</p> <ul style="list-style-type: none"> <li>• protect human health by ensuring the quality of water intended for human consumption</li> <li>• ensure that drinking water quality is controlled through standards based on the latest scientific evidence</li> <li>• secure efficient and effective monitoring, assessment and enforcement of drinking water quality</li> <li>• provide Europeans with adequate, timely and appropriately information</li> <li>• and to improve access to water intended for human consumption</li> </ul>
Link with SDG indicators	6.1.1 Proportion of population using safely managed drinking water services (similar indicator, but not identical)
Methodology for indicator calculation	Percentage of population connected to water supply industry = $100 \times \frac{\text{total number of population connected to water supply industry}}{\text{total number of resident population}}$
Comments	The scope of the indicator is narrower than of SDG indicator 6.1.1 (C-6.2) which includes in its concept of “safely managed drinking water services” also boreholes and tubewells, protected dug wells, protected springs, rainwater, water kiosks, and packaged and delivered water when they are located on premises, available when needed and free of faecal (and priority chemical) contamination.

## B. Policy references

<i>Title of the reference document</i>	<i>Link</i>
Transforming our world: the 2030 Agenda for Sustainable Development	<a href="https://sdgs.un.org/2030agenda">https://sdgs.un.org/2030agenda</a>
Directive (EU) 2020/2184 of the European Parliament and of the Council of 16 December 2020 on the quality of water intended for human consumption (recast)	<a href="http://data.europa.eu/eli/dir/2020/2184/oj">http://data.europa.eu/eli/dir/2020/2184/oj</a>

### C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
International Recommendations for Water Statistics	<a href="https://seea.un.org/content/seea-water">https://seea.un.org/content/seea-water</a>
UNSD/United Nations Environment Programme Questionnaire 2022 on Environment Statistics - section "Water"	<a href="https://unstats.un.org/unsd/envstats/questionnaire">https://unstats.un.org/unsd/envstats/questionnaire</a>
Directive (EU) 2020/2184 of the European Parliament and of the Council of 16 December 2020 on the quality of water intended for human consumption (recast)	<a href="http://data.europa.eu/eli/dir/2020/2184/oj">http://data.europa.eu/eli/dir/2020/2184/oj</a>
WHO Drinking-water quality guidelines	<a href="https://www.who.int/teams/environment-climate-change-and-health/water-sanitation-and-health/water-safety-and-quality/drinking-water-quality-guidelines">https://www.who.int/teams/environment-climate-change-and-health/water-sanitation-and-health/water-safety-and-quality/drinking-water-quality-guidelines</a>

### D. Data and statistics needed to compile the indicator

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
127	Resident population	5.1.1: Urban and rural population
197	Population supplied by water supply industry (ISIC 36)	5.1.2: Access to selected basic services

### E. International databases containing this indicator

<i>Name of the database</i>	<i>Link</i>
n/a	n/a

## 6.66 INDICATOR C-6.2 PROPORTION OF POPULATION USING SAFELY MANAGED DRINKING WATER SERVICES (SDG INDICATOR 6.1.1)

### A. General

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	C: Water
Component (FDES)	5: Human settlements and environmental health
Sub-component (FDES)	5.1: Human Settlements
Indicator topic (FDES)	5.1.2: Access to selected basic services



<i>Parameter</i>	<i>Description</i>
ID and name in previous indicator guidelines	C6: Connection of population to public water supply
First publication	05/12/2023
Latest update	-
Indicator definition	Proportion of population using an improved basic drinking water source which is located on premises, available when needed and free of faecal (and priority chemical) contamination.
Unit of measure	%
Coverage	Resident population
Spatial aggregation	National territory
Reference period	Reference date
Update frequency	Annual
Purpose	SDG indicator 6.1.1 is designed to address safe management of drinking water services, including dimensions of accessibility, availability and quality.
Policy context	SDGs target 6.1: By 2030, achieve universal and equitable access to safe and affordable drinking water for all.
Link with SDG indicators	6.1.1 Proportion of population using safely managed drinking water services
Methodology for indicator calculation	<p>Safely managed drinking water service is an improved basic drinking water source which is located on premises, available when needed and free of faecal (and priority chemical) contamination.</p> <p>Improved' drinking water sources include: piped supplies, boreholes and tubewells, protected dug wells, protected springs, rainwater, water kiosks, and packaged and delivered water. A water source is 'accessible on premises' if the point of collection is within the dwelling, compound, yard or plot, or water is delivered to the household.</p> <p>The indicator is calculated as the percentage of the resident population with access to safely managed drinking water services.</p>
Comments	-

**B. Policy references**

<i>Title of the reference document</i>	<i>Link</i>
Transforming our world: the 2030 Agenda for Sustainable Development	<a href="https://sdgs.un.org/2030agenda">https://sdgs.un.org/2030agenda</a>

**C. Methodology references**

<i>Title of the reference document</i>	<i>Link</i>
Metadata of SDG indicator 6.1.1: Proportion of population using safely managed drinking water services	<a href="https://unstats.un.org/sdgs/metadata/">https://unstats.un.org/sdgs/metadata/</a>
WHO Drinking-water quality guidelines	<a href="https://www.who.int/teams/environment-climate-change-and-health/water-sanitation-and-health/water-safety-and-quality/drinking-water-quality-guidelines">https://www.who.int/teams/environment-climate-change-and-health/water-sanitation-and-health/water-safety-and-quality/drinking-water-quality-guidelines</a>

**D. Data and statistics needed to compile the indicator**

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
127	Resident population	5.1.1: Urban and rural population
340	Population with access to safely managed drinking water services	5.1.2: Access to selected basic services

**E. International databases containing this indicator**

<i>Name of the database</i>	<i>Link</i>
SDG Indicators Database	<a href="https://unstats.un.org/sdgs/dataportal/database">https://unstats.un.org/sdgs/dataportal/database</a>

## 6.67 INDICATOR C-14.1 PERCENTAGE OF TOTAL POPULATION CONNECTED TO A WASTEWATER COLLECTING SYSTEM

### A. General

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	C: Water
Component (FDES)	5: Human settlements and environmental health
Sub-component (FDES)	5.1: Human Settlements
Indicator topic (FDES)	5.1.2: Access to selected basic services
ID and name in previous indicator guidelines	C14: Population connected to wastewater treatment
First publication	21/12/2023
Latest update	-
Indicator definition	The indicator measures the share of the resident population connected to a central wastewater collecting system
Unit of measure	%
Coverage	Resident population connected to wastewater collecting systems
Spatial aggregation	National territory
Reference period	Reference date
Update frequency	Annual
Purpose	<p>The indicator measures response, and as such, measures the impact on human health and, in a broader sense, quality of life.</p> <p>A wastewater collecting system (sewage network) may deliver wastewater to treatment plants or may discharge it without treatment to the environment. Wastewater treatment is a basic prerequisite for minimizing pressure on both surface and groundwaters in terms of water pollution.</p> <p>As both groundwaters and surface waters are abstracted for the production of drinking water, or even for direct use (self-supply), the reduction of water pollution represents one of the basic preconditions for human health and the prevention of water related diseases.</p>

<i>Parameter</i>	<i>Description</i>
Policy context	<p>The European Urban Wastewater Treatment Directive aims to protect human health and the environment from the effects of untreated urban wastewater. It therefore requires EU countries to ensure that towns, cities and settlements properly collect and treat wastewater. It aims to</p> <ul style="list-style-type: none"> <li>• protect the environment from the adverse effects of urban wastewater discharges and discharges from certain industrial sectors</li> <li>• ensure that domestic and industrial wastewater is effectively collected, treated and discharged.</li> </ul> <p>SDG target 6.2: By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations</p>
Link with SDG indicators	6.2.1 Proportion of population using (a) safely managed sanitation services and (b) a hand-washing facility with soap and water (related indicator, but not identical)
Methodology for indicator calculation	<p>Wastewater collecting system: usually a centralised sewer system. Also includes transportation of wastewater by trucks</p> <p>Percentage of total population connected to a wastewater collecting system = <math>100 \times \text{population connected to wastewater collecting system} / \text{resident population}</math></p>
Comments	<p>It is recommended to distinguish between population connected to a wastewater treatment plant and population whose wastewater is collected and discharged without treatment.</p> <p>Contextual information to be provided is the percentage of population served by independent treatment plants (usually smaller than 50 population equivalents) as this can be an environmental-friendly solution in particular in rural areas where a connection to a centralised sewer system would not make sense from both the economic and environmental perspectives.</p>

## B. Policy references

<i>Title of the reference document</i>	<i>Link</i>
Transforming our world: the 2030 Agenda for Sustainable Development	<a href="https://sdgs.un.org/2030agenda">https://sdgs.un.org/2030agenda</a>
Council Directive of 21 May 1991 concerning urban waste water treatment(91/271/EEC)	<a href="http://data.europa.eu/eli/dir/1991/271/2014-01-01">http://data.europa.eu/eli/dir/1991/271/2014-01-01</a>

## C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
Council Directive of 21 May 1991 concerning urban waste water treatment(91/271/EEC)	<a href="http://data.europa.eu/eli/dir/1991/271/2014-01-01">http://data.europa.eu/eli/dir/1991/271/2014-01-01</a>
UNSD/United Nations Environment Programme Questionnaire 2022 on Environment Statistics - section "Water"	<a href="https://unstats.un.org/unsd/envstats/questionnaire">https://unstats.un.org/unsd/envstats/questionnaire</a>
International Recommendations for Water Statistics	<a href="https://seea.un.org/content/seea-water">https://seea.un.org/content/seea-water</a>

## D. Data and statistics needed to compile the indicator

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
127	Resident population	5.1.1: Urban and rural population
362	Wastewater collection: Population connected to a wastewater collecting system	3.2.2: Collection and treatment of wastewater

## E. International databases containing this indicator

<i>Name of the database</i>	<i>Link</i>
n/a	n/a

## 6.68 INDICATOR I-4.1 PROPORTION OF POPULATION SERVED BY MUNICIPAL WASTE COLLECTION

### A. General

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	I: Waste
Component (FDES)	5: Human settlements and environmental health
Sub-component (FDES)	5.1: Human Settlements
Indicator topic (FDES)	5.1.2: Access to selected basic services
ID and name in previous indicator guidelines	I4: Final waste disposal
First publication	08/10/2019
Latest update	30/11/2023
Indicator definition	Proportion of the population covered by regular municipal waste collection
Unit of measure	%
Coverage	Resident population
Spatial aggregation	National territory
Reference period	Reference date
Update frequency	Annual
Purpose	The indicator provides a measure of the pressure on the environment and the response to the efficiency of the waste management system.
Policy context	The way a country manages its waste has significant long-term implications for public health, the economy and the natural environment. Therefore it is essential to promote an environmentally sound waste collection, treatment and disposal programme. Generally, adequate waste management indicates that the authorities are aware of the health and environmental risks and that they support or impose suitable measures to prevent or reduce waste. Reducing the amount of waste that needs to be disposed of reduces the demand for natural raw materials, leading to a reduction in resource extraction.

<i>Parameter</i>	<i>Description</i>
Link with SDG indicators	SDG target 11.6: By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management 11.6.1 Proportion of urban solid waste regularly collected and with adequate final discharge out of total urban solid waste generated, by cities (related)
Methodology for indicator calculation	Population served by regular municipal waste collection *100 / total resident population
Comments	-

## B. Policy references

<i>Title of the reference document</i>	<i>Link</i>
Transforming our world: the 2030 Agenda for Sustainable Development	<a href="https://sdgs.un.org/2030agenda">https://sdgs.un.org/2030agenda</a>
Green Economy Transition in Eastern Europe, the Caucasus and Central Asia: Progress and ways forward	<a href="https://unece.org/sites/default/files/2022-09/ece.nicosia.conf_.2022_inf_.8.pdf">https://unece.org/sites/default/files/2022-09/ece.nicosia.conf_.2022_inf_.8.pdf</a>
Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives	<a href="http://data.europa.eu/eli/dir/2008/98/2018-07-05">http://data.europa.eu/eli/dir/2008/98/2018-07-05</a>

## C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
Conference of European Statisticians Framework on Waste Statistics	<a href="https://unece.org/statistics/publications/conference-european-statisticians-framework-waste-statistics">https://unece.org/statistics/publications/conference-european-statisticians-framework-waste-statistics</a>
UNSD/United Nations Environment Programme Questionnaire 2022 on Environment Statistics - section "Waste"	<a href="https://unstats.un.org/unsd/envstats/questionnaire">https://unstats.un.org/unsd/envstats/questionnaire</a>

## D. Data and statistics needed to compile the indicator

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
127	Resident population	5.1.1: Urban and rural population
159	Population served by municipal waste collection services	5.1.2: Access to selected basic services

**E. International databases containing this indicator**

<i>Name of the database</i>	<i>Link</i>
n/a	n/a

**6.69 INDICATOR H-1.1 PASSENGER AND FREIGHT VOLUMES, BY MODE OF TRANSPORT (SDG INDICATOR 9.1.2)****A. General**

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	H: Transport
Component (FDES)	5: Human settlements and environmental health
Sub-component (FDES)	5.1: Human Settlements
Indicator topic (FDES)	5.1.5: Environmental concerns specific to urban settlements
ID and name in previous indicator guidelines	H1: Passenger transport demand
First publication	01/12/2023
Latest update	-
Indicator definition	2 sub-indicators: <ul style="list-style-type: none"> <li>• Passenger volume: passenger kilometres broken down by mode of transport</li> <li>• Freight volume: tonne kilometres broken down by mode of transport</li> </ul>
Unit of measure	Passenger-Kilometres and Tonne-Kilometres
Coverage	All transportation of passengers and freight
Spatial aggregation	National territory
Reference period	Calendar year
Update frequency	Annual
Purpose	The indicator provides a measure whether transport infrastructure is reliable, sustainable and resilient.



<i>Parameter</i>	<i>Description</i>
Policy context	<p>SDG Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation: Target 9.1: Develop quality, reliable, sustainable and resilient infrastructure, including regional and trans- border infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all.</p> <p>The EU Sustainable and Smart Mobility Strategy calls for decisive action to shift towards more public passenger transport like buses and trains.</p> <p>The European Green Deal includes a target to reduce transport-related greenhouse gas emissions by 90% by 2050. The Commission intends to adopt a comprehensive strategy to meet this target and ensure that the EU transport sector is fit for a clean, digital and modern economy. Objectives include:</p> <ul style="list-style-type: none"> <li>• increasing the uptake of zero-emission vehicles</li> <li>• making sustainable alternative solutions available to the public &amp; businesses</li> <li>• supporting digitalisation &amp; automation</li> <li>• improving connectivity &amp; access.</li> </ul>
Link with SDG indicators	9.1.2 Passenger and freight volumes, by mode of transport
Methodology for indicator calculation	Total passenger and freight volumes are the sum of aviation, road, rail, inland waterways and maritime traffic. However, the indicator is to be presented for the individual modes of transport (aviation, maritime, road, rail, inland waterways).
Comments	-

## B. Policy references

<i>Title of the reference document</i>	<i>Link</i>
Transforming our world: the 2030 Agenda for Sustainable Development	<a href="https://sdgs.un.org/2030agenda">https://sdgs.un.org/2030agenda</a>
Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: Sustainable and Smart Mobility Strategy – putting European transport on track for the future	<a href="https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020DC0789">https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020DC0789</a>
Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions: The European Green Deal (COM/2019/640 final)	<a href="https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2019:640:FIN">https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2019:640:FIN</a>

## C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
Metadata of SDG indicator 9.1.2: Passenger and freight volumes, by mode of transport	<a href="https://unstats.un.org/sdgs/metadata/">https://unstats.un.org/sdgs/metadata/</a>
ITF Modelling Framework PASTA (Policy Ambitions and Sustainable Transport Assessment)	<a href="https://www.itf-oecd.org/itf-modelling-framework-1">https://www.itf-oecd.org/itf-modelling-framework-1</a>

## D. Data and statistics needed to compile the indicator

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
347	Transport: Aviation passenger volume	5.1.5: Environmental concerns specific to urban settlements
348	Transport: Aviation freight volume	5.1.5: Environmental concerns specific to urban settlements
349	Transport: Maritime freight volume	5.1.5: Environmental concerns specific to urban settlements
350	Transport: Road passenger volume	5.1.5: Environmental concerns specific to urban settlements
351	Transport: Road freight volume	5.1.5: Environmental concerns specific to urban settlements
352	Transport: Rail passenger volume	5.1.5: Environmental concerns specific to urban settlements

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
353	Transport: Rail freight volume	5.1.5: Environmental concerns specific to urban settlements
354	Transport: Inland waterways freight volume	5.1.5: Environmental concerns specific to urban settlements

#### **E. International databases containing this indicator**

<i>Name of the database</i>	<i>Link</i>
UNECE Transportation Data Portal	<a href="https://w3.unece.org/PXWeb/en">https://w3.unece.org/PXWeb/en</a>
SDG Indicators Database	<a href="https://unstats.un.org/sdgs/dataportal/database">https://unstats.un.org/sdgs/dataportal/database</a>

## **6.70 INDICATOR H-1.2 TOTAL PASSENGER TRANSPORT DEMAND PER CAPITA**

### **A. General**

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	H: Transport
Component (FDES)	5: Human settlements and environmental health
Sub-component (FDES)	5.1: Human Settlements
Indicator topic (FDES)	5.1.5: Environmental concerns specific to urban settlements
ID and name in previous indicator guidelines	H1: Passenger transport demand
First publication	26/12/2023
Latest update	-
Indicator definition	The indicator measures total passenger transport demand per capita.
Unit of measure	Km
Coverage	All transportation of passengers
Spatial aggregation	National territory
Reference period	Calendar year
Update frequency	Annual

<i>Parameter</i>	<i>Description</i>
Purpose	<p>Passenger transport demand is a driving force indicator. It can be of major importance in regulating passenger transport demand and fostering specific modes of transport. Breaking down passenger transport demand by mode helps to assess the effectiveness of response measures.</p>
Policy context	<p>SDG Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation: Target 9.1: Develop quality, reliable, sustainable and resilient infrastructure, including regional and trans- border infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all.</p> <p>The EU Sustainable and Smart Mobility Strategy calls for decisive action to shift towards more public passenger transport like buses and trains.</p> <p>The European Green Deal includes a target to reduce transport-related greenhouse gas emissions by 90% by 2050. The Commission intends to adopt a comprehensive strategy to meet this target and ensure that the EU transport sector is fit for a clean, digital and modern economy. Objectives include:</p> <ul style="list-style-type: none"> <li>• increasing the uptake of zero-emission vehicles</li> <li>• making sustainable alternative solutions available to the public &amp; businesses</li> <li>• supporting digitalisation &amp; automation</li> <li>• improving connectivity &amp; access.</li> </ul>
Link with SDG indicators	9.1.2 Passenger and freight volumes, by mode of transport (related indicator)
Methodology for indicator calculation	Total passenger transport demand (person-kilometres) / resident population
Comments	Disaggregation by transport mode recommended: road, railway, inland waterways, maritime (of which domestic), transport, aviation (of which domestic)

## B. Policy references

<i>Title of the reference document</i>	<i>Link</i>
Transforming our world: the 2030 Agenda for Sustainable Development	<a href="https://sdgs.un.org/2030agenda">https://sdgs.un.org/2030agenda</a>
Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: Sustainable and Smart Mobility Strategy – putting European transport on track for the future	<a href="https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020DC0789">https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020DC0789</a>
Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions: The European Green Deal (COM/2019/640 final)	<a href="https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2019:640:FIN">https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2019:640:FIN</a>

## C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
Metadata of SDG indicator 9.1.2: Passenger and freight volumes, by mode of transport	<a href="https://unstats.un.org/sdgs/metadata/">https://unstats.un.org/sdgs/metadata/</a>
ITF Modelling Framework PASTA (Policy Ambitions and Sustainable Transport Assessment)	<a href="https://www.itf-oecd.org/itf-modelling-framework-1">https://www.itf-oecd.org/itf-modelling-framework-1</a>
Reference Manual on Air Transport Statistics	<a href="https://ec.europa.eu/eurostat/documents/29567/3217334/Aviation_Manual_V16_07_2023.pdf">https://ec.europa.eu/eurostat/documents/29567/3217334/Aviation_Manual_V16_07_2023.pdf</a>
Reference Manual on Inland Waterway Transport Statistics	<a href="https://ec.europa.eu/eurostat/documents/29567/3217334/iww_reference_manual_april_2023.pdf">https://ec.europa.eu/eurostat/documents/29567/3217334/iww_reference_manual_april_2023.pdf</a>
Reference Manual on Maritime Transport Statistics	<a href="https://ec.europa.eu/eurostat/documents/29567/3217334/Reference_Manual_Maritime_May_2023.pdf">https://ec.europa.eu/eurostat/documents/29567/3217334/Reference_Manual_Maritime_May_2023.pdf</a>
Reference Manual on Rail Transport Statistics	<a href="https://ec.europa.eu/eurostat/documents/29567/3217334/Rail_Reference_Manual_Ver+11.pdf">https://ec.europa.eu/eurostat/documents/29567/3217334/Rail_Reference_Manual_Ver+11.pdf</a>

**D. Data and statistics needed to compile the indicator**

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
347	Transport: Aviation passenger volume	5.1.5: Environmental concerns specific to urban settlements
364	Transport: Aviation passenger volume - of which domestic	5.1.5: Environmental concerns specific to urban settlements
350	Transport: Road passenger volume	5.1.5: Environmental concerns specific to urban settlements
352	Transport: Rail passenger volume	5.1.5: Environmental concerns specific to urban settlements
365	Transport: Inland waterways passenger volume	5.1.5: Environmental concerns specific to urban settlements
367	Transport: Maritime passenger volume	5.1.5: Environmental concerns specific to urban settlements
366	Transport: Maritime passenger volume - of which domestic	5.1.5: Environmental concerns specific to urban settlements
127	Resident population	5.1.1: Urban and rural population

**E. International databases containing this indicator**

<i>Name of the database</i>	<i>Link</i>
UNECE Transportation Data Portal	<a href="https://w3.unece.org/PXWeb/en">https://w3.unece.org/PXWeb/en</a>
SDG Indicators Database	<a href="https://unstats.un.org/sdgs/dataportal/database">https://unstats.un.org/sdgs/dataportal/database</a>

## 6.71 INDICATOR H-3.2 ROAD VEHICLE FLEET IN THE COUNTRY BY FUEL TYPE (GASOLINE, DIESEL, GAS, ELECTRICITY, BIOFUELS, OTHER)

### A. General

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	H: Transport
Component (FDES)	5: Human settlements and environmental health
Sub-component (FDES)	5.1: Human Settlements
Indicator topic (FDES)	5.1.5: Environmental concerns specific to urban settlements
ID and name in previous indicator guidelines	H3: Composition of road motor vehicle fleet by fuel type
First publication	27/12/2023
Latest update	-
Indicator definition	The indicator measures the road vehicle fleet in the country by fuel type. The indicator can be presented also as a share of each fuel type in the total road motor vehicle fleet for a respective category.
Unit of measure	1000 units
Coverage	Nationally registered road vehicles
Spatial aggregation	National territory
Reference period	Reference date
Update frequency	Annual
Purpose	This is a driving force indicator, which shows tendencies in the transport sector's development and is also an indirect indicator of fuel consumption. The indicator helps to understand developments in the composition of the road motor vehicle fleet by fuel type, which in turn explains observed trends in transport's impact on the environment.

<i>Parameter</i>	<i>Description</i>
Policy context	<p>The current transport system poses significant and growing threats to the environment and human health. Continuous growth of demand for transport, especially road transport, raises concern regarding the long-term sustainability of current trends. This problem is aggravated by the high age and energy intensity as well as poor environmental standards of the vehicle fleet and the poor state of road infrastructure. Transport policies increasingly recognize the need to improve the shares of transport modes that use environmentally friendly fuels, primarily electric and biofuel vehicles. The European Green Deal includes a target to reduce transport-related greenhouse gas emissions by 90% by 2050. The Commission intends to adopt a comprehensive strategy to meet this target and ensure that the EU transport sector is fit for a clean, digital and modern economy. Objectives include:</p> <ul style="list-style-type: none"> <li>• increasing the uptake of zero-emission vehicles</li> <li>• making sustainable alternative solutions available to the public &amp; businesses</li> <li>• supporting digitalisation &amp; automation</li> <li>• improving connectivity &amp; access.</li> </ul>
Link with SDG indicators	-
Methodology for indicator calculation	<p>Each category, vehicles (e.g. motorcycles; mopeds; passenger cars; buses, coaches and minibuses, trucks, tractors etc.) should be classified according to the type of fuel used by the motor. The main types are gasoline (petrol), diesel, gas (liquefied petroleum gases and natural gas), electricity, biofuel (e.g. biodiesel) and other sources. See B.II-42 (motor energy) in the Glossary for transport statistics where all options are listed.</p>
Comments	-



## B. Policy references

<i>Title of the reference document</i>	<i>Link</i>
Directive 98/70/EC of the European Parliament and of the Council of 13 October 1998 relating to the quality of petrol and diesel fuels and amending Council Directive 93/12/EEC	<a href="https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A31998L0070">https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A31998L0070</a>
Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: Sustainable and Smart Mobility Strategy – putting European transport on track for the future	<a href="https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020DC0789">https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020DC0789</a>
Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions: The European Green Deal (COM/2019/640 final)	<a href="https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2019:640:FIN">https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2019:640:FIN</a>

## C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
ITF Modelling Framework PASTA (Policy Ambitions and Sustainable Transport Assessment)	<a href="https://www.itf-oecd.org/itf-modelling-framework-1">https://www.itf-oecd.org/itf-modelling-framework-1</a>
Glossary for transport statistics, 5th edition	<a href="https://unece.org/sites/default/files/2021-12/Glossary_for_Transport_Statistics_EN_FINAL_WEB2_1.pdf">https://unece.org/sites/default/files/2021-12/Glossary_for_Transport_Statistics_EN_FINAL_WEB2_1.pdf</a>

## D. Data and statistics needed to compile the indicator

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
383	Road vehicles by category of vehicle	
384	Road vehicles by type of motor fuel	

## E. International databases containing this indicator

<i>Name of the database</i>	<i>Link</i>
UNECE Transportation Data Portal	<a href="https://w3.unece.org/PXWeb/en">https://w3.unece.org/PXWeb/en</a>

## 6.72 INDICATOR J-1.1 NATIONAL EXPENDITURE ON ENVIRONMENTAL PROTECTION AS PERCENTAGE OF GDP

### A. General

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	J: Environmental financing
Component (FDES)	6: Environmental protection, management and engagement
Sub-component (FDES)	6.1: Environmental Protection and Resource Management Expenditure
Indicator topic (FDES)	6.1.1: Government environmental protection and resource management expenditure
ID and name in previous indicator guidelines	J1: Environmental financing
First publication	07/08/2019
Latest update	01/12/2023
Indicator definition	The indicator measures the total national expenditure on environmental protection relative to the GDP.
Unit of measure	%
Coverage	Resident population
Spatial aggregation	National economy
Reference period	Calendar year
Update frequency	Annual
Purpose	<p>The indicator shows expenditures for environmental protection of the government, enterprises, non-profit organisations and households in relation to GDP. It represents, in relative terms, the annual resources devoted to environmental protection. The breakdown by environmental activities gives an indication about national environmental protection priorities and needs.</p> <p>Environmental protection expenditure statistics quantify the resources devoted to the environmental protection by resident economic units. This information supports understanding the response of society to the challenge of environmental degradation and depletion of natural resources, and the potential for economic activity to be based on environmentally friendly activities.</p>

<i>Parameter</i>	<i>Description</i>
Policy context	<p>The 7th EAP Priority Objective 6 (to secure investment for environment and climate policy and address environmental externalities) identifies the need to increase both public and private sector environment and climate-related expenditure. This is key to the achievement of the 7th EAP Priority Objective 2 (to turn the Union into a resource-efficient, green and competitive low-carbon economy), the monitoring of which this briefing contributes to.</p> <p>The European environmental accounts are established in Regulation (EU) 691/2011. The Regulation provides a legal framework for a harmonised collection of comparable data from all EU Member States and EFTA countries.</p>
Link with SDG indicators	-
Methodology for indicator calculation	<p>Total national expenditures for environmental protection purposes divided by GDP.</p> <p>Environmental protection includes all activities and actions which have as their main purpose the prevention, reduction and elimination of pollution and of any other degradation of the environment. Those activities and actions include all measures taken in order to restore the environment after it has been degraded. Activities which, while beneficial to the environment, primarily satisfy the technical needs or the internal requirements for hygiene or safety and security of an enterprise or other institution are excluded from this definition.</p> <p>This indicator and the underlying statistics can be taken from Environmental Protection Expenditure Accounts (EPEA).</p>
Comments	-

## B. Policy references

<i>Title of the reference document</i>	<i>Link</i>
Decision No 1386/2013/EU of the European Parliament and of the Council of 20 November 2013 on a General Union Environment Action Programme to 2020 'Living well, within the limits of our planet'	<a href="https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32013D1386">https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32013D1386</a>
Regulation (EU) No 691/2011 of the European Parliament and of the Council of 6 July 2011 on European environmental economic accounts	<a href="http://data.europa.eu/eli/reg/2011/691/2022-02-20">http://data.europa.eu/eli/reg/2011/691/2022-02-20</a>

## C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
Environmental protection expenditure accounts handbook, 2017 edition	<a href="https://seea.un.org/sites/seea.un.org/files/epea_ks-gq-17-004-en-n.pdf">https://seea.un.org/sites/seea.un.org/files/epea_ks-gq-17-004-en-n.pdf</a>
SEEA Technical Note: Environmental Protection Expenditure Accounts (EPEA) (draft)	<a href="https://seea.un.org/sites/seea.un.org/files/seea_technical_note_-_epea_jan_2017_draft.pdf">https://seea.un.org/sites/seea.un.org/files/seea_technical_note_-_epea_jan_2017_draft.pdf</a>
System of Environmental-Economic Accounting 2012 - Central Framework	<a href="https://seea.un.org/content/seea-central-framework">https://seea.un.org/content/seea-central-framework</a>
Eurostat/OECD Questionnaire on Environmental Protection Expenditure Accounts	

## D. Data and statistics needed to compile the indicator

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
83	Expenditures of the government for protection of ambient air and climate (CEPA1)	6.1.1: Government environmental protection and resource management expenditure
84	Expenditures of non-profit organisations for protection of ambient air and climate (CEPA1)	6.1.2: Corporate, non-profit institution and household environmental protection and resource management expenditure
85	Expenditures of households for protection of ambient air and climate (CEPA1)	6.1.2: Corporate, non-profit institution and household environmental protection and resource management expenditure
86	Expenditures of enterprises for protection of ambient air and climate (CEPA1)	6.1.2: Corporate, non-profit institution and household environmental protection and resource management expenditure
87	Expenditures of the government for wastewater management (CEPA2)	6.1.1: Government environmental protection and resource management expenditure

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
88	Expenditures of non-profit organisations for wastewater management (CEPA2)	6.1.2: Corporate, non-profit institution and household environmental protection and resource management expenditure
89	Expenditures of households for wastewater management (CEPA2)	6.1.2: Corporate, non-profit institution and household environmental protection and resource management expenditure
90	Expenditures of enterprises for wastewater management (CEPA2)	6.1.2: Corporate, non-profit institution and household environmental protection and resource management expenditure
95	Expenditures of the government for waste management (CEPA3)	6.1.1: Government environmental protection and resource management expenditure
96	Expenditures of non-profit organisations for waste management (CEPA3)	6.1.2: Corporate, non-profit institution and household environmental protection and resource management expenditure
97	Expenditures of households for waste management (CEPA3)	6.1.2: Corporate, non-profit institution and household environmental protection and resource management expenditure
103	Expenditures of enterprises for protection and remediation of soil, groundwater and surface water (CEPA4)	6.1.2: Corporate, non-profit institution and household environmental protection and resource management expenditure
105	Expenditures of the government for noise and vibration abatement (excluding workplace protection) (CEPA5)	6.1.1: Government environmental protection and resource management expenditure
106	Expenditures of non-profit organisations for noise and vibration abatement (excluding workplace protection) (CEPA5)	6.1.2: Corporate, non-profit institution and household environmental protection and resource management expenditure
107	Expenditures of households for noise and vibration abatement (excluding workplace protection) (CEPA5)	6.1.2: Corporate, non-profit institution and household environmental protection and resource management expenditure
108	Expenditures of enterprises for noise and vibration abatement (excluding workplace protection) (CEPA5)	6.1.2: Corporate, non-profit institution and household environmental protection and resource management expenditure
109	Expenditures of the government for protection of biodiversity and landscapes (CEPA6)	6.1.1: Government environmental protection and resource management expenditure
110	Expenditures of non-profit organisations for protection of biodiversity and landscapes (CEPA6)	6.1.2: Corporate, non-profit institution and household environmental protection and resource management expenditure
111	Expenditures of households for protection of biodiversity and landscapes (CEPA6)	6.1.2: Corporate, non-profit institution and household environmental protection and resource management expenditure

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
112	Expenditures of enterprises for protection of biodiversity and landscapes (CEPA6)	6.1.2: Corporate, non-profit institution and household environmental protection and resource management expenditure
113	Expenditures of the government for protection against radiation (excluding external safety) (CEPA7)	6.1.1: Government environmental protection and resource management expenditure
114	Expenditures of non-profit organisations for protection against radiation (excluding external safety) (CEPA7)	6.1.2: Corporate, non-profit institution and household environmental protection and resource management expenditure
115	Expenditures of households for protection against radiation (excluding external safety) (CEPA7)	6.1.2: Corporate, non-profit institution and household environmental protection and resource management expenditure
116	Expenditures of enterprises for protection against radiation (excluding external safety) (CEPA7)	6.1.2: Corporate, non-profit institution and household environmental protection and resource management expenditure
117	Expenditures of the government for research and development for environmental protection (CEPA8)	6.1.1: Government environmental protection and resource management expenditure
118	Expenditures of non-profit organisations for research and development for environmental protection (CEPA8)	6.1.2: Corporate, non-profit institution and household environmental protection and resource management expenditure
119	Expenditures of households for research and development for environmental protection (CEPA8)	6.1.2: Corporate, non-profit institution and household environmental protection and resource management expenditure
120	Expenditures of enterprises for research and development for environmental protection (CEPA8)	6.1.2: Corporate, non-profit institution and household environmental protection and resource management expenditure
121	Expenditures of the government for other environmental protection activities (CEPA9)	6.1.1: Government environmental protection and resource management expenditure
122	Expenditures of non-profit organisations for other environmental protection activities (CEPA9)	6.1.2: Corporate, non-profit institution and household environmental protection and resource management expenditure
123	Expenditures of households for other environmental protection activities (CEPA9)	6.1.2: Corporate, non-profit institution and household environmental protection and resource management expenditure
124	Expenditures of enterprises for other environmental protection activities (CEPA9)	6.1.2: Corporate, non-profit institution and household environmental protection and resource management expenditure
125	Total national expenditures for environmental protection activities	
126	GDP (nominal)	

## E. International databases containing this indicator

<i>Name of the database</i>	<i>Link</i>
Eurostat database	<a href="https://ec.europa.eu/eurostat/data/database">https://ec.europa.eu/eurostat/data/database</a>
OECD Data	<a href="https://data.oecd.org/">https://data.oecd.org/</a>

## 6.73 INDICATOR J-1.2 ENVIRONMENTAL TAX REVENUES AS A PROPORTION OF GDP

### A. General

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	J: Environmental financing
Component (FDES)	6: Environmental protection, management and engagement
Sub-component (FDES)	6.2: Environmental Governance and Regulation
Indicator topic (FDES)	6.2.2: Environmental regulation and instruments
ID and name in previous indicator guidelines	J1: Environmental financing
First publication	04/12/2023
Latest update	-
Indicator definition	The indicator measures revenues of environmental taxes in relation with the Gross Domestic Product (GDP)
Unit of measure	% of GDP
Coverage	All environmental taxes
Spatial aggregation	National economy
Reference period	Calendar year
Update frequency	Annual
Purpose	For environmental fiscal reform, revenue data, in the form of an aggregate overview of the structure and changes in structure of the taxation system, is important. This includes environmental tax revenue as a share of all revenue from taxes and social contributions, tax revenues a proportion of GDP and the distribution of revenue among aggregate tax bases.

<i>Parameter</i>	<i>Description</i>
Policy context	<p>Environmental policy aims to reach environmental and sustainable development goals. Policy-makers use incentive-based tools to ensure that environmental solutions are found at least cost, for correcting externalities and/or for raising revenues for specific purposes. Economic instruments for pollution control and natural resource management are thus an increasingly important part of environmental policy. The range of instruments includes, among others, environmental taxes, fees and charges, tradable permits, deposit-refund systems and subsidies.</p> <p>Environmental taxes can serve to discourage behaviour that is potentially damaging for the environment and can provide incentives to lessen the burden on the environment and to preserve it by 'getting the prices right'. The economic rationale for their use comes from their ability to influence markets in a cost-effective way, unlike regulatory or administrative approaches.</p> <p>Environmentally related taxes are an important instrument for governments to shape relative prices of goods and services. Revenues from environmental taxes could support the transition to a climate-neutral economy by 2050 and achieving the objectives of the European Green Deal reaching a net reduction of greenhouse gas emissions by 55% by 2030.</p>
Link with SDG indicators	-
Methodology for indicator calculation	<p>An environmental tax is a tax whose tax base is a physical unit (or a proxy of it) of something that has a proven, specific negative impact on the environment and which is defined in the European system of accounts (ESA 2010) as a tax: energy taxes, transport taxes and taxes on pollution and resources. For this indicator the total revenues of all environmental taxes are presented as percentage of GDP</p>
Comments	<p>Recommended to present environmental tax revenue also as a share of all revenue from taxes and social contributions and the distribution of revenue among aggregate tax bases.</p>



## B. Policy references

<i>Title of the reference document</i>	<i>Link</i>
Transforming our world: the 2030 Agenda for Sustainable Development	<a href="https://sdgs.un.org/2030agenda">https://sdgs.un.org/2030agenda</a>
Paris Agreement	<a href="https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement">https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement</a>
Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions: The European Green Deal (COM/2019/640 final)	<a href="https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2019:640:FIN">https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2019:640:FIN</a>

## C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
System of Environmental-Economic Accounting 2012 - Central Framework	<a href="https://seea.un.org/content/seea-central-framework">https://seea.un.org/content/seea-central-framework</a>
Environmental taxes: A statistical guide - 2013 edition	<a href="https://seea.un.org/sites/seea.un.org/files/taxes_ks-gq-13-005-en.pdf.pdf">https://seea.un.org/sites/seea.un.org/files/taxes_ks-gq-13-005-en.pdf.pdf</a>

## D. Data and statistics needed to compile the indicator

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
333	Revenue from energy taxes	6.2.2: Environmental regulation and instruments
334	Revenue from transport taxes	6.2.2: Environmental regulation and instruments
335	Revenue from pollution and resource taxes	6.2.2: Environmental regulation and instruments
126	GDP (nominal)	

## E. International databases containing this indicator

<i>Name of the database</i>	<i>Link</i>
Eurostat database	<a href="https://ec.europa.eu/eurostat/data/database">https://ec.europa.eu/eurostat/data/database</a>
OECD Data	<a href="https://data.oecd.org/">https://data.oecd.org/</a>

## 6.74 INDICATOR J-1.6 AMOUNT OF FOSSIL-FUEL SUBSIDIE (PRODUCTION AND CONSUMPTION) PER UNIT OF GDP (SDG INDICATOR 12.C.1)

### A. General

<i>Parameter</i>	<i>Description</i>
Indicator theme (Indicator Guidelines version 2009)	J: Environmental financing
Component (FDES)	6: Environmental protection, management and engagement
Sub-component (FDES)	6.2: Environmental Governance and Regulation
Indicator topic (FDES)	6.2.2: Environmental regulation and instruments
ID and name in previous indicator guidelines	J1: Environmental financing
First publication	04/12/2023
Latest update	-
Indicator definition	3 Sub-indicators: 1) direct transfer of government funds; 2) induced transfers (price support); and as an optional sub-indicator 3) tax expenditure, other revenue foregone, and underpricing of goods and services.
Unit of measure	Percentage of GDP; Constant United States dollars per capita; Millions of constant United States dollar
Coverage	All types of fossil-fuel subsidies
Spatial aggregation	National economy
Reference period	Calendar year
Update frequency	Annual
Purpose	Awareness and understanding of existing subsidies based on credible data is necessary to increase transparency and inform decision-making. Reporting against a global indicator measuring consumer and producer fossil fuel subsidies provides a global picture that encompasses both consumer and producer subsidies. It allows for tracking of national and global trends and serve as an important guide for policymaking.

<i>Parameter</i>	<i>Description</i>
Policy context	<p>The scale and impact of fossil fuel subsidies presents both challenges and opportunities for achieving the goals of the 2030 Agenda on Sustainable Development. For one, the use of fossil fuels, and their promotion through subsidy schemes, adversely affects the ability of governments to attain key goals, such as reducing poverty, improving health, reaching gender equality, providing access to energy, and addressing climate change. At the same time, there is a need to ensure that poor households that are particularly vulnerable to price increases obtain or retain access to energy. Energy-dependent sectors of the economy can be affected, particularly by abrupt changes in prices. Any successful reform therefore requires careful analysis and adapted mitigation measures. For another, reallocating fossil fuel subsidies to sectors that are relevant for development could give a boost to reaching the SDGs.</p> <p>In its 8th Action Programme to 2030 the European Union emphasises that “initiatives, programmes, investments, projects and agreements, should take into consideration the ‘do no significant harm’ principle laid down in Article 17 of the Taxonomy Regulation.”</p>
Link with SDG indicators	12.c.1 Amount of fossil-fuel subsidies per unit of GDP (production and consumption) and as a proportion of total national expenditure on fossil fuels
Methodology for indicator calculation	<p>It is proposed that countries report on the subsidy categories listed below as sub-indicators.</p> <p>Direct transfers;</p> <p>Induced transfers (reporting on regulated prices and calculation of the total amount);</p> <p>Tax expenditure, other government revenue foregone and under-pricing of goods and services, including risk (optional).</p>

<i>Parameter</i>	<i>Description</i>
	<p>The last category should be included as an optional sub-indicator. Each sub-indicator should be expressed in national currency or United States dollars in current prices. UN Environment will use market exchange rates to calculate between national currency and United States dollar.</p> <p>Care should be given if a country chooses to aggregate across the three sub-indicators in order to avoid double counting and all three sub-indicators should be publicly available to ensure transparency.</p> <p>Care needs to be taken when aggregating estimates of induced transfers with data on direct transfers and some measures in underpricing of goods and services.</p> <p>Estimates of subsidies to consumers observable through price-gaps (i.e., consumer price support) have been calculated by several international organizations (IADB, IEA, and IMF), covering different geographic regions and time-periods. The three organisations that produce these estimates use roughly the same approach, which can be summed up by the following equation:</p> <p>Consumer price support = (adjusted net-of-tax reference unit price – local net-of-tax unit price) x units subsidized</p> <p>Estimates are based on reference prices on import (or export) parity prices using the price of a product at the nearest international hub, adjusted for quality differences if necessary, plus (or minus) the cost of freight and insurance to the net importer (or back to the net exporter), plus the cost of internal distribution and marketing and any value-added tax (VAT). For tradable commodities (mainly coal, crude oil, and petroleum products), the reference prices are based on the spot price at the nearest international hub – e.g., the United States, Northwest Europe, or Singapore.</p>
Comments	-

## B. Policy references

<i>Title of the reference document</i>	<i>Link</i>
Transforming our world: the 2030 Agenda for Sustainable Development	<a href="https://sdgs.un.org/2030agenda">https://sdgs.un.org/2030agenda</a>
Decision (EU) 2022/591 of the European Parliament and of the Council of 6 April 2022 on a General Union Environment Action Programme to 2030	<a href="https://eur-lex.europa.eu/eli/dec/2022/591/oj">https://eur-lex.europa.eu/eli/dec/2022/591/oj</a>

## C. Methodology references

<i>Title of the reference document</i>	<i>Link</i>
Metadata of SDG indicator 12.c.1: Amount of fossil-fuel subsidies (production and consumption) per unit of GDP	<a href="https://unstats.un.org/sdgs/metadata/">https://unstats.un.org/sdgs/metadata/</a>
Measuring Fossil Fuel Subsidies in the Context of the Sustainable Development Goals	<a href="https://wedocs.unep.org/bitstream/handle/20.500.11822/28111/FossilFuel.pdf?sequence=1&amp;isAllowed=y">https://wedocs.unep.org/bitstream/handle/20.500.11822/28111/FossilFuel.pdf?sequence=1&amp;isAllowed=y</a>

## D. Data and statistics needed to compile the indicator

<i>ID</i>	<i>Data item</i>	<i>FDES topic</i>
330	Direct transfers of funds for production and consumption of fossil fuel	6.2.2: Environmental regulation and instruments
331	Induced transfers (regulations that oblige producers to sell their fuel at lower than the opportunity-cost price of that fuel (consumer price support))	6.2.2: Environmental regulation and instruments
332	Tax expenditures and other government revenue foregone	6.2.2: Environmental regulation and instruments
126	GDP (nominal)	

## E. International databases containing this indicator

<i>Name of the database</i>	<i>Link</i>
SDG Indicators Database	<a href="https://unstats.un.org/sdgs/dataportal/database">https://unstats.un.org/sdgs/dataportal/database</a>

## 7. STATISTICS REQUIRED FOR THE CALCULATION OF THE PRIORITY INDICATORS

119. The following Table 38 provides the list of statistics (and other data) which are required for the calculation of the priority indicators for which metadata are presented in these Guidelines. They are organised by FDES topics.

**Table 38** Statistics (and other data) required for the calculation of the priority indicators

<i>ID</i>	<i>Data item</i>	<i>Unit of measure</i>
55	GDP at constant prices	billion international dollars
125	Total national expenditures for environmental protection activities	national currency
126	GDP (nominal)	National currency
165	Environmental water requirements	million m <sup>3</sup>
195	Value added per economic activity	national currency or USD
<b>1.1.1: Atmosphere, climate and weather</b>		
260	Temperature: Climate normal (1961-1990)	Celsius degrees
261	Temperature: Mean annual temperature	Celsius degrees
<b>1.1.3: Geological and geographical information</b>		
66	Country area	1000 km <sup>2</sup>
227	Area of territorial seas (up to 12 nm) per country	
265	Total land area	km <sup>2</sup>
<b>1.2.1: Land cover</b>		
262	Land cover type	area (e.g. ha)
<b>1.2.2: Ecosystems and biodiversity</b>		
58	Total areas under protection (IUCN categories of protected areas)	1000 km <sup>2</sup>
59	Areas under category Ia protection (IUCN category "strict nature reserve")	1000 km <sup>2</sup>
60	Areas under category Ib protection (IUCN category "wilderness area")	1000 km <sup>2</sup>

<i>ID</i>	<i>Data item</i>	<i>Unit of measure</i>
61	Areas under category II protection (IUCN category “national park”)	1000 km <sup>2</sup>
62	Areas under category III protection (IUCN category “national monument or feature”)	1000 km <sup>2</sup>
63	Areas under category IV protection (IUCN category “habitat/species management area”)	1000 km <sup>2</sup>
64	Areas under category V protection (IUCN category “protected landscape / seascape”)	1000 km <sup>2</sup>
65	Areas under category VI protection (IUCN category “protected area with sustainable use of natural resources”)	1000 km <sup>2</sup>
226	Total areas designated as other effective area-based conservation measures	number
234	Number of threatened species of mammals	number
235	Number of threatened species of birds	number
236	Number of threatened species of fish	number
237	Number of threatened species of reptiles	number
238	Number of threatened species of amphibians	number
239	Number of threatened species of invertebrates	number
240	Number of threatened species of vascular plants	number
241	Number of threatened species of mosses	number
242	Number of threatened species of lichens	number
243	Number of threatened species of fungi	number
244	Overall number of species of mammals documented in country	number
245	Overall number of species of birds documented in country	number
246	Overall number of species of fish documented in country	number
247	Overall number of species of reptiles documented in country	number
248	Overall number of species of amphibians documented in country	number
249	Overall number of species of invertebrates documented in country	number
250	Overall number of species of vascular plants documented in country	number
251	Overall number of species of mosses documented in country	number

<i>ID</i>	<i>Data item</i>	<i>Unit of measure</i>
252	Overall number of species of lichens documented in country	number
253	Overall number of species of fungi documented in country	number
258	Number of threatened species of algae	number
259	Overall number of species of algae documented in country	number
263	Land productivity	vegetation indices
270	Number of species on the IUCN list according to IUCN Red List categories	number
<b>1.2.3: Forests</b>		
230	Forest area	hectares or km <sup>2</sup>
336	Above-ground biomass in forest	tonnes
337	Forest area within legally established protected areas	hectares or km <sup>2</sup>
338	Forest area under a long-term management plan	hectares or km <sup>2</sup>
339	Forest area under an independently verified forest management certification scheme	hectares or km <sup>2</sup>
363	Natural forest area	hectares or km <sup>2</sup>
<b>1.3.1: Air quality</b>		
3	Ambient air quality - PM <sub>10</sub> : Annual average concentration	micrograms per cubic meter of air
8	Ambient air quality - SO <sub>2</sub> : Annual average concentration	mg/m <sup>3</sup>
13	Ambient air quality - NO <sub>2</sub> : Annual average concentration	mg/m <sup>3</sup>
268	Ambient air quality - PM <sub>2.5</sub> : Annual average concentration	micrograms per cubic meter of air
272	Ambient air quality: Number of inhabitants corresponding to the monitoring station	number
<b>1.3.2: Fresh water quality</b>		
273	Water quality status of rivers	Water quality status according to SDG indicator 6.3.1 methodology
274	Water quality status of lakes	Water quality status according to SDG indicator 6.3.1 methodology



<i>ID</i>	<i>Data item</i>	<i>Unit of measure</i>
275	Water quality status of groundwater aquifers	Water quality status according SDG indicator 6.3.1 methodology
<b>2.1.1: Stocks and changes of mineral resources</b>		
276	Domestic extraction of materials	tonnes
<b>2.1.2: Production and trade of minerals</b>		
277	Raw material equivalent of imports	tonnes
278	Raw material equivalents of exports.	tonnes
279	Direct imports of materials	tonnes
280	Direct exports of material	tonnes
<b>2.2.2: Production, trade and consumption of energy</b>		
22	Final energy consumption: Households	ktoe
30	Production of energy	ktoe
31	Imports of energy	ktoe
32	Exports of energy	ktoe
33	International marine and aviation bunkers	ktoe
34	Stock changes of energy	ktoe
35	Total primary energy supply: Coal	ktoe
36	Total primary energy supply: Peat	ktoe
37	Total primary energy supply: Oil shale and oil sands	ktoe
38	Total primary energy supply: Natural gas	ktoe
39	Total primary energy supply: Oil	ktoe
40	Total primary energy supply: Waste - non-renewable	ktoe
41	Total primary energy supply: Nuclear fuels	ktoe
42	Total primary energy supply: Other non-renewable fuels	ktoe
43	Total primary energy supply: Solid biofuels	ktoe
44	Total primary energy supply: Biogases	ktoe
45	Total primary energy supply: Liquid biofuels	ktoe
46	Total primary energy supply: Hydropower	ktoe

<i>ID</i>	<i>Data item</i>	<i>Unit of measure</i>
47	Total primary energy supply: Geothermal	ktoe
48	Total primary energy supply: Solar photovoltaic	ktoe
49	Total primary energy supply: Solar thermal	ktoe
50	Total primary energy supply: Tide/wave/ocean	ktoe
51	Total primary energy supply: Wind	ktoe
52	Total primary energy supply: Waste - renewable	ktoe
53	Total primary energy supply: Other renewable fuels	ktoe
54	Imports of energy: of which electricity imported	ktoe
56	Total primary energy supply: total	ktoe
57	Total primary energy supply: Total renewable energy supply	ktoe
269	Total energy use by the national economy	Pejajoule (PJ)
<b>2.3.1: Land use</b>		
281	Net land take for housing, services and recreation	km <sup>2</sup>
282	Net land take for industrial and commercial sites	km <sup>2</sup>
283	Net land take for transport networks and infrastructure	km <sup>2</sup>
284	Net land take for mines, quarries and waste dump sites	km
285	Net land take for construction sites	km
358	Agricultural area	hectares or km <sup>2</sup>
<b>2.3.2: Use of forest land</b>		
232	Burnt forest area	hectares
<b>2.4.1: Soil resources</b>		
264	Soil organic carbon stock	t/ha
<b>2.5.2: Aquatic resources</b>		
271	Percentage of marine stocks of fish classified as "within biologically sustainable levels" for the Reference List of Stocks	%
<b>2.6.1: Water resources</b>		
160	Precipitation	million m <sup>3</sup>

<i>ID</i>	<i>Data item</i>	<i>Unit of measure</i>
161	Actual evapotranspiration	million m <sup>3</sup>
162	Inflow of surface and groundwaters from neighbouring countries	million m <sup>3</sup>
<b>2.6.2: Abstraction, use and returns of water</b>		
166	Fresh surface water abstracted: total	million m <sup>3</sup>
167	Fresh groundwater abstracted: total	million m <sup>3</sup>
168	Freshwater abstracted: by water supply industry (ISIC 36)	million m <sup>3</sup>
169	Freshwater abstracted: by households	million m <sup>3</sup>
170	Freshwater abstracted: by agriculture, forestry and fishing (ISIC 01-03)	million m <sup>3</sup>
171	Freshwater abstracted: by manufacturing (ISIC 10-33)	million m <sup>3</sup>
172	Freshwater abstracted: by manufacturing (ISIC 10-33): of which industry cooling	million m <sup>3</sup>
174	Freshwater abstracted: by production of electricity (cooling) (ISIC 35.11-35.13)	million m <sup>3</sup>
175	Freshwater abstracted: by construction and other industrial activities	million m <sup>3</sup>
176	Freshwater abstracted: by services (ISIC 45-96)	million m <sup>3</sup>
177	Freshwater abstracted: by agriculture, forestry and fishing (ISIC 01-03): of which irrigation	million m <sup>3</sup>
178	Freshwater abstracted: by agriculture, forestry and fishing (ISIC 01-03): of which aquaculture	million m <sup>3</sup>
179	Desalinated water	million m <sup>3</sup>
180	Reused water	million m <sup>3</sup>
181	Imports of water	million m <sup>3</sup>
182	Exports of water	million m <sup>3</sup>
183	Losses of water during transport	million m <sup>3</sup>
184	Freshwater used: by households	million m <sup>3</sup>
185	Freshwater used: by agriculture, forestry and fishing (ISIC 01-03)	million m <sup>3</sup>
186	Freshwater used: by agriculture, forestry and fishing (ISIC 01-03): of which for irrigation in agriculture	million m <sup>3</sup>
187	Freshwater used: by manufacturing (ISIC 10-33)	million m <sup>3</sup>

<i>ID</i>	<i>Data item</i>	<i>Unit of measure</i>
188	Freshwater used: by manufacturing (ISIC 10-33): of which industry cooling	million m <sup>3</sup>
189	Freshwater used: by mining and quarrying (05-09)	million m <sup>3</sup>
190	Freshwater used: by production of electricity (cooling) (ISIC 35.11-35.13)	million m <sup>3</sup>
191	Freshwater used: by construction and other industrial activities	million m <sup>3</sup>
192	Freshwater used: by services (ISIC 45-96)	million m <sup>3</sup>
193	Freshwater used: by agriculture, forestry and fishing (ISIC 01-03): of which aquaculture	million m <sup>3</sup>

### 3.1.1: Emissions of greenhouse gases

199	Air emissions: Sulfur oxide (SO <sub>x</sub> ) total	1000 t (expressed as SO <sub>2</sub> )
202	Air emissions: Nitrogen oxides (NO <sub>x</sub> ) total	1000 t
205	Air emissions: Non-methane volatile organic compounds (NMVOCs) total	1000 t
206	Air emissions: Non-methane volatile organic compounds (NMVOCs) - of which from stationary sources	1000 t
207	Air emissions: Non-methane volatile organic compounds (NMVOCs) - of which from mobile sources	1000 t
214	Air emissions: Hydrocarbons total	1000 t
215	Air emissions: Hydrocarbons - of which from stationary sources	1000 t
216	Air emissions: Hydrocarbons - of which from mobile sources	1000 t
286	Air emissions: carbon dioxide (CO <sub>2</sub> )	CO <sub>2</sub> -equivalent
287	Air emissions: methane (CH <sub>4</sub> )	CO <sub>2</sub> -equivalent
288	Air emissions: nitrous oxide (N <sub>2</sub> O)	CO <sub>2</sub> -equivalent
289	Air emissions: perfluorocarbons (PFCs)	CO <sub>2</sub> -equivalent
290	Air emissions: hydrofluorocarbons (HFCs)	CO <sub>2</sub> -equivalent
291	Air emissions: nitrogen trifluoride (NF <sub>3</sub> )	CO <sub>2</sub> -equivalent
292	Air emissions: total GHG emissions of sector "energy"	1000 t
293	Air emissions: total GHG emissions of sector "industrial processes and product use"	1000 t

<i>ID</i>	<i>Data item</i>	<i>Unit of measure</i>
294	Air emissions: total GHG emissions of sector "agriculture, forestry and other land use"	1000 t
295	Air emissions: total GHG emissions of sector "waste"	1000 t
296	Air emissions: carbon dioxide (CO <sub>2</sub> ) from fuel combustion (total and per economic activity (ISIC 4.0))	millions of tonnes
297	Air emissions: Net GHG emissions per LULUCF sub-sector (forest land, cropland, grassland, wetlands, settlements, other land)	CO <sub>2</sub> equivalent
298	Air emissions: GHG emissions of economic activities (total and per activity, ISIC 4.0 A-U)	CO <sub>2</sub> equivalent
<b>3.1.2: Consumption of ozone depleting substances</b>		
299	Consumption of ODS: CFCs	tonnes
300	Consumption of ODS: Halons	tonnes
301	Consumption of ODS: Other fully halogenated CFCs	tonnes
302	Consumption of ODS: Carbon tetrachloride	tonnes
303	Consumption of ODS: 1,1,1-trichloroethane (methyl chloroform)	tonnes
304	Consumption of ODS: Hydrochlorofluorocarbons	tonnes
305	Consumption of ODS: Hydrobromofluorocarbons	tonnes
306	Consumption of ODS: Methyl bromide	tonnes
307	Consumption of ODS: Bromochloromethane	tonnes
308	Consumption of ODS: Hydrofluorocarbons	tonnes
<b>3.1.3: Emissions of other substances</b>		
208	Air emissions: Ammonia (NH <sub>3</sub> ) total	1000 t
217	Air emissions: Total suspended particles (TSP) total	1000 t
218	Air emissions: Total suspended particles (TSP) - of which from stationary sources	1000 t
219	Air emissions: Total suspended particles (TSP) - of which from mobile sources	1000 t
220	Air emissions: PM <sub>10</sub> total	1000 t
221	Air emissions: PM <sub>10</sub> - of which from stationary sources	1000 t
222	Air emissions: PM <sub>10</sub> - of which from mobile sources	1000 t

<i>ID</i>	<i>Data item</i>	<i>Unit of measure</i>
223	Air emissions: PM <sub>2.5</sub> total	1000 t
224	Air emissions: PM <sub>2.5</sub> - of which from stationary sources	1000 t
225	Air emissions: PM <sub>2.5</sub> - of which from mobile sources	1000 t
<b>3.2.1: Generation and pollutant content of wastewater</b>		
316	Wastewater generated: Agriculture, forestry and fishing (ISIC 01-03)	million m <sup>3</sup>
317	Wastewater generated: Mining and quarrying (ISIC 05-09)	million m <sup>3</sup>
318	Wastewater generated: Manufacturing (ISIC 10-33)	million m <sup>3</sup>
319	Wastewater generated: Electricity, gas, steam and air conditioning supply (ISIC 35)	million m <sup>3</sup>
320	Wastewater generated: Construction (ISIC 41-43)	million m <sup>3</sup>
321	Wastewater generated: Other economic activities	million m <sup>3</sup>
322	Wastewater generated: Households	million m <sup>3</sup>
368	Wastewater generated: Agriculture, forestry and fishing (ISIC 01-03) - BOD <sub>5</sub> load	tonnes
369	Wastewater generated: Mining and quarrying (ISIC 05-09) - BOD <sub>5</sub> load	tonnes
370	Wastewater generated: Manufacturing (ISIC 10-33) - BOD <sub>5</sub> load	tonnes
371	Wastewater generated: Electricity, gas, steam and air conditioning supply (ISIC 35) - BOD <sub>5</sub> load	tonnes
372	Wastewater generated: Construction (ISIC 41-43) - BOD <sub>5</sub> load	tonnes
373	Wastewater generated: Other economic activities - BOD <sub>5</sub> load	tonnes
374	Wastewater generated: Households - BOD <sub>5</sub> load	tonnes
<b>3.2.2: Collection and treatment of wastewater</b>		
312	Wastewater treatment: UWWTPs with primary treatment - organic design capacity	p.e. (population equivalents)
313	Wastewater treatment: UWWTPs with secondary treatment - organic design capacity	p.e. (population equivalents)
314	Wastewater treatment: UWWTPs with tertiary treatment - organic design capacity	p.e. (population equivalents)

<i>ID</i>	<i>Data item</i>	<i>Unit of measure</i>
323	Wastewater treated: UWWTPs with primary treatment	million m <sup>3</sup>
324	Wastewater treated: UWWTPs with secondary treatment	million m <sup>3</sup>
325	Wastewater treated: UWWTPs with tertiary treatment	million m <sup>3</sup>
326	Wastewater treated: Other treatment plants with primary treatment	million m <sup>3</sup>
327	Wastewater treated: Other treatment plants with secondary treatment	million m <sup>3</sup>
328	Wastewater treated: Other treatment plants with tertiary treatment	million m <sup>3</sup>
329	Wastewater treated: Independent treatment facilities with at least secondary treatment	million m <sup>3</sup>
360	Wastewater treated: Independent treatment facilities with primary treatment only	million m <sup>3</sup>
362	Wastewater collection: Population connected to a wastewater collecting system	number
375	Wastewater treated: UWWTPs with primary treatment - BOD <sub>5</sub> load removed	tonnes
376	Wastewater treated: UWWTPs with secondary treatment - BOD <sub>5</sub> load removed	tonnes
377	Wastewater treated: UWWTPs with tertiary treatment - BOD <sub>5</sub> load removed	tonnes
378	Wastewater treated: Other treatment plants with primary treatment - BOD <sub>5</sub> load removed	tonnes
379	Wastewater treated: Other treatment plants with secondary treatment - BOD <sub>5</sub> load removed	tonnes
380	Wastewater treated: Other treatment plants with tertiary treatment - BOD <sub>5</sub> load removed	tonnes
381	Wastewater treated: Independent treatment facilities with primary treatment only - BOD <sub>5</sub> load removed	tonnes
382	Wastewater treated: Independent treatment facilities with at least secondary treatment - BOD <sub>5</sub> load removed	tonnes

### 3.3.1: Generation of waste

128	Waste generation: Agriculture, forestry and fishing (ISIC 01-03)	1000 t
129	Waste generation: Mining and quarrying (ISIC 05-09)	1000 t/

<i>ID</i>	<i>Data item</i>	<i>Unit of measure</i>
130	Waste generation: Electricity, gas, steam and air conditioning supply (ISIC 35)	1000 t
131	Waste generation: Construction (ISIC 41 - 43)	1000 t
132	Waste generation: Other economic activities excluding ISIC 38	1000 t
133	Waste generation: Households	1000 t
134	Total waste generation	1000 t/
136	Hazardous waste: Generated during the year	1000 t
144	Municipal waste generated	1000 t

### 3.3.2: Management of waste

140	Hazardous waste: Total amount treated or disposed during the year - of which recycled	1000 t
141	Hazardous waste: Total amount treated or disposed during the year - of which incinerated	1000 t
142	Hazardous waste: Total amount treated or disposed during the year - of which landfilled	1000 t
143	Hazardous waste: Total amount treated or disposed during the year - of which other disposal	1000 t
309	Material recycled	tonnes
310	Material exported intended for recycling	tonnes
311	Material imported intended for recycling	tonnes

### 3.4.1: Release of chemical substances

355	Fertilizer consumption: Nitrogen	tonnes of total nitrogen
356	Fertilizer consumption: Phosphorus	tonnes of K <sub>2</sub> O
357	Fertilizer consumption: Potassium	tonnes P <sub>2</sub> O <sub>5</sub>
359	Fertilizer consumption: Organic fertilizers	tonnes

### 4.1.2: Impact of natural extreme events and disasters

341	Direct agricultural loss attributed to disasters	national currency
342	Direct economic loss to all other damaged or destroyed productive assets attributed to disasters	national currency



<i>ID</i>	<i>Data item</i>	<i>Unit of measure</i>
343	Direct economic loss in the housing sector attributed to disasters	national currency
344	Direct economic loss resulting from damaged or destroyed critical infrastructure attributed to disasters	national currency
345	Direct economic loss to cultural heritage damaged or destroyed attributed to disasters	national currency
346	Number of deaths attributed to disasters	number of people
<b>5.1.1: Urban and rural population</b>		
127	Resident population	number
<b>5.1.2: Access to selected basic services</b>		
159	Population served by municipal waste collection services	number
340	Population with access to safely managed drinking water services	number
<b>5.1.5: Environmental concerns specific to urban settlements</b>		
347	Transport: Aviation passenger volume	Revenue Passenger-Kilometres (RPK)
364	Transport: Aviation passenger volume - of which domestic	Revenue Passenger-Kilometres (RPK)
348	Transport: Aviation freight volume	Freight Tonne Kilometres (FTK)
367	Transport: Maritime passenger volume	Passenger-Kilometres (Pkm)
366	Transport: Maritime passenger volume - of which domestic	Passenger-Kilometres (Pkm)
349	Transport: Maritime freight volume	Metric tonnes and twenty-foot equivalent unit (TEU)
350	Transport: Road passenger volume	Passenger-Kilometres (Pkm)
351	Transport: Road freight volume	Tonne-Kilometres (Tkm)
352	Transport: Rail passenger volume	Passenger-Kilometres (Pkm)
353	Transport: Rail freight volume	Tonne-Kilometres (Tkm)

<i>ID</i>	<i>Data item</i>	<i>Unit of measure</i>
365	Transport: Inland waterways passenger volume	Passenger-Kilometres (Pkm)
354	Transport: Inland waterways freight volume	Tonne-Kilometres (Tkm)
383	Road vehicles by category of vehicle	number
384	Road vehicles by type of motor fuel	number

### 6.1.1: Government environmental protection and resource management expenditure

83	Expenditures of the government for protection of ambient air and climate (CEPA1)	national currency
87	Expenditures of the government for wastewater management (CEPA2)	national currency
95	Expenditures of the government for waste management (CEPA3)	national currency
105	Expenditures of the government for noise and vibration abatement (excluding workplace protection) (CEPA5)	national currency
109	Expenditures of the government for protection of biodiversity and landscapes (CEPA6)	national currency
113	Expenditures of the government for protection against radiation (excluding external safety) (CEPA7)	national currency
117	Expenditures of the government for research and development for environmental protection (CEPA8)	national currency
121	Expenditures of the government for other environmental protection activities (CEPA9)	national currency

### 6.1.2: Corporate, non-profit institution and household environmental protection and resource management expenditure

84	Expenditures of non-profit organisations for protection of ambient air and climate (CEPA1)	national currency
85	Expenditures of households for protection of ambient air and climate (CEPA1)	national currency
86	Expenditures of enterprises for protection of ambient air and climate (CEPA1)	national currency
88	Expenditures of non-profit organisations for wastewater management (CEPA2)	national currency
89	Expenditures of households for wastewater management (CEPA2)	national currency

<i>ID</i>	<i>Data item</i>	<i>Unit of measure</i>
90	Expenditures of enterprises for wastewater management (CEPA2)	national currency
96	Expenditures of non-profit organisations for waste management (CEPA3)	national currency
97	Expenditures of households for waste management (CEPA3)	national currency
103	Expenditures of enterprises for protection and remediation of soil, groundwater and surface water (CEPA4)	national currency
106	Expenditures of non-profit organisations for noise and vibration abatement (excluding workplace protection) (CEPA5)	national currency
107	Expenditures of households for noise and vibration abatement (excluding workplace protection) (CEPA5)	national currency
108	Expenditures of enterprises for noise and vibration abatement (excluding workplace protection) (CEPA5)	national currency
110	Expenditures of non-profit organisations for protection of biodiversity and landscapes (CEPA6)	national currency
111	Expenditures of households for protection of biodiversity and landscapes (CEPA6)	national currency
112	Expenditures of enterprises for protection of biodiversity and landscapes (CEPA6)	national currency
114	Expenditures of non-profit organisations for protection against radiation (excluding external safety) (CEPA7)	national currency
115	Expenditures of households for protection against radiation (excluding external safety) (CEPA7)	national currency
116	Expenditures of enterprises for protection against radiation (excluding external safety) (CEPA7)	national currency
118	Expenditures of non-profit organisations for research and development for environmental protection (CEPA8)	national currency
119	Expenditures of households for research and development for environmental protection (CEPA8)	national currency
120	Expenditures of enterprises for research and development for environmental protection (CEPA8)	national currency
122	Expenditures of non-profit organisations for other environmental protection activities (CEPA9)	national currency
123	Expenditures of households for other environmental protection activities (CEPA9)	national currency

<i>ID</i>	<i>Data item</i>	<i>Unit of measure</i>
124	Expenditures of enterprises for other environmental protection activities (CEPA9)	national currency
<b>6.2.2: Environmental regulation and instruments</b>		
333	Revenue from energy taxes	national currency
334	Revenue from transport taxes	national currency
335	Revenue from pollution and resource taxes	national currency
330	Direct transfers of funds for production and consumption of fossil fuel	national currency
331	Induced transfers (regulations that oblige producers to sell their fuel at lower than the opportunity-cost price of that fuel (consumer price support))	national currency
332	Tax expenditures and other government revenue foregone	national currency

## 8. REFERENCES

120. The following reference documents are referred to as policy and/or methodological references in the indicator metadata.

Butterfly Conservation Europe (2020): Assessing Butterflies in Europe – Butterfly Indicators 1990-2018. Technical Report. <https://butterfly-monitoring.net/sites/default/files/Pdf/Reports/Assessing%20Butterflies%20in%20Europe%20-%20Butterfly%20Indicators%20Revised.pdf>

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# Guidelines for the Application of Environmental Indicators 2023 Edition

Environmental indicators play a key role for policy evaluation and designing new policies. They also help inform the public on the state and trends of the environment and on possible implications for human health.

UNECE has supported its member States over several decades in improving national environmental statistics and indicators with the aim to enhance the knowledge base in support of decision-making and public information.

Within the framework of ongoing cooperation under the UNECE Joint Task Force on Environmental Statistics and Indicators and the Working Group on Environmental Monitoring and Assessment, UNECE, the United Nations Environment Programme and the European Environment Agency have for many years promoted the production and use of a common and comparable priority set of environmental indicators for the pan-European region in support of environmental assessment, reporting and policymaking.

The present Guidelines provide a revised list of environmental indicators, as approved at the nineteenth session of the Joint Task Force on Environmental Statistics and Indicators, with the aim to better inform recent global policies. During the revision process the guidelines were also restructured to better align them with statistical frameworks, in particular the Framework for the Development of Environment Statistics.

The revised list of indicators will be promoted and applied throughout the pan-European region in the future. Each indicator responds to a specific purpose and helps describe causes and effects of environmental conditions.

The Guidelines also aim at supporting the preparation of the regular pan-European environmental assessments in support of the Environment for Europe process and its Ministerial Conferences. The guidelines are expected to remain a “living” document, considering that there will be a continuing need to align the guidelines with emerging policy needs and global processes.

This new edition also emphasizes the importance of data disaggregation which provides an invaluable contribution to the implementation of the Sustainable Development Goals.

Information Service  
United Nations Economic Commission for Europe

Palais des Nations  
CH - 1211 Geneva 10, Switzerland  
Telephone: +41(0)22 917 12 34  
E-mail: [unece\\_info@un.org](mailto:unece_info@un.org)  
Website: <http://www.unece.org>

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