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METADATA FOR THE SET OF CORE CLIMATE CHANGE-RELATED INDICATORS AND STATISTICS (Add. 2)

Prepared by the Task Force

The document presents the metadata for the indicators in the core set of climate change-related indicators and statistics. It complements two other documents submitted for your comments:

(i)   Set of core climate change related indicators and statistics using the System of Environmental-Economic Accounting', and
(ii)   Implementation guidelines for the indicator set (Add. 1).

You are invited to comment on all three documents.

***The deadline for the reply is 24 April 2020.** Please send your comments using the attached feedback questionnaire to <u>michael.nagy@un.org</u>.*

Subject to the positive outcome of the consultation, the documents will be submitted to the 2020 CES plenary session (22-24 June, Geneva) for endorsement.

Index: CES Set of Core Climate Change-related Indicators

Area and subarea	ID	Indicator	Tier
Drivers			
National total			
	01a	Total energy use by the national economy	3
	01b	Total primary energy supply (TPES)	1
	02a	Share of fossil fuels in total energy use by the national economy	3
	02b	Share of fossil fuels in total primary energy supply (TPES)	1
	03	Losses of land covered by (semi-) natural vegetation	3
	04	Total support for fossil fuels in relation to GDP	3
Production			
	05a	Total energy intensity of production activities of the national economy	2
	06a	Total CO2 intensity of energy used in production activities of the national economy	2
Consumption			
	08a	Energy use by resident households per capita	1
Emissions			
National total			
	09a	Total greenhouse gas emissions from the national economy	1
	09b	Total greenhouse gas emissions (excluding LULUCF) from the national territory	1
	10a	CO2 emissions from fuel combustion attributable to the national economy	3
	10b	CO2 emissions from fuel combustion within the national territory	1
	11	Greenhouse gas emissions from land use, land use change and forestry (LULUCF)	1
Production			
	12	Total greenhouse gas emissions from production activities	1
	13	Greenhouse gas emission intensity of production activities	1
Consumption			
	14	Direct greenhouse gas emissions from households	1
	15	Carbon footprint	2
Impacts			
National total			
	24	Direct economic loss attributed to hydro-meteorological disasters in relation to GDP	2
Physical conditions			
	16	Mean temperature anomaly (compared to climate normal 1961 - 1990)	1
	17	Percentage of land area suffering from unusually wet or dry conditions (Standard Precipitation Index)	1
	23	Occurrence of extremes of temperatures and precipitation	1
Water resources			
	18	Level of water stress: freshwater withdrawal as a proportion of available freshwater resources	1

Area and subarea	ID	Indicator	Tier
Land, land cover, ecosystems and biodiversity			
	20	Carbon stock in soil	3
	21	Proportion of land that is degraded over total land area	1
	86	PLACEHOLDER FOR INDICATOR ON CC IMPACT ON BIODIVERSITY	
Human settlements and human health			
	22	Number of deaths and missing persons attributed to hydro-meteorological disasters, per 100,000 population	2
	25	Number of people whose destroyed dwellings were attributed to hydro-meteorological disasters	2
	26	Incidence of climate-related vector-borne diseases	2
	27	Excess mortality related to heat	3
Agriculture, forestry and fishery			
	28	Direct agricultural loss attributed to hydro-meteorological disasters	2
Mitigation			
Agriculture, forestry and fishery			
	81	Net emissions/removal of carbon dioxide by forest land from national territory	1
Energy resources			
	29a	Renewable energy share in total energy use by the national economy	3
	29b	Renewable energy share in the total final energy consumption within the national territory	1
Expenditures			
	30	Share of climate change mitigation expenditure in relation to GDP	3
Environmental governance and regulation			
	31	Share of energy and transport related taxes in total taxes and social contributions	1
	32	Total climate change related subsidies and similar transfers in relation to GDP	3
	33	Average trading carbon price	1
	34	Amounts provided and mobilized in United States dollars per year in relation to the continued existing collective mobilization goal of the $100 billion commitment through to 2025	3
Adaptation			
Water resources			
	36	Change in water use efficiency over time	1
Human settlements and human health			
	82	Share of green spaces in the total area of cities	3
Agriculture, forestry and fishery			
	39	Proportion of agricultural area under productive and sustainable agriculture	2
	87	PLACEHOLDER FOR INDICATOR ON CC ADAPTATION BY FORESTS	
Expenditures			
	35	Share of government adaptation expenditure in relation to GDP	3

01a   Total energy use by the national economy

Indicator type **Core indicator**

Versioning

First publication | 1/26/2017 | Latest update | 9/24/2019

Area and sub-area

Area and sub-area | Drivers | National total

Presentation

Tier | 3

Indicator definition and description | 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 economy

Reference period | Calendar year

Update frequency | Annual

Base period | Not applicable

Disaggregation (operational indicators)

Disaggregation (operational indicators)	Comments
Economic sector (ISIC) and households	
Spatial	
Energy product (SIEC)	

Other related indicators (contextual, proxy, other core indicators)

ID	Subindicator	Type
01b	Total primary energy supply (TPES)	Core indicator
10a	CO2 emissions from fuel combustion attributable to the national economy	Core indicator
53	Energy imports by type of energy	Contextual indicator
54	Energy exports by type of energy	Contextual indicator

Relevance

Policy context and rationale | 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'.

Related SDG indicator | Not applicable

Relation |

Sendai Framew. indicator | Not applicable

01a   Total energy use by the national economy

Indicator type **Core indicator**

Policy references

Methodology

Methodology for indicator calculation	This indicator is derived from PEFA Table A (physical supply table). Is is the sum of supply by production and consumption activities of two specific residuals classes, namely - R30 'Energy losses all kinds of (during extraction, distribution, storage and transformation, and dissipative heat from end use)' and - R31 'Energy incorporated in products for non-energy use'. This indicator is automatically calculated in Table D: PEFA_IND06 "Net domestic energy use".

Methodology references

Document title	Link
Physical Flow Accounts for Energy (PEFA Manual) (Eurostat, 2014)	http://ec.europa.eu/eurostat/web/environment/methodology
System of Environmental-Economic Accounting for Energy (SEEA-Energy) (United Nations Statistics Division, 2019)	https://seea.un.org/seea-energy
International Recommendations for Energy Statistics (United Nations, 2018)	https://unstats.un.org/unsd/energy/ires/

Classification syst.	Standard International Energy Product Classification (SIEC)

Data sources

Main source	Official statistics: SEEA and/or SNA
Explanation	SEEA energy accounts

SEEA Accounts that can serve as data sources

SEEA Account	Comments
Physical flow accounts for energy	

UN-FDES	2.2.2: Production, trade and consumption of energy

International databases containing this indicator

Comments

Comments	In PEFA (Table D), this indicator is called 'Net domestic energy use' and it can beconsidered 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'

01b   Total primary energy supply (TPES)

Indicator type   **Core indicator**

Versioning

First publication | 1/26/2017 | Latest update | 9/17/2019

Area and sub-area

Area and sub-area | Drivers | National total

Presentation

Tier | 1

Indicator definition and description | Amount of energy available for use in a country.

Unit of measure | Petajoule (PJ)

Coverage | Production activities and consumption activities

Spatial aggregation | National territory

Reference period | Calendar year

Update frequency | Annual

Base period | Not applicable

Disaggregation (operational indicators)

Disaggregation (operational indicators)	Comments
Spatial	
Energy product (SIEC)	

Other related indicators (contextual, proxy, other core indicators)

ID	Subindicator	Type
01a	Total energy use by the national economy	Core indicator
53	Energy imports by type of energy	Contextual indicator
54	Energy exports by type of energy	Contextual indicator

Relevance

Policy context and rationale | Key indicator for almost all national and international energy- and climate-related policies

Related SDG indicator | 7.3.1 Energy intensity measured in terms of primary energy and GDP

Relation | Related (e.g. part of the indicator calculation)

Sendai Framew. indicator | Not applicable

Policy references

Document title	Link
Transforming our world: the 2030 Agenda for Sustainable Development (General Assembly of the United Nations, 2015)	https://sustainabledevelopment.un.org/post2015/transformingourworld

01b Total primary energy supply (TPES)

Indicator type **Core indicator**

Metadata of SDG indicator 7.3.1: Energy intensity measured in terms of primary energy and GDP (last update: 14 February 2019) (International Energy Agency (IEA) and United Nations Statistics Division (UNSD), 2019)	https://unstats.un.org/sdgs/metadata/files/Metadata-07-03-01.pdf
EEA Metadata for indicator ENER 026: Primary energy consumption by fuel (European Environment Agency, 2019)	https://www.eea.europa.eu/data-and-maps/indicators/primary-energy-consumption-by-fuel-6

Methodology

Methodology for indicator calculation

This indicator is calculated as production + imports - exports - bunkers - stock changes.

Methodology references

Document title	Link
IEA World Energy Balances (International Energy Agency,)	http://www.iea.org/statistics/topics/energybalances/
Energy Statistics Manual (OECD, International Energy Agency, Eurostat, 2005)	https://webstore.iea.org/energy-statistics-manual
International Recommendations for Energy Statistics (United Nations, 2018)	https://unstats.un.org/unsd/energy/ires/

Classification syst.   Standard International Energy Product Classification (SIEC)

Data sources

Main source   Official statistics: other than accounts

Explanation   Energy balances, energy statistics

SEEA Accounts that can serve as data sources

UN-FDES   2.2.2: Production, trade and consumption of energy

International databases containing this indicator

Eurostat database	https://ec.europa.eu/eurostat/data/database
International Energy Agency	http://www.iea.org/statistics/

Comments

Comments

The indicator is also part of the UNECE Online Guidelines for the Application of Environmental Indicators (Indicator G2 on primary energy supply, https://www.unece.org/env/indicators.html)

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.

Note that the concept of primary energy consumption does not exist in IRES, although it defines a "final energy consumption" which excludes non-energy uses of energy products but also excludes all the transformation sector.

02a   Share of fossil fuels in total energy use by the national economy

Indicator type **Core indicator**

Versioning

First publication | 1/26/2017 | Latest update | 9/24/2019

Area and sub-area

Area and sub-area | Drivers | National total

Presentation

Tier | 3

Indicator definition and description | Share of fossil fuels of the total energy use for a national economy. Fossil fuels used for non-energy products are not considered.

Unit of measure | %

Coverage | All economic activities (production, consumption, accumulation) undertaken by resident units

Spatial aggregation | National economy

Reference period | Calendar year

Update frequency | Annual

Base period | Not applicable

Disaggregation (operational indicators)

Disaggregation (operational indicators)	Comments
Economic sector (ISIC) and households	
Spatial	
Energy product (SIEC)	

Other related indicators (contextual, proxy, other core indicators)

ID	Subindicator	Type
01a	Total energy use by the national economy	Core indicator
02b	Share of fossil fuels in total primary energy supply (TPES)	Core indicator
29a	Renewable energy share in total energy use by the national economy	Core indicator

Relevance

Policy context and rationale | The combustion of fossil fuels is a leading contributor to global man-made greenhouse-gas emissions.

Related SDG indicator | Not applicable

Relation

Sendai Framew. indicator | Not applicable

Policy references

Document title	Link

02a Share of fossil fuels in total energy use by the national economy

Indicator type **Core indicator**

Communication From The Commission To The European Parliament, The Council, The European Economic And Social Committee And The Committee Of The Regions Energy 2020 A Strategy For Competitive, Sustainable And Secure Energy (European Commission, 2010)	https://ec.europa.eu/energy/en/topics/energy-strategy-and-energy-union/2020-energy-strategy

Methodology

Methodology for indicator calculation	Further research needed. Total energy use is measured at the end use stage. 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. Seperating out what share of that energy comes from fossil fuels is not straightforward, e.g. it requires an estimate of the energy mix for imported electricity

Methodology references

Document title	Link
Physical Flow Accounts for Energy (PEFA Manual) (Eurostat, 2014)	http://ec.europa.eu/eurostat/web/environment/methodology
System of Environmental-Economic Accounting for Energy (SEEA-Energy) (United Nations Statistics Division, 2019)	https://seea.un.org/seea-energy
International Recommendations for Energy Statistics (United Nations, 2018)	https://unstats.un.org/unsd/energy/ires/

Classification syst.	SEEA Physical Flow Accounts/Eurostat Energy Accounts

Data sources

Main source	Official statistics: SEEA and/or SNA
Explanation	SEEA energy accounts

SEEA Accounts that can serve as data sources

SEEA Account	Comments
Physical flow accounts for energy	

UN-FDES	2.2.2: Production, trade and consumption of energy

International databases containing this indicator

Comments

Comments	Such a kind of indicator is not yet included in PEFA. The indicator definition for a such a kind of indicator is not straightforward. Further research is needed.

02b   Share of fossil fuels in total primary energy supply (TPES)

Indicator type   **Core indicator**

Versioning

First publication | 1/26/2017 | Latest update | 9/20/2019

Area and sub-area

Area and sub-area | Drivers | National total

Presentation

Tier | 1

Indicator definition and description | Share of fossil fuels of the total primary energy supply for a national territory. Fossil fuels used for non-energy products are not considered.

Unit of measure | %

Coverage | Production activities and consumption activities

Spatial aggregation | National territory

Reference period | Calendar year

Update frequency | Annual

Base period | Not applicable

Disaggregation (operational indicators)

Disaggregation (operational indicators)	Comments
Spatial	
Energy product (SIEC)	

Other related indicators (contextual, proxy, other core indicators)

ID	Subindicator	Type
01b	Total primary energy supply (TPES)	Core indicator
02a	Share of fossil fuels in total energy use by the national economy	Core indicator
53	Energy imports by type of energy	Contextual indicator
54	Energy exports by type of energy	Contextual indicator

Relevance

Policy context and rationale | The combustion of fossil fuels is a leading contributor to global man-made greenhouse-gas emissions.

Related SDG indicator | Not applicable

Relation

Sendai Framew. indicator | Not applicable

Policy references

Document title	Link

02b   Share of fossil fuels in total primary energy supply (TPES)

Indicator type   **Core indicator**

Transforming our world: the 2030 Agenda for Sustainable Development (General Assembly of the United Nations, 2015)	https://sustainabledevelopment.un.org/post2015/transformingourworld
Communication From The Commission To The European Parliament, The Council, The European Economic And Social Committee And The Committee Of The Regions Energy 2020 A Strategy For Competitive, Sustainable And Secure Energy (European Commission, 2010)	https://ec.europa.eu/energy/en/topics/energy-strategy-and-energy-union/2020-energy-strategy

Methodology

Methodology for indicator calculation	This indicator is calculated as energy supply from fossil fuels divided by total primary energy supply per calendar year. Total primary energy supply is calculated as production + imports - exports - bunkers - stock changes. (see metadatasheet indicator 1b).

Methodology references

Document title	Link
Metadata of Indicator 1 of EEA: Primary Energy Consumption by Fuel (European Environment Agency, 2018)	https://www.eea.europa.eu/data-and-maps/indicators/primary-energy-consumption-by-fuel-6/assessment-2

Classification syst.	Standard International Energy Product Classification (SIEC)

Data sources

Main source	Official statistics: other than accounts
Explanation	Energy balances, energy statistics

SEEA Accounts that can serve as data sources

UN-FDES	2.2.2: Production, trade and consumption of energy

International databases containing this indicator

Eurostat database	https://ec.europa.eu/eurostat/data/database

Comments

Comments

03   Losses of land covered by (semi-) natural vegetation

Indicator type   **Core indicator**

Versioning

First publication   9/19/2019   Latest update   9/19/2019

Area and sub-area

Area and sub-area	Drivers	National total

Presentation

Tier	3
Indicator definition and description	The indicator measures losses of land covered by (semi-) natural vegetation. This category of land is defined as forest land, grassland and other natural vegetated land.
Unit of measure	Hectares
Coverage	National Territory
Spatial aggregation	National territory
Reference period	
Update frequency	
Base period	2000 , 2005, 2010, 2015

Disaggregation (operational indicators)

Other related indicators (contextual, proxy, other core indicators)

Relevance

Policy context and rationale	The OECD has designed this indicator to address the question of whether and to what extent changes in land cover due to human activities and competing uses of land may exert pressures on natural habitats and ecosystems, and erode natural capital. The OECD acknowledges that this indicator only partly captures services from biodiversity and ecosystems. It is a proxy and does not directly measure biodiversity; but changes in the spatial structure of natural habitats – that can be measured using data on land cover – are considered as the best measure currently available to broadly monitor pressures on ecosystems and biodiversity.
Related SDG indicator	15.3.1 Proportion of land that is degraded over total land area
Relation	Similar but not identical
Sendai Framew. indicator	Not applicable

Policy references

Document title	Link
United Nations Framework Convention on Climate Change (United Nations Climate Change, 1994)	https://unfccc.int/process-and-meetings/the-convention/what-is-the-united-nations-framework-convention-on-climate-change

Methodology

03   Losses of land covered by (semi-) natural vegetation

Indicator type   **Core indicator**

Methodology for
indicator
calculation

Methodology references

Document title	Link
Land cover change and conversions: Methodology and results for OECD and G20 countries; Green Growth Headline Indicator (OECD Working Party on Environmental Information (ENV/EPOC/WPEI(2016)1), 2018)	http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=ENV/EPOC/WPEI(2017)3/FINAL&docLanguage=En

Classification syst.

Data sources

Main source   Official statistics: SEEA and/or SNA

Explanation   Main source dual (SEEA Accounts and Statistics): Land accounts, statistics on land use and land cover

SEEA Accounts that can serve as data sources

SEEA Account	Comments
Physical asset accounts for land	

UN-FDES   1.2.1: Land cover

International databases containing this indicator

Comments

Comments

Regarding classification system:
The OECD has been advancing measurement in this area through work specifically dedicated to this indicator, through work on territorial indicators, and through international cooperation with the GEO, the UN-GGIM, the EEA and the FAO. Data are already available to track conversions to and from vegetated land cover classes, but more needs to be done to track conversions to and from artificial surfaces. The work in progress uses global remotely sensed data to achieve a wide geographic coverage (OECD and G20 countries, and beyond) and uses a standardised methodology that is being refined. However, there is not yet a unique global dataset recording changes over time in land cover at a spatial resolution that is sufficiently fine to detect changes.

Regarding base period:
OECD notes availability of 2000 , 2005, 2010, 2015. Nations may have access to earth observation data for different reference years and different frequencies.
Regarding georeferenced data:
Possible indicator definitions were outlined in ENV/EPOC/WPEI(2015)3 and data availability was reviewed in ENV/EPOC/WPEI(2015)4/FINAL (Diogo and Koomen, 2016). The Secretariat is actively following the on-going international efforts to improve global land cover monitoring. Further methodological refinements are expected for 2017-2018.

Interpretabilty of this indicator as a driver of climate change is difficult, since different types of ecosystems have differing abilities to store carbon

04   Total support for fossil fuels in relation to GDP

Indicator type   **Core indicator**

Versioning

First publication | 9/19/2019 | Latest update | 1/6/2020

Area and sub-area

Area and sub-area | Drivers | National total

Presentation

Tier | 3

Indicator definition and description | This indicator is the amount of measures (taxes, subsidies, transfers, …) supporting the extraction, the distribution and the use of fossil fuels; carried out by government and expressed as a share of Gross domestic product

Unit of measure | %

Coverage | Production activities and consumption activities

Spatial aggregation | National economy

Reference period | Calendar year

Update frequency | Annual

Base period |

Disaggregation (operational indicators)

Other related indicators (contextual, proxy, other core indicators)

Relevance

Policy context and rationale | Relevant to climate change mitigation policies and measures implemented under the UNFCCC, its Kyoto Protocol and the Paris Agreement under the UNFCCC

Target 12.c: Rationalize inefficient fossil-fuel subsidies that encourage wasteful consumption by removing market distortions, in accordance with national circumstances, including by restructuring taxation and phasing out those harmful subsidies, where they exist, to reflect their environmental impacts, taking fully into account the specific needs and conditions of developing countries and minimizing the possible adverse impacts on their development in a manner that protects the poor and the affected communities

Related SDG indicator | 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

Relation | Similar but not identical

Sendai Framew. indicator | Not applicable

Policy references

Document title	Link
United Nations Framework Convention on Climate Change (United Nations Climate Change, 1994)	https://unfccc.int/process-and-meetings/the-convention/what-is-the-united-nations-framework-convention-on-climate-change

04   Total support for fossil fuels in relation to GDP

Indicator type   **Core indicator**

Kyoto Protocol (United Nations Climate Change, 1997)	https://unfccc.int/process-and-meetings/the-kyoto-protocol/what-is-the-kyoto-protocol/kyoto-protocol-targets-for-the-first-commitment-period
Paris Agreement (United Nations, 2015)	https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement

Methodology

Methodology for indicator calculation

Uses real GDP (adjusted for inflation, by means of constant prices or chain-linked prices) as denominator

Methodology references

Document title	Link
Compiling and Refining Environmental and Economic Accounts (CREEA) (EU Cordis, 2014)	https://cordis.europa.eu/project/rcn/97380/reporting/en
Environmental subsidies and similar transfers — Guidelines (Eurostat, 2015)	https://ec.europa.eu/eurostat/en/web/products-manuals-and-guidelines/-/KS-GQ-15-005-EN-N
OECD Companion to the Inventory of Support Measures for Fossil Fuels 2015 (OECD, 2015)	https://www.oecd-ilibrary.org/energy/oecd-companion-to-the-inventory-of-support-measures-for-fossil-fuels-2015_9789264239616-en

Classification syst.

Data sources

Main source   Official statistics: SEEA and/or SNA

Explanation   National accounts, National and international specific studies, such as by OECD, IEA

SEEA Accounts that can serve as data sources

SEEA Account	Comments
Accounts for other transactions related to the environment	

UN-FDES

International databases containing this indicator

OECD Inventory of Support Measures for Fossil Fuels	http://www.oecd.org/site/tadffss/data/

Comments

Comments

05a   Total energy intensity of production activities of the national economy

Indicator type   **Core indicator**

Versioning

First publication   1/26/2017   Latest update   9/17/2019

Area and sub-area

Area and sub-area   Drivers   Production

Presentation

Tier	2
Indicator definition and description	Energy use by production activities (total ISIC industries) of a national economy per unit of gross domestic product (real GDP: adjusted for inflation, by means of constant prices or chain-linked prices).
Unit of measure	Terajoule (TJ) / monetary unit (national currency)
Coverage	Production activities
Spatial aggregation	National economy
Reference period	Calendar year
Update frequency	Annual
Base period	

Disaggregation (operational indicators)

Disaggregation (operational indicators)	Comments
Economic sector (ISIC) and households	Energy intensity at sector level (energy use per unit of value added); Here only a disaggregation by economic sectors is possible (households not included in the indicator)
Spatial	
Energy product (SIEC)	

Other related indicators (contextual, proxy, other core indicators)

ID	Subindicator	Type
05b	Energy intensity of GDP	Proxy indicator
12	Total greenhouse gas emissions from production activities	Core indicator

Relevance

Policy context and rationale	International (for example EU) and National Energy efficiency targets EE3- Final energy intensity in industry - indicators for Energy Union EE5- Final energy intensity in services sector- indicators for Energy Union Link to target 7.3 and indicator 7.3.1. However, the indicator measures the energy intensity of production activities only (excluding households), in terms of energy consumption by GDP. It is therefore different from the SDG indicator.
Related SDG indicator	7.3.1 Energy intensity measured in terms of primary energy and GDP
Relation	Similar but not identical

05a   Total energy intensity of production activities of the national economy

Indicator type   **Core indicator**

Sendai Framew. indicator	Not applicable

Policy references

Document title	Link
Directive 2012/27/EU of the European Parliament and of 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 (European Commission, 2012)	https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2012:315:0001:0056:EN:PDF

Methodology

Methodology for indicator calculation	This indicator is calculated as intermediate consumption of energy products of total ISIC Industries (01-99) in TJ divided by gross domestic product (in PPP, constant prices).

Methodology references

Document title	Link
Physical Flow Accounts for Energy (PEFA Manual) (Eurostat, 2014)	http://ec.europa.eu/eurostat/web/environment/methodology
System of Environmental-Economic Accounting for Energy (SEEA-Energy) (United Nations Statistics Division, 2019)	https://seea.un.org/seea-energy

Classification syst.	SEEA Physical Flow Accounts/Eurostat Energy Accounts

Data sources

Main source	Official statistics: SEEA and/or SNA
Explanation	SEEA energy accounts

SEEA Accounts that can serve as data sources

SEEA Account	Comments
Physical flow accounts for energy	

UN-FDES	2.2.2: Production, trade and consumption of energy

International databases containing this indicator

Comments

Comments

06a   Total CO2 intensity of energy used in production activities of the national economy

Indicator type   **Core indicator**

Versioning

First publication	1/26/2018	Latest update	9/17/2019

Area and sub-area

Area and sub-area	Drivers	Production

Presentation

Tier	2
Indicator definition and description	CO2 emissions per unit of energy used in production activities (total ISIC industries) of national economy.
Unit of measure	Kilotonnes (kt) of CO2/Terajoule (TJ)
Coverage	Production activities
Spatial aggregation	National economy
Reference period	Calendar year
Update frequency	Annual
Base period	

Disaggregation (operational indicators)

Disaggregation (operational indicators)	Comments
Economic sector (ISIC) and households	Carbon intensity of energy by industry (ISIC classification); Here only a disaggregation by economic sectors is possible (households not included in the indicator)
Spatial	
Energy product (SIEC)	

Other related indicators (contextual, proxy, other core indicators)

ID	Subindicator	Type
06b	Carbon intensity of TPES	Proxy indicator
29a	Renewable energy share in total energy use by the national economy	Core indicator

Relevance

Policy context and rationale	One possible mechanism to reduce the CO2 emissions is to change the energy mix of production processes. Relevant to climate change mitigation policies and measures implemented under the UNFCCC, its Kyoto Protocol and the Paris Agreement under the UNFCCC
Related SDG indicator	Not applicable
Relation	
Sendai Framew. indicator	Not applicable

06a   Total CO2 intensity of energy used in production activities of the national economy

Indicator type   **Core indicator**

Policy references

Document title	Link
Paris Agreement (United Nations, 2015)	https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement

Methodology

Methodology for indicator calculation	This indicator is calculated as CO2 emissions (without emissions from biomass used as a fuel) from total ISIC Industries (01-99) in kilotonnes divided by the intermediate consumption of energy products of total ISIC Industries (01-99) in TJ.

Methodology references

Document title	Link
Manual for air emission accounts (Eurostat, 2015)	https://ec.europa.eu/eurostat/web/products-manuals-and-guidelines/-/KS-GQ-15-009
System of Environmental Economic Accounting: Air Emission Accounts (United Nations Statistics Division, 2016)	https://seea.un.org/content/air-emissions-accounts
Physical Flow Accounts for Energy (PEFA Manual) (Eurostat, 2014)	http://ec.europa.eu/eurostat/web/environment/methodology
System of Environmental-Economic Accounting for Energy (SEEA-Energy) (United Nations Statistics Division, 2019)	https://seea.un.org/seea-energy

Classification syst.	Standard International Energy Product Classification (SIEC)

Data sources

Main source	Official statistics: SEEA and/or SNA
Explanation	SEEA air emission accounts and SEEA energy accounts

SEEA Accounts that can serve as data sources

SEEA Account	Comments
Physical flow accounts for energy	
Air emission accounts	

UN-FDES	3.1.1: Emissions of greenhouse gases
	2.2.2: Production, trade and consumption of energy

International databases containing this indicator

Comments

Comments	This indicator differs from similar indicators produced by the World Bank and the International Energy Agency as it excludes households.

08a   Energy use by resident households per capita

Indicator type   **Core indicator**

Versioning

First publication   1/26/2017   Latest update   9/17/2019

Area and sub-area

Area and sub-area   Drivers   Consumption

Presentation

Tier   1

Indicator definition and description   Total use of energy by resident households (total purposes, i.e. heating/cooling, transport, other) divided by resident population

Unit of measure   Terajoule (TJ) per person

Coverage   Use by households

Spatial aggregation   National economy

Reference period   Calendar year

Update frequency   Annual

Base period   Not applicable

Disaggregation (operational indicators)

Disaggregation (operational indicators)	Comments
Spatial	
Income group	
Energy product (SIEC)	
Temporal (by month, by season)	
Type of purpose (heating, cooling, transport, other)	

Other related indicators (contextual, proxy, other core indicators)

ID	Subindicator	Type
08b	Final energy consumption by households on the national territory per capita	Proxy indicator
29b	Renewable energy share in the total final energy consumption within the national territory	Contextual indicator
55	Passenger transport mode (person kilometers per mode/capita)	Contextual indicator
01a	Total energy use by the national economy	Core indicator
14	Direct greenhouse gas emissions from households	Core indicator

Relevance

Policy context and rationale   Indicator relevant for energy policies, because it informs about structure of energy demand and is also related to sustainable consumption of energy.
Target 7.3: By 2030, double the global rate of improvement in energy efficiency

08a   Energy use by resident households per capita

Indicator type **Core indicator**

Related SDG indicator	Not applicable

Relation

Sendai Framew. indicator	Not applicable

Policy references

Document title	Link
Transforming our world: the 2030 Agenda for Sustainable Development (General Assembly of the United Nations, 2015)	https://sustainabledevelopment.un.org/post2015/transformingourworld

Methodology

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.

Methodology references

Document title	Link
Physical Flow Accounts for Energy (PEFA Manual) (Eurostat, 2014)	http://ec.europa.eu/eurostat/web/environment/methodology
System of Environmental-Economic Accounting for Energy (SEEA-Energy) (United Nations Statistics Division, 2019)	https://seea.un.org/seea-energy

Classification syst.	SEEA Physical Flow Accounts/Eurostat Energy Accounts

Data sources

Main source	Official statistics: SEEA and/or SNA
Explanation	SEEA energy accounts

SEEA Accounts that can serve as data sources

SEEA Account	Comments
Physical flow accounts for energy	

UN-FDES	2.2.2: Production, trade and consumption of energy

International databases containing this indicator

Eurostat database	https://ec.europa.eu/eurostat/data/database

Comments

Comments	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.

09a   Total greenhouse gas emissions from the national economy

Indicator type   **Core indicator**

Versioning

First publication	1/26/2017	Latest update	9/17/2019

Area and sub-area

Area and sub-area	Emissions	National total

Presentation

Tier	1
Indicator definition and description	The indicator measures total greenhouse gas (GHG) emissions from all residents of a national economy. Residents can be persons, groups of persons in the form of households, and legal or social entities, such as corporations, non-profit institutions, or government units. Residents belong to the national economy where they have their centre of predominant economic interest.
Unit of measure	Kilotonnes (kt) of CO2 equivalent
Coverage	Total economy; production and consumption activities
Spatial aggregation	National economy
Reference period	Calendar year
Update frequency	Annual
Base period	Not applicable

Disaggregation (operational indicators)

Disaggregation (operational indicators)	Comments
Economic sector (ISIC) and households	
Spatial	
Temporal (by month, by season)	

Other related indicators (contextual, proxy, other core indicators)

ID	Subindicator	Type
09b	Total greenhouse gas emissions (excluding LULUCF) from the national territory	Core indicator
10a	CO2 emissions from fuel combustion attributable to the national economy	Core indicator
12	Total greenhouse gas emissions from production activities	Core indicator
14	Direct greenhouse gas emissions from households	Core indicator
07	Greenhouse gas emissions intensity of agricultural commodities	Contextual indicator

Relevance

Policy context and rationale	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. 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 helps us 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, stategy

09a   Total greenhouse gas emissions from the national economy

Indicator type   **Core indicator**

	and legislation for 2030 environmental, energy and climate targets. Environmental accounts, such as air emission accounts, are used in economic-environmental modeling, 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. Indirect links to goals 7, 9, 12 and 13.
Related SDG indicator	Not applicable
Relation	
Sendai Framew. indicator	Not applicable

Policy references

Document title	Link
Transforming our world: the 2030 Agenda for Sustainable Development (General Assembly of the United Nations, 2015)	https://sustainabledevelopment.un.org/post2015/transformingourworld
United Nations Framework Convention on Climate Change (United Nations Climate Change, 1994)	https://unfccc.int/process-and-meetings/the-convention/what-is-the-united-nations-framework-convention-on-climate-change
Paris Agreement (United Nations, 2015)	https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement
European Union Climate Strategies and Targets (European Commission, 2008)	https://ec.europa.eu/clima/policies/strategies_en

Methodology

Methodology for indicator calculation	Total GHG emissions by economic activity are aggregated to a total for the national economy. The economic activities include production and consumption activities. Total GHG emissions are calculated as the sum of individual greenhouse gas emissions: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), perfluorocarbons (PFCs), hydrofluorocarbons (HFCs), sulphur hexafluoride (SF_6) and nitrogen trifluoride (NF_3), measured in units of CO_2-equivalent, by using a common weighting factor, the so-called Global Warming Potentials (GWP). According to 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 (https://www.ipcc.ch/report/ar4/wg1/). The GWP values for the main direct GHGs are as follows: CO_2 = 1, CH_4 = 25, N_2O = 298, SF_6 = 22800, NF_3 = 17200. GWP values for HFCs and PFCs vary for individual species. These are the so-called direct GHG emissions. There exist also precursor gases: carbon monoxide (CO), nitrogen oxides (NOX), non-methane volatile organic compounds (NMVOCs), as well as sulphur oxides (SOX). The emissions of precursor gases are not included in this indicator. 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).

Methodology references

Document title	Link
Manual for air emission accounts (Eurostat, 2015)	https://ec.europa.eu/eurostat/web/products-manuals-and-guidelines/-/KS-GQ-15-009

09a Total greenhouse gas emissions from the national economy

Indicator type **Core indicator**

System of Environmental Economic Accounting 2012 Central Framework (United Nations, European Commission, Food and Agriculture Organization of the United Nations, OECD, World Bank, 2014)	https://seea.un.org/content/seea-central-framework

Classification syst. International Standard Industrial Classification of All Economic Activities (ISIC), Statistical classificat

Data sources

Main source Official statistics: SEEA and/or SNA

Explanation National SEEA air emission accounts

SEEA Accounts that can serve as data sources

SEEA Account	Comments
Air emission accounts	

UN-FDES 3.1.1: Emissions of greenhouse gases

International databases containing this indicator

Eurostat database	https://ec.europa.eu/eurostat/data/database
OECD Air Emissions Accounts	https://stats.oecd.org/Index.aspx?DataSetCode=AEA

Comments

Comments The reported value for indicator 9a should equal the sum of indicators 12 and 14.

09b Total greenhouse gas emissions (excluding LULUCF) from the national territory

Indicator type **Core indicator**

Versioning

First publication | 1/26/2017 | Latest update | 3/24/2020

Area and sub-area

Area and sub-area | Emissions | National total

Presentation

Tier | 1

Indicator definition and description | Total greenhouse gas (GHG) emissions on the national territory without emissions from land use, land use-change and forestry (LULUCF).

Unit of measure | Kilotonnes (kt) of CO_2 equivalent

Coverage | Total economy; industries, governments, institutions and households - excluding sources and sinks from LULUCF activities

Spatial aggregation | National territory

Reference period | Calendar year

Update frequency | Annual

Base period | See comments

Disaggregation (operational indicators)

Disaggregation (operational indicators)	Comments
Spatial	
Temporal (by month, by season)	
IPCC sector	

Other related indicators (contextual, proxy, other core indicators)

ID	Subindicator	Type
09a	Total greenhouse gas emissions from the national economy	Core indicator
10b	CO2 emissions from fuel combustion within the national territory	Core indicator
11	Greenhouse gas emissions from land use, land use change and forestry (LULUCF)	Core indicator
07	Greenhouse gas emissions intensity of agricultural commodities	Contextual indicator

Relevance

Policy context and rationale | 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.
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 its emissions trading scheme.
Directly linked with SDG 13, indirect links to SDG 7, 9 and 12.

Related SDG indicator | 13.2.2 Total greenhouse gas emissions per year

09b Total greenhouse gas emissions (excluding LULUCF) from the national territory

Indicator type	**Core indicator**

Relation	Related (e.g. part of the indicator calculation)
Sendai Framew. indicator	Not applicable

Policy references

Document title	Link
Transforming our world: the 2030 Agenda for Sustainable Development (General Assembly of the United Nations, 2015)	https://sustainabledevelopment.un.org/post2015/transformingourworld
Kyoto Protocol (United Nations Climate Change, 1997)	https://unfccc.int/process-and-meetings/the-kyoto-protocol/what-is-the-kyoto-protocol/kyoto-protocol-targets-for-the-first-commitment-period
Paris Agreement (United Nations, 2015)	https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement

Methodology

Methodology for indicator calculation	This indicator is calculated as the sum of individual greenhouse gas emissions: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), perfluorocarbons (PFCs), hydrofluorocarbons (HFCs), sulphur hexafluoride (SF_6) and nitrogen trifluoride (NF_3), measured in units of CO_2-equivalent, by using a common weighting factor, the so-called Global Warming Potentials (GWP). According to 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 (https://www.ipcc.ch/report/ar4/wg1/). The GWP values for the main direct GHGs are as follows: CO_2 = 1, CH_4 = 25, N_2O = 298, SF_6 = 22800, NF_3 = 17200. GWP values for HFCs and PFCs vary for individual species. These are the so-called direct GHG emissions. There exist also precursor gases: carbon monoxide (CO), nitrogen oxides (NOX), non-methane volatile organic compounds (NMVOCs), as well as sulphur oxides (SOX). The emissions of precursor gases are not included in this indicator. 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).

Methodology references

Document title	Link
Decision 17/CP.8 Guidelines for the preparation of national communications from Parties not included in Annex I to the Convention (United Nations Climate Change, 2002)	https://unfccc.int/process-and-meetings/transparency-and-reporting/support-for-developing-countries/guidelines-and-manuals-for-the-preparation-of-non-annex-i-national-reports-and-international - eq-5
Decision 24/CP.19 Revision of the UNFCCC reporting guidelines on annual inventories for Parties included in Annex I to the Convention (United Nations Climate Change, 2013)	https://unfccc.int/process-and-meetings/transparency-and-reporting/reporting-and-review-under-the-convention/greenhouse-gas-inventories-annex-i-parties/reporting-requirements
2006 IPCC Guidelines for National Greenhouse Gas Inventories (Intergovernmental Panel on Climate Change, 2007)	https://www.ipcc-nggip.iges.or.jp/public/2006gl/index.html

Classification syst.	IPCC Common Reporting Format Tables, see: http://unfccc.int/files/national_reports/annex_i_ghg

Data sources

09b   Total greenhouse gas emissions (excluding LULUCF) from the national territory

Indicator type   **Core indicator**

Main source	Other than official statistics
Explanation	National GHG inventory submission under the UNFCCC (in some countries part of official statistics)

SEEA Accounts that can serve as data sources

UN-FDES	3.1.1: Emissions of greenhouse gases

International databases containing this indicator

Eurostat database	https://ec.europa.eu/eurostat/data/database
UNFCCC GHG data portal	https://unfccc.int/process/transparency-and-reporting/greenhouse-gas-data/ghg-data-unfccc/ghg-data-from-unfccc
UNFCCC database	http://di.unfccc.int/detailed_data_by_party
UNFCCC website for National Inventory Submissions for Annex I Parties	https://unfccc.int/process/transparency-and-reporting/reporting-and-review-under-the-convention/greenhouse-gas-inventories-annex-i-parties/national-inventory-submissions-2019
UNFCCC website for National Communication submissions from Non-Annex I Parties	https://unfccc.int/process-and-meetings/transparency-and-reporting/reporting-and-review-under-the-convention/national-communications-and-biennial-update-reports-non-annex-i-parties/national-communication-submissions-from-non-annex-i-parties
UNFCCC website for Biennial Update Report submissions from	https://unfccc.int/BURs
EEA greenhouse gas - data viewer	https://www.eea.europa.eu/data-and-maps/data/data-viewers/greenhouse-gases-viewer

Comments

Comments	A base year for this indicator can be defined when presenting a trend or reporting on compliance within the context of the UNFCCC or its Kyoto Protocol. The base year under Convention is a year chosen as the reference/starting point of the historical level of anthropogenic emissions in accordance with Article 4.6 of the Convention. For the EU countries, the base year under the Kyoto Protocol is 1990 or 1995 for all gases, except NF3 where base year is either 1995 or 2000 (depending on what the EU member States use).

10a CO2 emissions from fuel combustion attributable to the national economy

Indicator type **Core indicator**

Versioning

First publication	1/26/2017	Latest update	9/17/2019

Area and sub-area

Area and sub-area	Emissions	National total

Presentation

Tier	3
Indicator definition and description	Total energy use-related CO2 emissions from fuel combustion by all residents of a country. Residents can be persons, groups of persons in the form of households, and legal or social entities, such as corporations, non-profit institutions, or government units. Residents belong to the national economy where they have their centre of predominant economic interest. Emissions from non-energy use of fuels, fugitive emissions, and industrial process emissions are excluded.
Unit of measure	Kilotonnes (kt) of CO2
Coverage	Total economy; production and consumption activities
Spatial aggregation	National economy
Reference period	Calendar year
Update frequency	Annual
Base period	Not applicable

Disaggregation (operational indicators)

Disaggregation (operational indicators)	Comments
Economic sector (ISIC) and households	
Spatial	
Energy product (SIEC)	
Temporal (by month, by season)	

Other related indicators (contextual, proxy, other core indicators)

ID	Subindicator	Type
09a	Total greenhouse gas emissions from the national economy	Contextual indicator
10b	CO2 emissions from fuel combustion within the national territory	Core indicator
55	Passenger transport mode (person kilometers per mode/capita)	Contextual indicator
56	Freight transport mode (ton kilometers per mode)	Contextual indicator

Relevance

Policy context and rationale	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. In addition, information is needed to better understand who emits, what they emit, and for which purposes. Extensive analyses of emission 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 helps us to work towards the goals set in international

10a   CO2 emissions from fuel combustion attributable to the national economy

Indicator type   **Core indicator**

agreements, including the Paris Agreement and the UNFCCC. At European level, emissions targets are set in Europe 2030: the EU policy, stategy and legislation for 2030 environmental, energy and climate targets.

Environmental accounts, such as air emission accounts, are used in economic-environmental modeling, 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.

The indicator is linked with SDG 7, 9, 12 and 13.

Related SDG indicator

Not applicable

Relation

Sendai Framew. indicator

Not applicable

Policy references

Document title	Link
Transforming our world: the 2030 Agenda for Sustainable Development (General Assembly of the United Nations, 2015)	https://sustainabledevelopment.un.org/post2015/transformingourworld
European Union Climate Strategies and Targets (European Commission, 2008)	https://ec.europa.eu/clima/policies/strategies_en
Paris Agreement (United Nations, 2015)	https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement
United Nations Framework Convention on Climate Change (United Nations Climate Change, 1994)	https://unfccc.int/process-and-meetings/the-convention/what-is-the-united-nations-framework-convention-on-climate-change

Methodology

Methodology for indicator calculation

This indicators is calculated as the sum of CO2 emissions from the combustion of fuels. For each fuel, CO2 emissions are calculated as fuel consumption by national residents multiplied by the CO2 emission factor of given fuel. Emission factors used can be country-specific emission factors or emission factors from the 2006 IPCC guidelines.

Methodology references

Document title	Link
Manual for air emission accounts (Eurostat, 2015)	https://ec.europa.eu/eurostat/web/products-manuals-and-guidelines/-/KS-GQ-15-009
System of Environmental Economic Accounting 2012 Central Framework (United Nations, European Commission, Food and Agriculture Organization of the United Nations, OECD, World Bank, 2014)	https://seea.un.org/content/seea-central-framework
2006 IPCC Guidelines for National Greenhouse Gas Inventories (Intergovernmental Panel on Climate Change, 2007)	https://www.ipcc-nggip.iges.or.jp/public/2006gl/index.html

Classification syst.   International Standard Industrial Classification of All Economic Activities (ISIC), Statistical classificat

10a CO2 emissions from fuel combustion attributable to the national economy

Indicator type **Core indicator**

Data sources

Main source	Official statistics: SEEA and/or SNA
Explanation	Physical energy flow accounts or energy statistics (which will need to be adapted to the residence principle) and emission coefficients. Note that data from greenhouse gas inventories would need to be adapted to the residence principle. The source is data used for the compilation of SEEA air emission accounts, available to air emission accounts compilers. Whether their internal compilation files include all the information to compile this indicator depends on the compilation method used.

SEEA Accounts that can serve as data sources

SEEA Account	Comments
Air emission accounts	

UN-FDES	3.1.1: Emissions of greenhouse gases

International databases containing this indicator

Comments

Comments	The value reported for indicator "10a - CO2 emissions from fuel combustion by national economy" should be different from the value reported for indicator "10b - CO2 emissions from fuel combustion in the national territory".

10b   CO2 emissions from fuel combustion within the national territory

Indicator type   **Core indicator**

Versioning

First publication   1/26/2017   Latest update   9/17/2019

Area and sub-area

Area and sub-area   Emissions   National total

Presentation

Tier   1

Indicator definition and description   CO2 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 CO2

Coverage   Total economy; industries, governments, institutions and households - excluding sources and sinks from LULUCF activities

Spatial aggregation   National territory

Reference period   Calendar year

Update frequency   Annual

Base period   Not applicable

Disaggregation (operational indicators)

Disaggregation (operational indicators)	Comments
Spatial	
Energy product (SIEC)	
Temporal (by month, by season)	

Other related indicators (contextual, proxy, other core indicators)

ID	Subindicator	Type
09b	Total greenhouse gas emissions (excluding LULUCF) from the national territory	Core indicator
55	Passenger transport mode (person kilometers per mode/capita)	Contextual indicator
56	Freight transport mode (ton kilometers per mode)	Contextual indicator

Relevance

Policy context and rationale   CO2 emissions from fuel combustion represent a very large share of total GHG emissions. Specfic targets for this indicator do not exist, but limiting emissions from fuel combustion will significantly help to reduce overall GHG emissions.
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.
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 its emissions trading scheme.
Indirect links to SDG 7, 9, 12 and 13.

10b CO2 emissions from fuel combustion within the national territory

Indicator type   **Core indicator**

Related SDG indicator	Not applicable

Relation

Sendai Framew. indicator	Not applicable

Policy references

Document title	Link
Transforming our world: the 2030 Agenda for Sustainable Development (General Assembly of the United Nations, 2015)	https://sustainabledevelopment.un.org/post2015/transformingourworld
Kyoto Protocol (United Nations Climate Change, 1997)	https://unfccc.int/process-and-meetings/the-kyoto-protocol/what-is-the-kyoto-protocol/kyoto-protocol-targets-for-the-first-commitment-period
Paris Agreement (United Nations, 2015)	https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement
United Nations Framework Convention on Climate Change (United Nations Climate Change, 1994)	https://unfccc.int/process-and-meetings/the-convention/what-is-the-united-nations-framework-convention-on-climate-change

Methodology

Methodology for indicator calculation	This indicator is calculated as the sum of emissions from the combustion of fuels, where for each fuel: CO2 emissions = fuel consumption related to energy use in the territory * CO2 emission factor. CO2 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.

Methodology references

Document title	Link
CO2 Emissions from Fuel Combustion 2018 with 2016 data (International Energy Agency, 2018)	https://webstore.iea.org/co2-emissions-from-fuel-combustion-2018
2006 IPCC Guidelines for National Greenhouse Gas Inventories Volume 2: Energy (Intergovermental Panel on Climate Change (IPCC), 2006)	https://www.ipcc-nggip.iges.or.jp/public/2006gl/vol2.html
Decision 17/CP.8 Guidelines for the preparation of national communications from Parties not included in Annex I to the Convention (United Nations Climate Change, 2002)	https://unfccc.int/process-and-meetings/transparency-and-reporting/support-for-developing-countries/guidelines-and-manuals-for-the-preparation-of-non-annex-i-national-reports-and-international - eq-5
Decision 24/CP.19 Revision of the UNFCCC reporting guidelines on annual inventories for Parties included in Annex I to the Convention (United Nations Climate Change, 2013)	https://unfccc.int/process-and-meetings/transparency-and-reporting/reporting-and-review-under-the-convention/greenhouse-gas-inventories-annex-i-parties/reporting-requirements

Classification syst.   By fuel and by sectors: Electricity and heat production. Manufacturing industries and construction

Data sources

10b   CO2 emissions from fuel combustion within the national territory

Indicator type   **Core indicator**

Main source	Other than official statistics
Explanation	National GHG inventories submitted under the UNFCCC (in some countries part of official statistics) or national energy statistics in combination with (default or national) emission coefficients.

SEEA Accounts that can serve as data sources

UN-FDES	3.1.1: Emissions of greenhouse gases

International databases containing this indicator

Eurostat database	https://ec.europa.eu/eurostat/data/database
International Energy Agency	http://www.iea.org/statistics/
UNFCCC GHG data portal	https://unfccc.int/process/transparency-and-reporting/greenhouse-gas-data/ghg-data-unfccc/ghg-data-from-unfccc
UNFCCC database	http://di.unfccc.int/detailed_data_by_party
UNFCCC website for National Inventory Submissions for Annex I Parties	https://unfccc.int/process/transparency-and-reporting/reporting-and-review-under-the-convention/greenhouse-gas-inventories-annex-i-parties/national-inventory-submissions-2019
UNFCCC website for National Communication submissions from Non-Annex I Parties	https://unfccc.int/process-and-meetings/transparency-and-reporting/reporting-and-review-under-the-convention/national-communications-and-biennial-update-reports-non-annex-i-parties/national-communication-submissions-from-non-annex-i-parties
UNFCCC website for Biennial Update Report submissions from	https://unfccc.int/BURs
EEA greenhouse gas - data viewer	https://www.eea.europa.eu/data-and-maps/data/data-viewers/greenhouse-gases-viewer

Comments

Comments	The value reported for indicator "10b - CO2 emissions from fuel combustion in the national territory" should be different from the value reported for indicator "10a - CO2 emissions from fuel combustion by national economy".

11   Greenhouse gas emissions from land use, land use change and forestry (LULUCF)

Indicator type   **Core indicator**

Versioning

First publication   1/26/2017   Latest update   12/19/2019

Area and sub-area

Area and sub-area   Emissions   National total

Presentation

Tier   1

Indicator definition and description   GHG emissions and removals produced in land use, land use change and forestry, as defined by the relevant IPCC Guidelines for National Greenhouse Gas Inventories.

Unit of measure   Kilotonnes (kt) of CO_2 equivalent

Coverage

Spatial aggregation   National territory

Reference period   Calendar year

Update frequency   Annual

Base period   Not applicable

Disaggregation (operational indicators)

Disaggregation (operational indicators)	Comments
Spatial	
Land cover class	

Other related indicators (contextual, proxy, other core indicators)

ID	Subindicator	Type
09b	Total greenhouse gas emissions (excluding LULUCF) from the national territory	Core indicator
81	Net emissions/removal of carbon dioxide by forest land from national territory	Contextual indicator
58	Deforestation	Contextual indicator
59	Forest area cleared for agricultural production	Contextual indicator
60	Forest re-growth	Contextual indicator
84	Emissions from Agriculture, Forestry and Land Use (AFOLU)	Contextual indicator

Relevance

Policy context and rationale   According to IPCC (special report 2019) an estimated 23% of total anthropogenic greenhouse gas emissions (2007-2016) derive from Agriculture, Forestry and Other Land Use.

Related SDG indicator   Not applicable

Relation

Sendai Framew. indicator   Not applicable

11 Greenhouse gas emissions from land use, land use change and forestry (LULUCF)

Indicator type **Core indicator**

Policy references

Document title	Link
Kyoto Protocol (United Nations Climate Change, 1997)	https://unfccc.int/process-and-meetings/the-kyoto-protocol/what-is-the-kyoto-protocol/kyoto-protocol-targets-for-the-first-commitment-period
Paris Agreement (United Nations, 2015)	https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement
United Nations Framework Convention on Climate Change (United Nations Climate Change, 1994)	https://unfccc.int/process-and-meetings/the-convention/what-is-the-united-nations-framework-convention-on-climate-change
IPCC Special Report on climate change, desertification, land degradation, sustainable land nanagement, food security, and greenhouse gas fluxes in terrestrial ecosystem (summary for policymakers) (Intergovernmental Panel on Climate Change (IPCC), 2019)	https://www.ipcc.ch/site/assets/uploads/2019/08/4.-SPM_Approved_Microsite_FINAL.pdf
IPCC Fifth Assessment Report: Climate Change 2014 (Synthesis Report) (Intergovermental Panel on Climate Change (IPCC), 2014)	https://www.ipcc.ch/report/ar5/syr/
IPCC Fourth Assessment Report: The Physical Science Basis (Intergovermental Panel on Climate Change (IPCC), 2007)	https://www.ipcc.ch/report/ar4/wg1/

Methodology

Methodology for indicator calculation	Data consist of CO_2 (carbon dioxide), CH_4 (methane) and N_2O (nitrous oxide) emission estimates associated with land management activities and land use change, as described by relevant IPCC Guidelines for National Greenhouse Gas Inventories.

Methodology references

Document title	Link
2006 IPCC Guidelines for National Greenhouse Gas Inventories (Intergovernmental Panel on Climate Change, 2007)	https://www.ipcc-nggip.iges.or.jp/public/2006gl/index.html

Classification syst.

Data sources

Main source	Other than official statistics
Explanation	National GHG inventories (in some countries part of official statistics). Second option: FAOSTAT Emission Database

SEEA Accounts that can serve as data sources

SEEA Account	Comments
Air emission accounts	
Accounting for carbon	

UN-FDES	3.1.1: Emissions of greenhouse gases

11   Greenhouse gas emissions from land use, land use change and forestry (LULUCF)

Indicator type   **Core indicator**

International databases containing this indicator

UNFCCC database	http://di.unfccc.int/detailed_data_by_party
FAOSTAT	http://www.fao.org/faostat/en/ - data

Comments

Comments

12 Total greenhouse gas emissions from production activities

Indicator type **Core indicator**

Versioning

First publication | 1/26/2017 | Latest update | 9/17/2019

Area and sub-area

Area and sub-area | Emissions | Production

Presentation

Tier | 1

Indicator definition and description | 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_2 equivalent

Coverage | Production activities

Spatial aggregation | National economy

Reference period | Calendar year

Update frequency | Annual

Base period | Not applicable

Disaggregation (operational indicators)

Disaggregation (operational indicators)	Comments
Economic sector (ISIC) and households	Here only a disaggregation by economic sectors is possible (households not included in the indicator)
Spatial	
Energy product (SIEC)	
Temporal (by month, by season)	

Other related indicators (contextual, proxy, other core indicators)

ID	Subindicator	Type
05a	Total energy intensity of production activities of the national economy	Core indicator
06a	Total CO2 intensity of energy used in production activities of the national economy	Core indicator
09a	Total greenhouse gas emissions from the national economy	Core indicator
13	Greenhouse gas emission intensity of production activities	Core indicator
14	Direct greenhouse gas emissions from households	Core indicator
61	Number of employees (FTE) per industry	Contextual indicator

Relevance

Policy context and rationale | 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.
In addition, information is needed to better understand who emits, what they emit, and for which

12   Total greenhouse gas emissions from production activities

Indicator type **Core indicator**

	purposes. Extensive analyses of emission 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 helps us 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, stategy and legislation for 2030 environmental, energy and climate targets. Environmental accounts, such as air emission accounts, are used in economic-environmental modeling, 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. Indirect links to SDG 7, 9 (see indicator 13), 12 and 13.
Related SDG indicator	Not applicable
Relation	
Sendai Framew. indicator	Not applicable

Policy references

Document title	Link
European Union Climate Strategies and Targets (European Commission, 2008)	https://ec.europa.eu/clima/policies/strategies_en
Paris Agreement (United Nations, 2015)	https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement
United Nations Framework Convention on Climate Change (United Nations Climate Change, 1994)	https://unfccc.int/process-and-meetings/the-convention/what-is-the-united-nations-framework-convention-on-climate-change

Methodology

Methodology for indicator calculation	This indicator is calculated as total GHG emissions reported for ISIC A-U industries. Total GHG emissions are calculated as the sum of individual greenhouse gas emissions: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), perfluorocarbons (PFCs), hydrofluorocarbons (HFCs), sulphur hexafluoride (SF_6) and nitrogen trifluoride (NF_3), measured in units of CO_2-equivalent, by using a common weighting factor, the so-called Global Warming Potentials (GWP). According to 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 (https://www.ipcc.ch/report/ar4/wg1/). The GWP values for the main direct GHGs are as follows: CO_2 = 1, CH_4 = 25, N_2O = 298, SF_6 = 22800, NF_3 = 17200. GWP values for HFCs and PFCs vary for individual species. These are the so-called direct GHG emissions. There exist also precursor gases: carbon monoxide (CO), nitrogen oxides (NOX), non-methane volatile organic compounds (NMVOCs), as well as sulphur oxides (SOX). The emissions of precursor gases are not included in this indicator. 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).

Methodology references

Document title	Link
Manual for air emission accounts (Eurostat, 2015)	https://ec.europa.eu/eurostat/web/products-

12 Total greenhouse gas emissions from production activities

Indicator type   **Core indicator**

	manuals-and-guidelines/-/KS-GQ-15-009
Air emissions accounts and intensities, Reference Metadata in Euro SDMX Metadata Structure (ESMS) (Eurostat, 2018)	https://ec.europa.eu/eurostat/cache/metadata/en/env_ac_ainah_r2_esms.htm

Classification syst.	International Standard Industrial Classification of All Economic Activities (ISIC), Statistical classificat

Data sources

Main source	Official statistics: SEEA and/or SNA
Explanation	National SEEA air emission accounts

SEEA Accounts that can serve as data sources

SEEA Account	Comments
Air emission accounts	

UN-FDES	3.1.1: Emissions of greenhouse gases

International databases containing this indicator

Eurostat database	https://ec.europa.eu/eurostat/data/database
OECD Air Emissions Accounts	https://stats.oecd.org/Index.aspx?DataSetCode=AEA

Comments

Comments	The reported value for indicator 9a should equal the sum of indicators 12 and 14.

13   Greenhouse gas emission intensity of production activities

Indicator type **Core indicator**

Versioning

First publication | 1/26/2017 | Latest update | 1/6/2020

Area and sub-area

Area and sub-area | Emissions | Production

Presentation

Tier | 1

Indicator definition and description | 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 CO2 equivalent / monetary unit (in chain linked dollars or national currency)

Coverage | Production activities

Spatial aggregation | National economy

Reference period | Calendar year

Update frequency | Annual

Base period | Not applicable

Disaggregation (operational indicators)

Disaggregation (operational indicators)	Comments
Economic sector (ISIC) and households	Here only a disaggregation by economic sectors is possible (households not included in the indicator)
Spatial	
Energy product (SIEC)	
Temporal (by month, by season)	

Other related indicators (contextual, proxy, other core indicators)

ID	Subindicator	Type
05a	Total energy intensity of production activities of the national economy	Core indicator
12	Total greenhouse gas emissions from production activities	Core indicator
61	Number of employees (FTE) per industry	Contextual indicator

Relevance

Policy context and rationale | 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.
In addition, information is needed to better understand who emits, what they emit, and for which purposes. Extensive analyses of emission 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 helps us to work towards the goals set in international agreements, including the Paris Agreement and

13 Greenhouse gas emission intensity of production activities

Indicator type **Core indicator**

the UNFCCC. At European level, emissions targets are set in Europe 2030: the EU policy, stategy and legislation for 2030 environmental, energy and climate targets.

Environmental accounts, such as air emission accounts, are used in economic-environmental modeling, 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.

Note: the SDG indicator does not apply the residential principle, as it is based on GHG inventories. Also the SDG indicator includes CO2 emissions only, whereas the indicator defined in this metadata sheet covers total GHG emissions.

Indirect links to goals 7, 12 and 13.

Related SDG indicator	9.4.1 CO2 emission per unit of value added
Relation	Similar but not identical
Sendai Framew. indicator	Not applicable

Policy references

Document title	Link
Transforming our world: the 2030 Agenda for Sustainable Development (General Assembly of the United Nations, 2015)	https://sustainabledevelopment.un.org/post2015/transformingourworld
Paris Agreement (United Nations, 2015)	https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement
European Union Climate Strategies and Targets (European Commission, 2008)	https://ec.europa.eu/clima/policies/strategies_en

Methodology

Methodology for indicator calculation	This indicator is 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). Total GHG emissions include the following individual GHGs: carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), perfluorocarbons (PFCs), hydrofluorocarbons (HFCs), sulphur hexafluoride (SF6) and nitrogen trifluoride (NF3). These are the so-called direct GHG emissions; there exist also indirect GHG emissions (or "precursor gases): carbon monoxide (CO), nitrogen oxides (NOX), non-methane volatile organic compounds (NMVOCs), as well as sulphur oxides (SOX). Direct GHG emissions are summed up into total GHG emissions, measured in units of CO2-equivalent, by using a common weighting factor, the so-called Global Warming Potentials (GWP). According to 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 (https://www.ipcc.ch/report/ar4/wg1/). The GWP values for the main direct GHGs are as follows: CO2 = 1, CH4 = 25, N2O = 298, SF6 = 22800, NF3 = 17200. GWP values for HFCs and PFCs vary for individual species. 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).

Methodology references

Document title	Link
IPCC Fourth Assessment Report: The Physical Science Basis (Intergovermental Panel on Climate Change (IPCC), 2007)	https://www.ipcc.ch/report/ar4/wg1/

13 Greenhouse gas emission intensity of production activities

Indicator type **Core indicator**

Manual for air emission accounts (Eurostat, 2015)	https://ec.europa.eu/eurostat/web/products-manuals-and-guidelines/-/KS-GQ-15-009
Air emissions accounts and intensities, Reference Metadata in Euro SDMX Metadata Structure (ESMS) (Eurostat, 2018)	https://ec.europa.eu/eurostat/cache/metadata/en/env_ac_ainah_r2_esms.htm
2006 IPCC Guidelines for National Greenhouse Gas Inventories (Intergovernmental Panel on Climate Change, 2007)	https://www.ipcc-nggip.iges.or.jp/public/2006gl/index.html

Classification syst. International Standard Industrial Classification of All Economic Activities (ISIC), Statistical classificat

Data sources

Main source Official statistics: SEEA and/or SNA

Explanation National SEEA air emission accounts
SNA/ESA National accounts; value added at basic prices (chained values)

SEEA Accounts that can serve as data sources

SEEA Account	Comments
Air emission accounts	

UN-FDES 3.1.1: Emissions of greenhouse gases

International databases containing this indicator

Eurostat database	https://ec.europa.eu/eurostat/data/database

Comments

Comments This indicator is the ratio of indicator 12 to real gross domestic product.
Note that this indicator cannot be compared directly to the related indicators for individual economic activities (emission by economic activitiy/value added)

14 Direct greenhouse gas emissions from households

Indicator type **Core indicator**

Versioning

First publication	1/26/2017	Latest update	9/19/2019

Area and sub-area

Area and sub-area	Emissions	Consumption

Presentation

Tier	1
Indicator definition and description	Greenhouse gas (GHG) emissions from households consumption activities that directly cause emissions: fuel use for transport, heating, cooking, and other purposes; other activities such as the use of solvents.
Unit of measure	Kilotonnes (kt) of CO2 equivalent
Coverage	Consumption by households
Spatial aggregation	National economy
Reference period	Calendar year
Update frequency	Annual
Base period	Not applicable

Disaggregation (operational indicators)

Disaggregation (operational indicators)	Comments
Spatial	
Temporal (by month, by season)	

Other related indicators (contextual, proxy, other core indicators)

ID	Subindicator	Type
09a	Total greenhouse gas emissions from the national economy	Core indicator
12	Total greenhouse gas emissions from production activities	Core indicator

Relevance

Policy context and rationale	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.
	In addition, information is needed to better understand who emits, what they emit, and for which purposes. Extensive analyses of emission 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 helps us 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, stategy and legislation for 2030 environmental, energy and climate targets.
	Environmental accounts, such as air emission accounts, are used in economic-environmental modeling, 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.

14 Direct greenhouse gas emissions from households

Indicator type **Core indicator**

Related SDG indicator	Indirect links to SDGs 7, 12 and 13.
	Not applicable
Relation	
Sendai Framew. indicator	Not applicable

Policy references

Document title	Link
Transforming our world: the 2030 Agenda for Sustainable Development (General Assembly of the United Nations, 2015)	https://sustainabledevelopment.un.org/post2015/transformingourworld
Paris Agreement (United Nations, 2015)	https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement
United Nations Framework Convention on Climate Change (United Nations Climate Change, 1994)	https://unfccc.int/process-and-meetings/the-convention/what-is-the-united-nations-framework-convention-on-climate-change
European Union Climate Strategies and Targets (European Commission, 2008)	https://ec.europa.eu/clima/policies/strategies_en

Methodology

Methodology for indicator calculation	The indicator is calculated as the sum of direct GHG emissions from households for 1) transport, 2) heating and 3) other purposes and can be derived from air emission accounts.
	Total GHG emissions are calculated as the sum of individual greenhouse gas emissions: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), perfluorocarbons (PFCs), hydrofluorocarbons (HFCs), sulphur hexafluoride (SF_6) and nitrogen trifluoride (NF_3), measured in units of CO_2-equivalent, by using a common weighting factor, the so-called Global Warming Potentials (GWP). According to 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 (https://www.ipcc.ch/report/ar4/wg1/). The GWP values for the main direct GHGs are as follows: CO_2 = 1, CH_4 = 25, N_2O = 298, SF_6 = 22800, NF_3 = 17200. GWP values for HFCs and PFCs vary for individual species. These are the so-called direct GHG emissions. There exist also precursor gases: carbon monoxide (CO), nitrogen oxides (NOX), non-methane volatile organic compounds (NMVOCs), as well as sulphur oxides (SOX). The emissions of precursor gases are not included in this indicator.
	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).

Methodology references

Document title	Link
Manual for air emission accounts (Eurostat, 2015)	https://ec.europa.eu/eurostat/web/products-manuals-and-guidelines/-/KS-GQ-15-009
Air emissions accounts and intensities, Reference Metadata in Euro SDMX Metadata Structure (ESMS) (Eurostat, 2018)	https://ec.europa.eu/eurostat/cache/metadata/en/env_ac_ainah_r2_esms.htm

14   Direct greenhouse gas emissions from households

Indicator type   **Core indicator**

System of Environmental Economic Accounting 2012 Central Framework (United Nations, European Commission, Food and Agriculture Organization of the United Nations, OECD, World Bank, 2014)	https://seea.un.org/content/seea-central-framework

Classification syst.   The European standard statistical classification of products by activity (CPA), Classification of Indivi

Data sources

Main source   Official statistics: SEEA and/or SNA

Explanation   National SEEA air emission accounts

SEEA Accounts that can serve as data sources

SEEA Account	Comments
Air emission accounts	

UN-FDES   3.1.1: Emissions of greenhouse gases

International databases containing this indicator

Eurostat database	https://ec.europa.eu/eurostat/data/database
OECD Air Emissions Accounts	https://stats.oecd.org/Index.aspx?DataSetCode=AEA

Comments

Comments   The reported value for indicator 9a should equal the sum of indicators 12 and 14.

15   Carbon footprint

Indicator type   **Core indicator**

Versioning

First publication	9/19/2019	Latest update	12/17/2019

Area and sub-area

Area and sub-area	Emissions	Consumption

Presentation

Tier	2
Indicator definition and description	Carbon footprints represent the amount of CO2 (or CO2-equivalent) emissions that are associated with domestic final use (where domestic final use consists of consumption and gross capital formation) and that are directly emitted by households. A carbon footprint includes both emissions by residents and emissions elsewhere that are due to domestic final use or directly emitted by households, and excludes emissions by residents that are due to final use elsewhere (i.e. emissions embodied in exports).
Unit of measure	kg CO2 (equivalents) / capita
Coverage	Consumption and investment
Spatial aggregation	National economy
Reference period	Calendar year
Update frequency	Annual
Base period	

Disaggregation (operational indicators)

Disaggregation (operational indicators)	Comments
Gender, age groups and disabilities	
Income group	
Spatial	

Other related indicators (contextual, proxy, other core indicators)

ID	Subindicator	Type
88	Carbon footprint by product	Contextual indicator

Relevance

Policy context and rationale	General context: Sustainable production and consumption. Carbon footprints play a large role in the public debate about climate change as they can be seen as a measure of the consumer behaviour. Related SDG target 12.c: Rationalize inefficient fossil-fuel subsidies that encourage wasteful consumption by removing market distortions, in accordance with national circumstances, including by restructuring taxation and phasing out those harmful subsidies, where they exist, to reflect their environmental impacts, taking fully into account the specific needs and conditions of developing countries and minimizing the possible adverse impacts on their development in a manner that protects the poor and the affected communities
Related SDG indicator	Not applicable

15 Carbon footprint

Indicator type **Core indicator**

Relation

Sendai Framew. indicator	Not applicable

Policy references

Document title	Link
Transforming our world: the 2030 Agenda for Sustainable Development (General Assembly of the United Nations, 2015)	https://sustainabledevelopment.un.org/post2015/transformingourworld

Methodology

Methodology for indicator calculation	The carbon footprint indicator is derived from air emission accounts in combination with environmental-economic modelling also referred to as environmentally-extended input-output modelling. For details see the methodology references. There are two main approaches to estimating footprints at the national level; 1) input-output (IO) modelling and 2) life-cycle-analysis (LCA). 1) Input-output modelling is usually on the basis of economy-wide datasets. The IO model connects production-side air emissions by economic activity (air emission accounts) to final demand for consumption and investment using economic data representing intersectoral linkages. A national carbon footprint indicator can be obtained from the IO model as well as more detailed consumption-based air emission accounts (e.g. footprints broken down by broad product groups or final demand category, such as household or investment expenditure. IO tables and air emission accounts are compiled based on international standards (System of National Accounts/European System of Accounts and System of Environmental-Economic Accounting respectively). The concept of a footprint indictor is that it captures all impacts associated with a final product / product group. This includes impacts along the production chain and across countries. The more accurately these international and intersectoral links are captured, the higher the quality of the resulting footprint estimate will be. Hence, ideally a international dataset is used as input to the IO modelling that includes all international trade in some detail. National Statistical Offices generally do not produce international datasets and therefor often fall back on a IO modelling set-up that requires less data, but more assumptions. Estimates derived with different IO modelling set-ups result may differ quite significantly. The metadata sheet of the material footprint included in the SDG indictor set (SDG indicator 8.4.1/12.2.1), specifies that an IO model was used to compile the international dataset with material footprint estimates (https://unstats.un.org/sdgs/metadata/files/Metadata-08-04-01.pdf). More specifically, a multi-regional input-output (MRIO) modelling framework based on an international dataset was used. Databases with the required input for global MRIO modelling have been set-up by the OECD and by various research consortiums (one of them has been used to produce the SDG indicator 8-4-1 estimates, commissioned by the International Resource Panel of UN Environment). In a broad sense, there is consensus on the ideal IO modelling methodology, but not an explicit international agreement on what an acceptable IO modelling set-up would be in different scenarios. For some NSIs it may be acceptable to use estimates sourced from an international database in a national SDG indicator set, while others may want to rely on in-house source data only.

Methodology references

15   Carbon footprint

Indicator type   **Core indicator**

Document title	Link
Creating consolidated and aggregated EU27 Supply, Use and Input-Output Tables, adding environmental extensions (air emissions), and conducting Leontief-type modelling to approximate carbon and other 'footprints' of EU27 consumption for 2000 to 2006 (Eurostat, 2011)	https://ec.europa.eu/eurostat/documents/1798247/6191529/eeSUIOT-TechDoc-final-060411.pdf/96a44595-c00d-4e05-914f-396ec27687b9
Estimating CO2 Emissions Embodied in Final Demand and Trade using the OECD ICIO 2015 (OECD, 2016)	https://www.oecd-ilibrary.org/science-and-technology/estimating-co2-emissions-embodied-in-final-demand-and-trade-using-the-oecd-icio-2015_5jlrcm216xkl-en
Input-Output Analysis Foundations and Extensions (Miller and Blair, 2009)	https://www.cambridge.org/ch/academic/subjects/economics/econometrics-statistics-and-mathematical-economics/input-output-analysis-foundations-and-extensions-2nd-edition?format=HB&isbn=9780521517133
Creating consolidated and aggregated EU27 Supply, Use and InputOutput Tables, adding environmental extensions (air emissions), and conducting Leontief-type modelling to approximate carbon and other 'footprints' of EU27 consumption for 2000 to 2006 (Eurostat, 2011)	https://ec.europa.eu/eurostat/documents/1798247/6191529/eeSUIOT-TechDoc-final-060411.pdf/96a44595-c00d-4e05-914f-396ec27687b9
System of Environmental Economic Accounting Applications and Extensions (United Nations, European Commission, Food and Agriculture Organization of the United Nations, OECD, World Bank, 2017)	https://seea.un.org/applications-extensions

Classification syst.	Standard product or economic activities classifications, e.g. CPA 2008 and ISIC Rev. 4

Data sources

Main source	Official statistics: SEEA and/or SNA
Explanation	Air emission accounts and supply and use or input-output tables plus the required additional modelling

SEEA Accounts that can serve as data sources

SEEA Account	Comments
Air emission accounts	

UN-FDES	3.1.1: Emissions of greenhouse gases

International databases containing this indicator

OECD Carbon dioxide emissions embodied in international trade	http://www.oecd.org/sti/ind/carbondioxideemissionsembodiedininternationaltrade.htm
Eurostat Emission Greenhouse Gases And Air pollutants	https://ec.europa.eu/eurostat/web/products-datasets/-/env_ac_io10
Eora Global Supply Chain Database: Carbon footprint of natio	https://worldmrio.com/footprints/carbon/
EXIOBASE	https://www.exiobase.eu

15 Carbon footprint

Indicator type **Core indicator**

Comments	
Comments	The global footprint network uses a different definition and methodology. Even with the methodology described here implementation may differ (multi-regional/country modelling vs. using a domestic technology assumption)

16   Mean temperature anomaly (compared to climate normal 1961 - 1990)

Indicator type **Core indicator**

Versioning

First publication | 1/26/2017 | Latest update | 9/17/2019

Area and sub-area

Area and sub-area | Impacts | Physical conditions

Presentation

Tier | 1

Indicator definition and description | Difference of the observed mean temperature year from climate normal (1961-1990), averaged across the country.

Unit of measure | Celsius degrees

Coverage | National territory

Spatial aggregation | National territory

Reference period | Calendar year

Update frequency | Annual

Base period | Climate Normal 1961-1990

Disaggregation (operational indicators)

Disaggregation (operational indicators)	Comments
Spatial	
Temporal (by month, by season)	Seasonal average temperatures Subnational annual and seasonal average temperatures and temperature changes Annual average global temperature

Other related indicators (contextual, proxy, other core indicators)

ID	Subindicator	Type
62	Temperature change compared to pre-industrial levels	Proxy indicator
63	Temperature change (compared to base period 1951 - 1980)	Proxy indicator

Relevance

Policy context and rationale | The UN Paris Agreement on climate change aims to ensure increases in global temperature are less than 2°C above 'pre-industrial' levels, with an aspirational 1.5°C limit.

Related SDG indicator | Not applicable

Relation |

Sendai Framew. indicator | Not applicable

Policy references

Document title	Link

16   Mean temperature anomaly (compared to climate normal 1961 - 1990)

Indicator type **Core indicator**

Sendai Framework for Disaster Risk Reduction 2015-2030 (United Nations Office for Disaster Risk Reduction (UNDRR), 2015)	https://www.unisdr.org/we/inform/publications/43291

Methodology

Methodology for indicator calculation	The indicator is calculated as the average of mean temperature anomalies accross the country. Mean temperature anomalies are calculated as differences of a annual mean temperatures from a correponding average temperature over the base period (climate normal, 1961-1990). The methodology uses in-situ data from monitoring stations and is explained in details the methodological document of WMO mentioned below.

Methodology references

Document title	Link
WMO Guidelines on the Calculation of Climate Normals (World Meteorological Organization, 2017)	https://library.wmo.int/index.php?lvl=notice_display&id=20130 - .XWOTUigzaUk
WMO Guidelines on Generating a Defined Set of National Climate Monitoring Products (World Meteorological Organization, 2017)	https://library.wmo.int/index.php?lvl=notice_display&id=20166 - .XWOTHSgzaUk

Classification syst.	

Data sources

Main source	Other than official statistics
Explanation	Hydro-meteorological Institutes

SEEA Accounts that can serve as data sources

UN-FDES	1.1.1: Atmosphere, climate and weather

International databases containing this indicator

Comments

Comments	The indicator shows general trends, but cancels out seasonal and sub-national extremes. The base period 1961-1990 is recommended by WMO in http://www.wmo.int/pages/prog/wcp/wcdmp/documents/Report-Expert-meeting_final-WCDMP-84.pdf for long-term analysis of climate change. In most countries no data is available to calculate time series for national aggregates back to the pre-industrial period.

17 Percentage of land area suffering from unusually wet or dry conditions (Standard Precipitation Index)

Indicator type **Core indicator**

Versioning

First publication | 1/26/2017 | Latest update | 9/19/2019

Area and sub-area

Area and sub-area | Impacts | Physical conditions

Presentation

Tier | 1

Indicator definition and description | Percentage of the land area where the standard precipitation index (SPI) is >= 1.5 (very wet or extremely wet) or <= -1.5 (severely dry or extremely dry).

Unit of measure | %

Coverage | National territory

Spatial aggregation | National territory

Reference period | Calendar year

Update frequency | Annual

Base period | Climate normal 1961-1990

Disaggregation (operational indicators)

Disaggregation (operational indicators)	Comments
Spatial	
Temporal (by month, by season)	

Other related indicators (contextual, proxy, other core indicators)

ID	Subindicator	Type
16	Mean temperature anomaly (compared to climate normal 1961 - 1990)	Core indicator
18	Level of water stress: freshwater withdrawal as a proportion of available freshwater resources	Core indicator
24	Direct economic loss attributed to hydro-meteorological disasters in relation to GDP	Core indicator
28	Direct agricultural loss attributed to hydro-meteorological disasters	Core indicator
40	Water exploitation index	Contextual indicator
43	Water consumption index	Contextual indicator
44	Water abstraction by individual economic activities and households	Contextual indicator
62	Temperature change compared to pre-industrial levels	Contextual indicator
63	Temperature change (compared to base period 1951 - 1980)	Contextual indicator
65	Total precipitation	Contextual indicator

Relevance

17   Percentage of land area suffering from unusually wet or dry conditions (Standard Precipitation Index)

Indicator type	**Core indicator**

Policy context and rationale	Climate change can cause changes in intensity and patterns of precipitation, and frequency and severity of droughts and dry spells. Unusual precipitation variations can affect agriculture, health, tourism and other important sectors. Standardization applied in this indicator allows for comparing the "unusualness" of precipitation at stations from different climatic zones within a country and among countries.
Related SDG indicator	Not applicable
Relation	
Sendai Framew. indicator	Not applicable

Policy references

Document title	Link
United Nations Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, in particular in Africa (United Nations, 1994)	https://www.unccd.int/
Sendai Framework for Disaster Risk Reduction 2015-2030 (United Nations Office for Disaster Risk Reduction (UNDRR), 2015)	https://www.unisdr.org/we/inform/publications/43291

Methodology

Methodology for indicator calculation	The Standard Precipitation Index (SPI) for any location is calculated based on the long-term precipitation record for a desired period. This long-term record is fitted to a probability distribution, which is then transformed into a normal distribution so that the mean SPI for the location and desired period is zero (Edwards and McKee, 1997).

Methodology references

Document title	Link
WMO Standardized Precipitation Index User Guide (World Meteorological Organization, 2012)	https://public.wmo.int/en/resources/library/standardized-precipitation-index-user-guide
WMO Guidelines on the Calculation of Climate Normals (World Meteorological Organization, 2017)	https://library.wmo.int/index.php?lvl=notice_display&id=20130 - .XWOTUigzaUk
WMO Guidelines on Generating a Defined Set of National Climate Monitoring Products (World Meteorological Organization, 2017)	https://library.wmo.int/index.php?lvl=notice_display&id=20166 - .XWOTHSgzaUk

Classification syst.	Not applicable

Data sources

Main source	Other than official statistics
Explanation	National hydrometeorological institutes, International Research Institute for Climate and Society (Columbia University).

SEEA Accounts that can serve as data sources

UN-FDES	1.1.1: Atmosphere, climate and weather

17 Percentage of land area suffering from unusually wet or dry conditions (Standard Precipitation Index)

Indicator type **Core indicator**

International databases containing this indicator

International Research Institute for Climate and Society	https://iridl.ldeo.columbia.edu/maproom/Global/Precipitation/SPI.html

Comments

Comments

18   Level of water stress: freshwater withdrawal as a proportion of available freshwater resources

Indicator type   **Core indicator**

Versioning

First publication   1/26/2017   Latest update   9/17/2019

Area and sub-area

Area and sub-area   Impacts   Water resources

Presentation

Tier	1
Indicator definition and description	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	All water abstractions; all freshwater bodies
Spatial aggregation	National territory
Reference period	Calendar year
Update frequency	Annual
Base period	Not applicable

Disaggregation (operational indicators)

Disaggregation (operational indicators)	Comments
Spatial	e.g. by river basin
Temporal (by month, by season)	

Other related indicators (contextual, proxy, other core indicators)

ID	Subindicator	Type
40	Water exploitation index	Proxy indicator
43	Water consumption index	Contextual indicator
44	Water abstraction by individual economic activities and households	Contextual indicator
45	Water consumption (total and by different economic activities and households)	Core indicator

Relevance

Policy context and rationale	This is an SDG indicator (goal 6). Climate change can have a significant impact on water stress, such as the change of precipitation patterns, shrinking water assets (groundwater, lakes, glaciers) or the change of water use patterns (more water needed for electricity production, cooling, drinking, irrigation, livestock feeding, etc.).
Related SDG indicator	6.4.2 Level of water stress: freshwater withdrawal as a proportion of available freshwater resources
Relation	Identical with SDG indicator
Sendai Framew. indicator	Not applicable
Policy references	

18   Level of water stress: freshwater withdrawal as a proportion of available freshwater resources

Indicator type   **Core indicator**

Document title	Link
Integrated Water Resources Management (Global Water Partnership,)	http://www.gwp.org/the-challenge/what-is-iwrm/
Transforming our world: the 2030 Agenda for Sustainable Development (General Assembly of the United Nations, 2015)	https://sustainabledevelopment.un.org/post2015/transformingourworld

Methodology

Methodology for indicator calculation	The indicator is computed as the total annual freshwater withdrawn (TWW) 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 km3/year (10^9 m3/year). Main sectors, as defined by ISIC standards, include for example agriculture; forestry and fishing; manufacturing; electricity industry; and municipalities. This indicator is also known as water withdrawal intensity.

Methodology references

Document title	Link
Integrated Monitoring Guide for SDG 6 (UN WATER, 2017)	https://www.unwater.org/publications/integrated-monitoring-guide-sdg-6-2/
Step-by-step monitoring methodology for indicator 6.4.2 (GEMI – Integrated Monitoring Initiative for SDG 6, 2017)	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
Metadata of SDG indicator 6.4.2: Level of water stress: freshwater withdrawal as a proportion of available freshwater resources (Food and Agriculture Organization of the United Nations (FAO), 2017)	https://unstats.un.org/sdgs/metadata/files/Metadata-06-04-02.pdf

Classification syst.	SEEA-CF: Classification of inland water bodies

Data sources

Main source	Official statistics: SEEA and/or SNA
Explanation	Best option: SEEA water accounts Other option(s): Data for this indicator are usually collected by national ministries and institutions having water-related issues in their mandate, such as ministries of water resources, agriculture, or environment. Data are mainly published within national water resources and irrigation master plans, national statistical yearbooks and other reports (such as those from projects, international surveys or results and publications from national and international research centres).

SEEA Accounts that can serve as data sources

SEEA Account	Comments
Physical flow accounts for water	
Physical asset accounts for water resources	

UN-FDES	2.6.1: Water resources

18　Level of water stress: freshwater withdrawal as a proportion of available freshwater resources

Indicator type　**Core indicator**

International databases containing this indicator

FAO Aquastat	http://www.fao.org/nr/water/aquastat/data/query/index.html?lang=en

Comments

Comments	The indicator has certain limitations as it cancels out seasonal and sub-national water stress situations. However, longterm trends can be shown; If the hydrological year (instead of the calendar year) is used to compute the indicator this should be indicated in the metadata.

20   Carbon stock in soil

Indicator type **Core indicator**

Versioning

First publication	9/19/2019	Latest update	9/19/2019

Area and sub-area

Area and sub-area	Impacts	Land, land cover, ecosystems and biodiversity

Presentation

Tier	3
Indicator definition and description	Soil carbon: The amount of carbon stored in the soil. Soil carbon is present in two forms: inorganic and organic. Soil inorganic carbon consists of mineral forms of C, either from weathering of parent material, or from reaction of soil minerals with atmospheric CO_2. Carbonate minerals are the dominant form of soil carbon in desert climates. Soil organic carbon is present as soil organic matter.
Unit of measure	tons C/ha
Coverage	National territory
Spatial aggregation	National territory
Reference period	Reference date
Update frequency	Annual
Base period	

Disaggregation (operational indicators)

Other related indicators (contextual, proxy, other core indicators)

Relevance

Policy context and rationale

Related SDG indicator	Not applicable

Relation

Sendai Framew. indicator	Not applicable

Policy references

Methodology

Methodology for indicator calculation

Methodology references

Classification syst.

20   Carbon stock in soil

Indicator type   **Core indicator**

Data sources

Main source

Official statistics: SEEA and/or SNA

Explanation

SEEA Accounts that can serve as data sources

SEEA Account	Comments
Accounting for carbon	

UN-FDES

International databases containing this indicator

Comments

Comments

21   Proportion of land that is degraded over total land area

Indicator type   **Core indicator**

Versioning

First publication	1/26/2017	Latest update	12/11/2019

Area and sub-area

Area and sub-area	Impacts	Land, land cover, ecosystems and biodiversity

Presentation

Tier	1
Indicator definition and description	Amount of land area that is degraded over total land area.
Unit of measure	%
Coverage	All land area of a country
Spatial aggregation	National territory
Reference period	A specific reference date, e.g. 31 December of a given year
Update frequency	Annual
Base period	2015

Disaggregation (operational indicators)

Disaggregation (operational indicators)	Comments
Spatial	by administrative unit; by river basin
Land cover class	

Other related indicators (contextual, proxy, other core indicators)

ID	Subindicator	Type
17	Percentage of land area suffering from unusually wet or dry conditions (Standard Precipitation Index)	Core indicator
51	Area affected by desertification	Contextual indicator

Relevance

Policy context and rationale	Global, regional and national policies to combat desertification. In the last decade, there have been a number of global/regional targets and initiatives to halt and reverse land degradation and restore degraded land. Starting in 2010, these include the Aichi Biodiversity Targets, one of which aims to restore at least 15% of degraded ecosystems; the Bonn Challenge and its regional initiatives to restore more than 150 million hectares; and most recently the Sustainable Development Goals (SDGs), in particular SDG target 15.3.
Related SDG indicator	15.3.1 Proportion of land that is degraded over total land area
Relation	Identical with SDG indicator
Sendai Framew. indicator	Not applicable
Policy references	

21   Proportion of land that is degraded over total land area

Indicator type   **Core indicator**

Document title	Link
United Nations Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, in particular in Africa (United Nations, 1994)	https://www.unccd.int/
United Nations Convention on Biological Diversity (CBD) (United Nations, 1992)	https://www.cbd.int/

Methodology

Methodology for indicator calculation

This indicator is calculated as the spatial extent (hectares or km2) expressed as the proportion (percentage or %) of land that is degraded over total land area.
SDG indicator 15.3.1 is a binary - degraded/not degraded - quantification based on the analysis of available data for three sub-indicators to be validated and reported by national authorities. The sub-indicators (Trends in Land Cover, Land Productivity and Carbon Stocks) were adopted by the UNCCD's governing body in 2013 as part of its monitoring and evaluation approach.

For more methodological details see SDG 15.3.1 metadata.

Methodology references

Document title	Link
Metadata for SDG indicator 15.3.1: Proportion of land that is degraded over total land area (United Nations Convention to Combat Desertification (UNCCD) and partners, including the Food and Agriculture Organization of the United Nations (FAO), United Nations Statistics Division (UNSD), United Nations Environment (UNEP), United Nations Framework Convention on Climate Change (UNFCCC) and Convention on Biological Diversity (CBD)., 2018)	https://unstats.un.org/sdgs/metadata/files/Metadata-15-03-01.pdf

Classification syst.

Data sources

Main source   Official statistics: SEEA and/or SNA

Explanation   Best option: SEEA land accounts
Other option(s): For land cover and land cover change, most countries have quantitative data and mapping capacities which are derived primarily from Earth observation. Land Use and Land Cover information are also available in FAOSTAT. For carbon stocks, countries regularly report o the UNFCCC according to a tiered approach. For land productivity, data for large geographical areas can be derived using Earth observation.

SEEA Accounts that can serve as data sources

SEEA Account	Comments
Physical asset accounts for land	
SEEA-EEA: Measuring ecosystem degradation in monetary terms	

UN-FDES

International databases containing this indicator

21   Proportion of land that is degraded over total land area

Indicator type   **Core indicator**

Comments	
Comments	SDG indicator 15.3.1 was reviewed at 6th IAEG-SDG meeting (classified as Tier II); status as of 22 May 2019

22　Number of deaths and missing persons attributed to hydro-meteorological disasters, per 100,000 population

Indicator type　**Core indicator**

Versioning

First publication	1/26/2017	Latest update	9/17/2019

Area and sub-area

Area and sub-area	Impacts	Human settlements and human health

Presentation

Tier	2
Indicator definition and description	Number of people who died, went missing or were directly affected by hydro-meteorological disasters per 100,000 population.
Unit of measure	number of deaths per 100,000 population
Coverage	Resident population
Spatial aggregation	National territory
Reference period	Calendar year
Update frequency	Annual
Base period	Base period of Sendai Framework: 2005-2015

Disaggregation (operational indicators)

Disaggregation (operational indicators)	Comments
Spatial	by administrative area
Gender, age groups and disabilities	
Income group	
Temporal (by month, by season)	
Type of hazard	
Dead versus missing persons	
Hazardous event	in case of large disasters: by individual hazardous event

Other related indicators (contextual, proxy, other core indicators)

ID	Subindicator	Type
23	Occurrence of extremes of temperatures and precipitation	Core indicator
24	Direct economic loss attributed to hydro-meteorological disasters in relation to GDP	Core indicator
25	Number of people whose destroyed dwellings were attributed to hydro-meteorological disasters	Core indicator
52	Proportion of population exposed to hazards	Contextual indicator

Relevance

22 Number of deaths and missing persons attributed to hydro-meteorological disasters, per 100,000 population

Indicator type	**Core indicator**
Policy context and rationale	Climate change leads to more and stronger hydro-meteorological hazards, thus population may be at higher risk. The indicator is relevant for climate change policies, sustainable development and disaster-risk reduction. 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 ituations. SDG Target 13.1: Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries This indicator is conceptually identical with SDG indicator 13.1.1, but it measures only the impacts caused by hydro-meteorological hazards ((hydrological, meteorological and climatological hazards according to IRDR peril classification).
Related SDG indicator	13.1.1 Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population
Relation	A disaggregation of the SDG indicator
Sendai Framew. indicator	A-1 (compound) - Number of deaths and missing persons attributed to disasters, per 100,000 population.

Policy references

Document title	Link
Sendai Framework for Disaster Risk Reduction 2015-2030 (United Nations Office for Disaster Risk Reduction (UNDRR), 2015)	https://www.unisdr.org/we/inform/publications/43291
Transforming our world: the 2030 Agenda for Sustainable Development (General Assembly of the United Nations, 2015)	https://sustainabledevelopment.un.org/post2015/transformingourworld
Paris Agreement (United Nations, 2015)	https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement

Methodology

Methodology for indicator calculation	This indicator, A1, is calculated as a simple summation of related indicators (death, missing people) divided by the represented population: A1 = ((A2+aA3a)/(population)) × 100,000 Where: A1: Number of deaths and missing persons attributed to hydro-meteorological disasters per 100,000 A2a: Number of deaths attributed to hydro-meteorological disasters; A3a: Number of missing persons attributed to hydro-meteorological disasters Death : The number of people who died during the disaster, or directly after, as a direct result of the hazardous event. Missing : The number of people whose whereabouts is unknown since the hazardous event. It includes people who are presumed dead, for whom there is no physical evidence such as a body, and for which an official/legal report has been filed with competent authorities. Hydro-meteorological disasters: Disasters originating from hydro-meteorological hazards (hydrological, meteorological and climatological hazards according to IRDR peril classification). Note: The data on number of deaths and number of missing/presumed dead are mutually exclusive, so no-one should be double counted.

22 Number of deaths and missing persons attributed to hydro-meteorological disasters, per 100,000 population

Indicator type	**Core indicator**

Detailed methodologies can be found in the Technical Guidance for Monitoring and Reporting on Progress in Achieving the Global Targets of the Sendai Framework
NOTE: The Sendai Framework indicator represents the impacts of all types of disasters (e.g. including earthquakes, technological disasters etc.), whereas this CC-related indicator only relates to disasters originating from hydro-meteorological hazards (hydrological, meteorological and climatological hazards according to IRDR peril classification).

Methodology references

Document title	Link
Technical Guidance for Monitoring and Reporting on Progress in Achieving the Global Targets of the Sendai Framework for Disaster Risk Reduction (United Nations Office for Disaster Risk Reduction (UNDRR), 2017)	https://www.unisdr.org/files/54970_techguidancefdigitalhr.pdf

Classification syst.	IRDR Peril Classification

Data sources

Main source	Official statistics: other than accounts
Explanation	National Statistical Offices, Disaster Risk Management Agencies

SEEA Accounts that can serve as data sources

UN-FDES	4.1.1: Occurrence of natural extreme events and disasters

International databases containing this indicator

Sendai Framework Monitor	https://sendaimonitor.unisdr.org/

Comments

Comments

23   Occurrence of extremes of temperatures and precipitation

Indicator type   **Core indicator**

Versioning

First publication   1/26/2017   Latest update   9/19/2019

Area and sub-area

Area and sub-area	Impacts	Physical conditions

Presentation

Tier	1
Indicator definition and description	Number of days per year when extreme weather events (precipitation and temperature) occured.
Unit of measure	Number of days per year
Coverage	National territory
Spatial aggregation	National territory
Reference period	Calendar year
Update frequency	Annual
Base period	Climate Normal 1961-1990

Disaggregation (operational indicators)

Disaggregation (operational indicators)	Comments
Spatial	
Temporal (by month, by season)	
Hazardous event	Extremes of temperatures; Extremes of precipitation; Seasonal and territorial breakdowns

Other related indicators (contextual, proxy, other core indicators)

ID	Subindicator	Type
16	Mean temperature anomaly (compared to climate normal 1961 - 1990)	Core indicator
17	Percentage of land area suffering from unusually wet or dry conditions (Standard Precipitation Index)	Core indicator
22	Number of deaths and missing persons attributed to hydro-meteorological disasters, per 100,000 population	Core indicator
24	Direct economic loss attributed to hydro-meteorological disasters in relation to GDP	Core indicator
28	Direct agricultural loss attributed to hydro-meteorological disasters	Core indicator
62	Temperature change compared to pre-industrial levels	Contextual indicator
63	Temperature change (compared to base period 1951 - 1980)	Contextual indicator
65	Total precipitation	Contextual indicator

Relevance

23   Occurrence of extremes of temperatures and precipitation

Indicator type   **Core indicator**

Policy context and rationale	Related to Sendai Framework, Sustainable Development Goals, Paris Agreement Related to SDG 13
Related SDG indicator	13.1.1 Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population
Relation	Similar but not identical
Sendai Framew. indicator	Not applicable

Policy references

Document title	Link
Sendai Framework for Disaster Risk Reduction 2015-2030 (United Nations Office for Disaster Risk Reduction (UNDRR), 2015)	https://www.unisdr.org/we/inform/publications/43291

Methodology

Methodology for indicator calculation	The indicator is calculated as number of days per year when an extreme weather event occurred. An extreme weather event occurs if oberved temperature or precipitation is below or above 10th or 90th percentile value.

Methodology references

Document title	Link
WMO Guidelines on the Calculation of Climate Normals (World Meteorological Organization, 2017)	https://library.wmo.int/index.php?lvl=notice_display&id=20130 - .XWOTUigzaUk
WMO Guidelines on Generating a Defined Set of National Climate Monitoring Products (World Meteorological Organization, 2017)	https://library.wmo.int/index.php?lvl=notice_display&id=20166 - .XWOTHSgzaUk

Classification syst.	

Data sources

Main source	Official statistics: other than accounts
Explanation	National Hydrometeorlogical Institutes, European Severe Weather Database (https://www.eswd.eu/)

SEEA Accounts that can serve as data sources

UN-FDES	4.1.1: Occurrence of natural extreme events and disasters

International databases containing this indicator

Comments

Comments	The aim is to flag the exceptional events, that is, events that often have extreme impacts. The indicator cannot characterize or define the full range of very extreme events that affect countries and people around the region, which include tropical storms, tornadoes, hail, lightning, flooding, duststorms, windstorms, wind gusts or heat stress. The choice was made to focus on extremes of temperature and precipitation, as these are widely measured.

24 Direct economic loss attributed to hydro-meteorological disasters in relation to GDP

Indicator type **Core indicator**

Versioning

First publication | 1/26/2017 | Latest update | 1/6/2020

Area and sub-area

Area and sub-area | Impacts | National total

Presentation

Tier | 2

Indicator definition and description | Monetary value of total or partial destruction of physical assets existing in the affected area of a hydro-meteorological disaster in relation to the GDP (in current prices, assuming that the numerator is also expressed in current prices)

Unit of measure | %

Coverage | All physical assets within a country

Spatial aggregation | National territory

Reference period | Calendar year

Update frequency | Annual

Base period | 2015

Disaggregation (operational indicators)

Disaggregation (operational indicators)	Comments
Economic sector (ISIC) and households	
Spatial	
Temporal (by month, by season)	
Type of hazard	in case of large disasters: by individual hazardous event
Type of damage (agricultural, other productive assets, critical infras	

Other related indicators (contextual, proxy, other core indicators)

ID	Subindicator	Type
22	Number of deaths and missing persons attributed to hydro-meteorological disasters, per 100,000 population	Core indicator
23	Occurrence of extremes of temperatures and precipitation	Core indicator
25	Number of people whose destroyed dwellings were attributed to hydro-meteorological disasters	Core indicator
28	Direct agricultural loss attributed to hydro-meteorological disasters	Core indicator

Relevance

Policy context and rationale | Climate change leads to more and stronger hydro-meteorological hazards, thus all economic assets may be at higher risk. The indicators contributes to measuring climate change policies, sustainable development and disaster-risk reduction.

24   Direct economic loss attributed to hydro-meteorological disasters in relation to GDP

Indicator type   **Core indicator**

	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
	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 ituations.
	SDG Target 13.1: Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries
	This indicator is conceptually identical with SDG indicator 11.5.2, but it measures only the impacts caused by hydro-meteorological hazards ((hydrological, meteorological and climatological hazards according to IRDR peril classification).
Related SDG indicator	11.5.2 Direct economic loss in relation to global GDP, damage to critical infrastructure and number of disruptions to basic services, attributed to disasters
Relation	A disaggregation of the SDG indicator
Sendai Framew. indicator	C-1 (compound) - Direct economic loss attributed to disasters in relation to global gross domestic product.

Policy references

Document title	Link
Paris Agreement (United Nations, 2015)	https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement
Transforming our world: the 2030 Agenda for Sustainable Development (General Assembly of the United Nations, 2015)	https://sustainabledevelopment.un.org/post2015/transformingourworld
Sendai Framework for Disaster Risk Reduction 2015-2030 (United Nations Office for Disaster Risk Reduction (UNDRR), 2015)	https://www.unisdr.org/we/inform/publications/43291

Methodology

Methodology for indicator calculation	General formula for Sendai Indicator C1: C1 = (C2+C3+C4+C5+C6)/GDP Where: C2: Direct agricultural loss attributed to disasters C3: Direct economic loss to all other damaged or destroyed productive assets attributed to disasters C4: Direct economic loss in the housing sector attributed to disasters C5: Direct economic loss resulting from damaged or destroyed critical infrastructure attributed to disasters C6: Direct economic loss to cultural heritage damaged or destroyed attributed to disasters Direct economic loss is nearly equivalent to physical damage. It is the sum of direct agricultural loss, direct economic loss to all other damaged or destroyed productive assets, direct economic loss in the housing sector, direct economic loss resulting from damaged or destroyed critical infrastructure and direct economic loss to cultural heritage damaged or destroyed attributed to hydro-meteorological disasters. The total direct economic loss of a country within a calendar year is then divided by the GDP. For more details, see Technical Guidance for Sendai Framework Indicators.

24   Direct economic loss attributed to hydro-meteorological disasters in relation to GDP

Indicator type   **Core indicator**

NOTE: The CC-related indicator only refers to HYDRO-METEOROLOGICAL disasters, that is disasters caused by hydro-meteorological hazards ((hydrological, meteorological and climatological hazards according to IRDR peril classification).

Denominator: GDP in current prices (assuming that the numerator is also expressed in current prices)

Methodology references

Document title	Link
Technical Guidance for Monitoring and Reporting on Progress in Achieving the Global Targets of the Sendai Framework for Disaster Risk Reduction (United Nations Office for Disaster Risk Reduction (UNDRR), 2017)	https://www.unisdr.org/files/54970_techguidancefdigitalhr.pdf

Classification syst.   IRDR Peril Classification

Data sources

Main source   Official statistics: other than accounts

Explanation   National Statistical Offices, Disaster Risk Management Agencies

SEEA Accounts that can serve as data sources

UN-FDES   4.1.2: Impact of natural extreme events and disasters

International databases containing this indicator

Sendai Framework Monitor	https://sendaimonitor.unisdr.org/

Comments

Comments

25 Number of people whose destroyed dwellings were attributed to hydro-meteorological disasters

Indicator type **Core indicator**

Versioning

First publication | 1/26/2017 | Latest update | 9/17/2019

Area and sub-area

Area and sub-area | Impacts | Human settlements and human health

Presentation

Tier | 2

Indicator definition and description | Estimated number of inhabitants previously living in the dwellings (houses, or housing units) destroyed.

Unit of measure | Number of people

Coverage | Resident population

Spatial aggregation | National territory

Reference period | Calendar year

Update frequency | Annual

Base period | Base period of Sendai Framework: 2005-2015

Disaggregation (operational indicators)

Disaggregation (operational indicators)	Comments
Spatial	
Gender, age groups and disabilities	
Income group	
Temporal (by month, by season)	
Type of hazard	in case of large disasters: by individual hazardous event

Other related indicators (contextual, proxy, other core indicators)

ID	Subindicator	Type
22	Number of deaths and missing persons attributed to hydro-meteorological disasters, per 100,000 population	Core indicator
23	Occurrence of extremes of temperatures and precipitation	Core indicator
24	Direct economic loss attributed to hydro-meteorological disasters in relation to GDP	Core indicator

Relevance

Policy context and rationale | Climate change leads to more and stronger hydro-meteorological hazards, thus basic infrastructure may be at higher risk. The indicator contributes to measuring climate change policies, sustainable development and disaster-risk reduction.

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

25   Number of people whose destroyed dwellings were attributed to hydro-meteorological disasters

Indicator type   Core indicator

	product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable ituations. SDG Target 13.1: Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries However, there is no indicator in the SDG framework measuring the impact of destroyed dwellings.
Related SDG indicator	Not applicable
Relation	
Sendai Framew. indicator	B-4 - Number of people whose destroyed dwellings were attributed to disasters.

Policy references

Document title	Link
Transforming our world: the 2030 Agenda for Sustainable Development (General Assembly of the United Nations, 2015)	https://sustainabledevelopment.un.org/post2015/transformingourworld
Sendai Framework for Disaster Risk Reduction 2015-2030 (United Nations Office for Disaster Risk Reduction (UNDRR), 2015)	https://www.unisdr.org/we/inform/publications/43291

Methodology

Methodology for indicator calculation	Houses destroyed: Houses (housing units) levelled, buried, collapsed, washed away or damaged to the extent that they are no longer habitable, or must be rebuilt. The indicator is calculated as the number of population living in houses or housing units which were destroyed by hydro-meteorological disasters.

Methodology references

Document title	Link
Technical Guidance for Monitoring and Reporting on Progress in Achieving the Global Targets of the Sendai Framework for Disaster Risk Reduction (United Nations Office for Disaster Risk Reduction (UNDRR), 2017)	https://www.unisdr.org/files/54970_techguidancefdigitalhr.pdf

Classification syst.	IRDR Peril Classification

Data sources

Main source	Official statistics: other than accounts
Explanation	Population and housing statistics, Disaster Risk Management Agencies

SEEA Accounts that can serve as data sources

UN-FDES	4.1.2: Impact of natural extreme events and disasters

International databases containing this indicator

Sendai Framework Monitor	https://sendaimonitor.unisdr.org/

Comments

Comments

26   Incidence of climate-related vector-borne diseases

Indicator type   **Core indicator**

Versioning

First publication	1/26/2017	Latest update	9/27/2019

Area and sub-area

Area and sub-area	Impacts	Human settlements and human health

Presentation

Tier	2
Indicator definition and description	Incidence of vector-borne diseases influenced by climatic conditions reported during a year. Vector-borne diseases influenced by climatic conditions include: Lyme disease (A69.2), malaria (B50-B54), West Nile virus (A92.3), yellow fever (A95), dengue(A97).
Unit of measure	Percentage
Coverage	Resident population
Spatial aggregation	National territory
Reference period	Calendar year
Update frequency	Annual
Base period	Not applicable

Disaggregation (operational indicators)

Disaggregation (operational indicators)	Comments
Disease	
Spatial	
Temporal (by month, by season)	
Gender, age groups and disabilities	

Other related indicators (contextual, proxy, other core indicators)

ID	Subindicator	Type
77	Estimated number of cases of the selected vector-borne diseases	Contextual indicator
85	Reported number of cases of the selected vector-borne diseases	Contextual indicator

Relevance

Policy context and rationale	Numerous climate change vulnerability assessments anticipate that rising global temperatures will increase the incidence of communicable diseases including vector-borne diseases (VBDs). Globally, vector-borne diseases account for more than 17% of all infectious diseases, causing more than 1 million deaths annually. Globalization of travel and trade, unplanned urbanization and environmental challenges such as climate change are having a significant impact on disease transmission in recent years. Some diseases, such as dengue, chikungunya, and West Nile virus, are emerging in countries where they were previously unknown. Changes in climate are likely to lengthen the transmission seasons of important vector-borne diseases and to alter their geographic range. Malaria (transmitted by Anopheles mosquitoes) is strongly influenced by climate. The Aedes mosquito vector of dengue is also highly sensitive to climate conditions, and studies suggest that climate change is likely to continue to increase exposure to dengue (WHO).

26 Incidence of climate-related vector-borne diseases

Indicator type **Core indicator**

	The development and survival of ticks, their animal hosts, and the bacterium that causes Lyme disease are all strongly influenced by climatic factors, especially temperature, precipitation, and humidity (CDC). Future climate change in Europe is therefore likely to facilitate the spread of Lyme borreliosis in the same way, while reducing its occurrence in areas that become hotter and drier.
Related SDG indicator	Not applicable
Relation	
Sendai Framew. indicator	Not applicable

Policy references

Document title	Link
WHO climate change and vector-borne diseases (World Health Organization,)	http://www.wpro.who.int/mvp/climate_change/en/

Methodology

Methodology for indicator calculation	Number of reported new cases of the selected diseases divided by the resident population of a country at the beginning of the year.

Methodology references

Classification syst.	International Statistical Classification of Diseases and Related Health Problems (http://www.who.i

Data sources

Main source	Other than official statistics
Explanation	Surveillance systems, ministries of health

SEEA Accounts that can serve as data sources

UN-FDES	5.2.3: Vector-borne diseases

International databases containing this indicator

WHO Database	http://apps.who.int/gho/data/node.imr
European Centre for Disease Control and Prevention	https://ecdc.europa.eu/en/publications-data?f%5B0%5D=diseases%3A194

Comments

Comments	The number of reported cases may differ from number of estimated cases. The reported number can be affected by: - the completeness of reporting: the number of reported cases can be lower than the estimated cases if the percentage of health facilities reporting in a month is less than 100% - the extent of malaria diagnostice tsting - the use of private health facilities which are usually not included in reporting systems. - the indicator is estimated only where malaria transmission occurs.

27   Excess mortality related to heat

Indicator type **Core indicator**

Versioning

First publication	1/26/207	Latest update	9/27/2019

Area and sub-area

Area and sub-area	Impacts	Human settlements and human health

Presentation

Tier	3

Indicator definition and description	Estimated number of excess deaths which can be attributed to heat compared to the average number of deaths in given period for population over 65 years old.

Unit of measure	Number of deaths per million people
Coverage	Resident population aged 65 and over
Spatial aggregation	National territory
Reference period	Calendar year
Update frequency	Annual
Base period	Not applicable

Disaggregation (operational indicators)

Disaggregation (operational indicators)	Comments
Gender, age groups and disabilities	
Spatial	
Temporal (by month, by season)	
Income group	

Other related indicators (contextual, proxy, other core indicators)

ID	Subindicator	Type
80	Share of people working outside	Contextual indicator
37	Proportion of population living in dwellings with air conditioners or air conditioning	Contextual indicator

Relevance

Policy context and rationale	Extreme high air temperatures contribute directly to deaths from cardiovascular and respiratory disease, particularly among elderly people. In the heat wave of summer 2003 in Europe for example, more than 70 000 excess deaths were recorded. Global warming constitutes a new health threat in an aged Europe that may be difficult to detect at the country level, depending on its size. An increase in future heat-related mortality is seen as one of the most likely impacts of future anthropogenic climate change (WHO).
Related SDG indicator	Not applicable

Relation

27 Excess mortality related to heat

Indicator type **Core indicator**

Sendai Framew. indicator	Not applicable

Policy references

Methodology

Methodology for indicator calculation	This indicator is calculated as the estimated number of excess deaths which can be attributed to heat compared to the expected number of deaths in the heatwave period. There is no internationally agreed methodology for calculation of this indicator. For an example of exisiting methodology, refer to the methodology reference.

Methodology references

Document title	Link
Quantitative risk assessment of the effects of climate change on selected causes of death, 2030s and 2050s (World Health Organization, 2014)	https://apps.who.int/iris/handle/10665/134014

Classification syst.	Not applicable

Data sources

Main source	Other than official statistics
Explanation	Estimation

SEEA Accounts that can serve as data sources

UN-FDES	

International databases containing this indicator

Comments

Comments	A cutoff time when the outcomes are observed needs to be included in the estimation. The estimation is limited to the older population (aged 65 years or over) because this is the population considered most at risk of heat-related mortality, and also to avoid double counting with other outcomes.

28   Direct agricultural loss attributed to hydro-meteorological disasters

Indicator type **Core indicator**

Versioning

First publication		Latest update	7/22/2019

Area and sub-area

Area and sub-area	Impacts	Agriculture, forestry and fishery

Presentation

Tier	2
Indicator definition and description	Direct agriculture loss in monetary units, including the crops, livestock, fisheries, apiculture, aquaculture and forest sectors as well as associated facilities and infrastructure.
Unit of measure	National currency and USD
Coverage	All agricultural assets and production: Stored inputs, stored production, crops, forestry, livestock, aquaculture
Spatial aggregation	National territory
Reference period	Calendar year
Update frequency	Annual
Base period	2015

Disaggregation (operational indicators)

Disaggregation (operational indicators)	Comments
Spatial	
Temporal (by month, by season)	
Product	by type of agricultural product lost
Type of hazard	in case of large disasters: by individual hazardous event

Other related indicators (contextual, proxy, other core indicators)

ID	Subindicator	Type
16	Mean temperature anomaly (compared to climate normal 1961 - 1990)	Core indicator
17	Percentage of land area suffering from unusually wet or dry conditions (Standard Precipitation Index)	Core indicator
23	Occurrence of extremes of temperatures and precipitation	Core indicator
24	Direct economic loss attributed to hydro-meteorological disasters in relation to GDP	Core indicator

Relevance

Policy context and rationale	Disaster-risk reduction and climate change: Most of agricultural damage (98.5%) is associated with weather-related hazards. Three disaster types, namely flood, drought and forest fire, represent 82% of the damage with a total of more than 209 million hectares affected. The importance of agricultural loss due to disasters is undeniable, especially when looking at accumulated impact of small-scale but frequent events.

28   Direct agricultural loss attributed to hydro-meteorological disasters

Indicator type   **Core indicator**

	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 This is a sub-indicator of SDG indicator 1.5.2 and Sendai Framework Indicator C-2 This indicator is conceptually identical with SDG indicator 11.5.2, but it measures only the impacts caused by hydro-meteorological hazards ((hydrological, meteorological and climatological hazards according to IRDR peril classification).
Related SDG indicator	1.5.2 Direct economic loss attributed to disasters in relation to global gross domestic product (GDP)
Relation	A disaggregation of the SDG indicator
Sendai Framew. indicator	C-2 - Direct agricultural loss attributed to disasters.

Policy references

Document title	Link
Sendai Framework for Disaster Risk Reduction 2015-2030 (United Nations Office for Disaster Risk Reduction (UNDRR), 2015)	https://www.unisdr.org/we/inform/publications/43291
Transforming our world: the 2030 Agenda for Sustainable Development (General Assembly of the United Nations, 2015)	https://sustainabledevelopment.un.org/post2015/transformingourworld

Methodology

Methodology for indicator calculation	Agriculture is understood to include the crops, livestock, fisheries, apiculture, aquaculture and forest sectors as well as associated facilities and infrastructure. 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. In order to capture the direct impact of disasters on agriculture, it is important to take into account both: - Losses, that is, changes in economic flows arising directly from the disaster (i.e. reduction in output in crops, livestock, fisheries, aquaculture and forestry); and - The replacement and/or recovery costs of totally or partially destroyed physical assets and stocks (stored inputs and production) in the disaster-affected area. For more details, see Technical Guidance for Sendai Framework Indicators. NOTE: The CC-related indicator only refers to HYDRO-METEOROLOGICAL disasters, that is disasters caused by hydro-meteorological hazards (hydrological, meteorological and climatological hazards according to IRDR peril classification).

Methodology references

Document title	Link
Technical Guidance for Monitoring and Reporting on Progress in Achieving the Global Targets of the Sendai Framework for Disaster Risk Reduction (United Nations Office for Disaster Risk Reduction (UNDRR), 2017)	https://www.unisdr.org/files/54970_techguidancefdigitalhr.pdf

Classification syst.	IRDR peril classification

28 Direct agricultural loss attributed to hydro-meteorological disasters

Indicator type **Core indicator**

Data sources

Main source	Official statistics: other than accounts
Explanation	Agriculture statistics, Disaster Risk Management Agencies

SEEA Accounts that can serve as data sources

SEEA Account	Comments
Monetary asset accounts for timber resources	
Monetary asset accounts for aquatic resources	

UN-FDES 4.1.2: Impact of natural extreme events and disasters

International databases containing this indicator

Sendai Framework Monitor	https://sendaimonitor.unisdr.org/

Comments

Comments

29a Renewable energy share in total energy use by the national economy

Indicator type **Core indicator**

Versioning

First publication 1/26/2017   Latest update   9/24/2019

Area and sub-area

Area and sub-area   Mitigation   Energy resources

Presentation

Tier   3

Indicator definition and description   Percentage of renewable energy use in total energy use of the national economy.

Unit of measure   %

Coverage   All economic activities (production, consumption, accumulation)

Spatial aggregation   National economy

Reference period   Calendar year

Update frequency   Annual

Base period

Disaggregation (operational indicators)

Disaggregation (operational indicators)	Comments
Spatial	
Energy product (SIEC)	
Type of purpose (heating, cooling, transport, other)	

Other related indicators (contextual, proxy, other core indicators)

ID	Subindicator	Type
01a	Total energy use by the national economy	Core indicator
29b	Renewable energy share in the total final energy consumption within the national territory	Core indicator
69	Production costs of renewable energy (total and per technology)	Contextual indicator
70	Energy price	Contextual indicator
71	Number of vehicles per type of fuel	Contextual indicator
72	Renewable energy capacity per technology	Contextual indicator
73	Energetic share of biofuel in total fuel	Contextual indicator

Relevance

Policy context and rationale   Renewable energy has generally several benefits compared to fossil fuels, including a reduction in greenhouse gas and air pollutant emissions, lesser environmental and health impacts, and a reduced dependency on energy imports. Increasing the share of renewable energy sources in energy consumption will therefore reduce environmental pressures linked to the extraction and use of non-renewable energy.

29a   Renewable energy share in total energy use by the national economy

Indicator type   **Core indicator**

	For European countries: Directive 28/2009/CE and Europe 2020 Strategy RES - overall target of European Directive 28/2009/CE S19 - indicators for Energy Union headline indicators of the Europe 2020 Strategy SDG Target 7.2: By 2030, increase substantially the share of renewable energy in the global energy mix
Related SDG indicator	Not applicable
Relation	
Sendai Framew. indicator	Not applicable

Policy references

Document title	Link
Communication From The Commission To The European Parliament, The Council, The European Economic And Social Committee And The Committee Of The Regions Energy 2020 A Strategy For Competitive, Sustainable And Secure Energy (European Commission, 2010)	https://ec.europa.eu/energy/en/topics/energy-strategy-and-energy-union/2020-energy-strategy
Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC (Text with EEA relevance) (European Commission, 2009)	https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32009L0028

Methodology

Methodology for indicator calculation	Further research needed. Total energy use is measured at the end use stage. 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. Seperating out what share of that energy comes from renewable enegy is not straightforward, e.g. it requires an estimate of the energy mix for imported electricity.

Methodology references

Document title	Link
System of Environmental-Economic Accounting for Energy (SEEA-Energy) (United Nations Statistics Division, 2019)	https://seea.un.org/seea-energy
Physical Flow Accounts for Energy (PEFA Manual) (Eurostat, 2014)	http://ec.europa.eu/eurostat/web/environment/methodology
International Recommendations for Energy Statistics (United Nations, 2018)	https://unstats.un.org/unsd/energy/ires/

Classification syst.	SIEC

Data sources

Main source	Official statistics: SEEA and/or SNA

29a   Renewable energy share in total energy use by the national economy

Indicator type   **Core indicator**

Explanation	SEEA energy accounts

SEEA Accounts that can serve as data sources

SEEA Account	Comments
Physical flow accounts for energy	

UN-FDES	2.2.2: Production, trade and consumption of energy

International databases containing this indicator

Comments

Comments

29b Renewable energy share in the total final energy consumption within the national territory

Indicator type **Core indicator**

Versioning

First publication | 1/26/2017 | Latest update | 9/20/2019

Area and sub-area

Area and sub-area | Mitigation | Energy resources

Presentation

Tier | 1

Indicator definition and description | Percentage of final consumption of energy on the national territory that is derived from renewable resources.

Unit of measure | %

Coverage | Final consumption on the territory. Final consumption refers to all fuel and energy delivered to users for both their energy and non-energy uses, and which do not involve a transformation process.

Spatial aggregation | National territory

Reference period | Calendar year

Update frequency | Annual

Base period | Not applicable

Disaggregation (operational indicators)

Disaggregation (operational indicators)	Comments
Spatial	
Energy product (SIEC)	
Economic sector (ISIC) and households	

Other related indicators (contextual, proxy, other core indicators)

ID	Subindicator	Type
29a	Renewable energy share in total energy use by the national economy	Core indicator
69	Production costs of renewable energy (total and per technology)	Contextual indicator
70	Energy price	Contextual indicator
71	Number of vehicles per type of fuel	Contextual indicator
72	Renewable energy capacity per technology	Contextual indicator
73	Energetic share of biofuel in total fuel	Contextual indicator

Relevance

Policy context and rationale | Renewable energy has generally several benefits compared to fossil fuels, including a reduction in greenhouse gas and air pollutant emissions, lesser environmental and health impacts, and a reduced dependency on energy imports. Increasing the share of renewable energy sources in energy consumption will therefore reduce environmental pressures linked to the extraction and use of non-renewable energy.

29b Renewable energy share in the total final energy consumption within the national territory

Indicator type	**Core indicator**

Related SDG indicator	7.2.1 Renewable energy share in the total final energy consumption
Relation	Identical with SDG indicator
Sendai Framew. indicator	Not applicable

Policy references

Document title	Link
Transforming our world: the 2030 Agenda for Sustainable Development (General Assembly of the United Nations, 2015)	https://sustainabledevelopment.un.org/post2015/transformingourworld
Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC (Text with EEA relevance) (European Commission, 2009)	https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32009L0028
Communication From The Commission To The European Parliament, The Council, The European Economic And Social Committee And The Committee Of The Regions Energy 2020 A Strategy For Competitive, Sustainable And Secure Energy (European Commission, 2010)	https://ec.europa.eu/energy/en/topics/energy-strategy-and-energy-union/2020-energy-strategy

Methodology

Methodology for indicator calculation	The indicator is calculated by dividing final energy consumption from all renewable sources by total final energy consumption. Renewable energy consumption is derived from three tables of the IEA world energy statistics and balances: total final consumption, electricity output and heat output. For detailed methodology, see metadata of SDG indicator 7.2.1

Methodology references

Document title	Link
Tracking SDG 7. The Energy Progress Report. (Internal Energy Agency, International Renewable Energy Agency, United Nations Statistical Division, World Bank Group, World Health Organization, 2019)	https://trackingsdg7.esmap.org/data/files/download-documents/2019-Tracking%20SDG7-Full%20Report.pdf
Metadata of SDG indicator 7.2.1: Renewable energy share in the total final energy consumption (percent) (International Energy Agency (IEA), United Nations Statistics Division (UNSD), International Renewable Energy Agency (IRENA), 2019)	https://unstats.un.org/sdgs/metadata/files/Metadata-07-02-01.pdf

Classification syst.	Standard International Energy Product Classification (SIEC)

Data sources

Main source	Official statistics: other than accounts
Explanation	Energy balances, energy statistics

SEEA Accounts that can serve as data sources

29b Renewable energy share in the total final energy consumption within the national territory

Indicator type	**Core indicator**

UN-FDES	2.2.2: Production, trade and consumption of energy

International databases containing this indicator

World Bank DataBank	https://databank.worldbank.org

Comments

Comments	This indicator is not comparable to the indicator requested by Directive 28/2009/CE, because the latter includes some multiplicative factors for some renewables products.

30   Share of climate change mitigation expenditure in relation to GDP

Indicator type   **Core indicator**

Versioning

First publication	9/19/2019	Latest update	9/19/2019

Area and sub-area

Area and sub-area	Mitigation	Expenditures

Presentation

Tier	3
Indicator definition and description	This indicator measures the (governmental, private sector and households) expenditures related to human interventions to reduce the sources or enhance the sinks of greenhouse gasses for the limitation or reduction of GHG emissions; expressed as a share of GDP (in current prices, assuming that the numerator is also expressed in current prices)
Unit of measure	%
Coverage	National economy
Spatial aggregation	National economy
Reference period	Calendar year
Update frequency	Annual
Base period	

Disaggregation (operational indicators)

Disaggregation (operational indicators)	Comments
Mitigation expenditure type (renewable energy, energy saving, CO2	

Other related indicators (contextual, proxy, other core indicators)

Relevance

Policy context and rationale	Relevant to climate change mitigation policies and measures implemented under the UNFCCC, its Kyoto Protocol and the Paris Agreement under the UNFCCC
Related SDG indicator	Not applicable
Relation	
Sendai Framew. indicator	Not applicable

Policy references

Document title	Link
Regulation (EU) No 538/2014 of the European Parliament and of the Council of 16 April 2014 amending Regulation (EU) No 691/2011 on European environmental economic accounts (European Parliament, 2014)	https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32014R0538

Methodology

30 Share of climate change mitigation expenditure in relation to GDP

Indicator type **Core indicator**

Methodology for indicator calculation	Denominator: GDP in current prices (assuming that the numerator is also expressed in current prices)

Methodology references

Document title	Link
Compiling and Refining Environmental and Economic Accounts (CREEA) (EU Cordis, 2014)	https://cordis.europa.eu/project/rcn/97380/reporting/en
Environmental protection expenditure accounts Handbook — 2017 edition: Quantities, Flows, and Resources (Eurostat, 2017)	https://ec.europa.eu/eurostat/web/products-manuals-and-guidelines/-/KS-GQ-17-004
Environmental expenditure statistics (Eurostat, 2007)	https://ec.europa.eu/eurostat/en/web/products-statistical-working-papers/-/KS-RA-07-012

Classification syst.	

Data sources

Main source	Official statistics: SEEA and/or SNA
Explanation	Best option: SEEA Environmental expenditure accounts Other option(s): national statistics, national and international research data

SEEA Accounts that can serve as data sources

SEEA Account	Comments
Accounts for other transactions related to the environment	

UN-FDES	6.1.1: Government environmental protection and resource management expenditure

International databases containing this indicator

Comments

Comments	Follow-up work needed, e.g. within SEEA research agenda.

31   Share of energy and transport related taxes in total taxes and social contributions

Indicator type   **Core indicator**

Versioning

First publication | 1/26/2017   Latest update | 9/25/2019

Area and sub-area

Area and sub-area | Mitigation | Environmental governance and regulation

Presentation

Tier | 1

Indicator definition and description | Energy and transport taxes revenue as percentage of revenues from total taxes and social contributions.
Energy and transport taxes are part of environmental taxes defined as taxes whose tax base is a physical unit (or a proxy of it) of something that has a proven, specific, negative impact on the environment (SEEA CF § 4.150). Energy and transport taxes are two specific categories of environmental taxes.

Unit of measure | %

Coverage | Production activities and consumption activities

Spatial aggregation | National economy

Reference period | Calendar year

Update frequency | Annual

Base period | Not applicable

Disaggregation (operational indicators)

Disaggregation (operational indicators)	Comments
Economic sector (ISIC) and households	
Spatial	
Type of tax (energy, CO2, transport, etc.)	e.g. energy taxes by economic activity, CO2 taxes by economic activity, transport taxes by economic activity

Other related indicators (contextual, proxy, other core indicators)

ID	Subindicator	Type
76	Energy consumption by product	Contextual indicator

Relevance

Policy context and rationale | Relevant to climate change mitigation policies and measures implemented under the UNFCCC, its Kyoto Protocol and the Paris Agreement under the UNFCCC.

Related SDG indicator | Not applicable

Relation

Sendai Framew. indicator | Not applicable

Policy references

31 Share of energy and transport related taxes in total taxes and social contributions

Indicator type **Core indicator**

Document title	Link
Kyoto Protocol (United Nations Climate Change, 1997)	https://unfccc.int/process-and-meetings/the-kyoto-protocol/what-is-the-kyoto-protocol/kyoto-protocol-targets-for-the-first-commitment-period
United Nations Framework Convention on Climate Change (United Nations Climate Change, 1994)	https://unfccc.int/process-and-meetings/the-convention/what-is-the-united-nations-framework-convention-on-climate-change
Paris Agreement (United Nations, 2015)	https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement
Regulation (EU) No 691/2011 of the European Parliament and of the Council of 6 July 2011 on European environmental economic accounts (European Parliament, 2011)	https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:02011R0691-20140616

Methodology

Methodology for indicator calculation	The indicator is calculated as the revenue of energy and transport taxes divided by total revenue from taxes and social contributions. The indicator refers to two categories of taxes (energy and transport), out of four broad categories into which environmental taxes are grouped in the SEEA CF and in general: - Energy taxes: this category includes taxes on energy products used for both transport and stationary purposes. Taxes on carbon are also included; a special type of carbon taxes are payments for tradable emissions permits. - Transport taxes: this category includes mainly taxes related to the ownership and use of motor vehicles. Taxes on other transport equipment (e.g., planes), and related transport services (e.g., duties on charter or scheduled flights) are also included here, as are taxes related to the use of roads. The transport taxes may be "one-off" taxes related to imports or sales of the equipment or recurrent taxes such as an annual road tax. Taxes on petrol, diesel and other transport fuels are included under energy taxes; (SEEA CF § 4.155). "Total revenue from taxes and social contributions" includes all taxes (on products, production, income, other current taxes and capital taxes) as well as actual and imputed social contributions (SEEA CF § 4.149).

Methodology references

Classification syst.	SNA and SEEA classification of taxes

Data sources

Main source	Official statistics: SEEA and/or SNA
Explanation	Environmental taxes

SEEA Accounts that can serve as data sources

SEEA Account	Comments
Accounts for other transactions related to the environment	

UN-FDES	6.2.2: Environmental regulation and instruments

31   Share of energy and transport related taxes in total taxes and social contributions

Indicator type   **Core indicator**

International databases containing this indicator

Comments

Comments

32 Total climate change related subsidies and similar transfers in relation to GDP

Indicator type **Core indicator**

Versioning

First publication | 9/19/2019 | Latest update | 9/19/2019

Area and sub-area

Area and sub-area | Mitigation | Environmental governance and regulation

Presentation

Tier | 3

Indicator definition and description | This indicator is defined as the amount of current or capital transfers intended to support activities having as main purpose the limitation or reduction of GHG emissions.
Tax abatements and other environmental support measures are excluded.
Flows from general government to the other sectors, plus transfers from (and to) the rest of the world are included. Transfers from other sectors to the general government (fines, donations and legacies, etc.) are excluded.
The indicator is expressed as a share of GDP (in current prices, assuming that the numerator is also expressed in current prices).

Unit of measure | %

Coverage | National economy

Spatial aggregation | National economy

Reference period | Calendar year

Update frequency | Annual

Base period |

Disaggregation (operational indicators)

Disaggregation (operational indicators)	Comments
Type of transfer (subsidies, current transfer, capital transfer)	

Other related indicators (contextual, proxy, other core indicators)

Relevance

Policy context and rationale | Relevant to climate change mitigation policies and measures implemented under the UNFCCC, its Kyoto Protocol and the Paris Agreement under the UNFCCC

Related SDG indicator | Not applicable

Relation |

Sendai Framew. indicator | Not applicable

Policy references

Document title	Link
Environmental subsidies and similar transfers — Guidelines (Eurostat, 2015)	https://ec.europa.eu/eurostat/en/web/products-manuals-and-guidelines/-/KS-GQ-15-005-EN-N

32   Total climate change related subsidies and similar transfers in relation to GDP

Indicator type **Core indicator**

Methodology

Methodology for indicator calculation	Denominator: GDP in current prices (assuming that the numerator is also expressed in current prices)

Methodology references

Document title	Link
Compiling and Refining Environmental and Economic Accounts (CREEA) (EU Cordis, 2014)	https://cordis.europa.eu/project/rcn/97380/reporting/en
Environmental subsidies and similar transfers — Guidelines (Eurostat, 2015)	https://ec.europa.eu/eurostat/en/web/products-manuals-and-guidelines/-/KS-GQ-15-005-EN-N

Classification syst.	

Data sources

Main source	Official statistics: SEEA and/or SNA
Explanation	Environmental subsidies

SEEA Accounts that can serve as data sources

SEEA Account	Comments
Accounts for other transactions related to the environment	

UN-FDES	6.2.2: Environmental regulation and instruments

International databases containing this indicator

Comments

Comments	Follow-up work needed, e.g. within SEEA research agenda.

33   Average trading carbon price

Indicator type   **Core indicator**

Versioning

First publication 1/26/2017   Latest update   9/17/2019

Area and sub-area

Area and sub-area   Mitigation   Environmental governance and regulation

Presentation

Tier   1

Indicator definition and description   Average price paid on the market for 1 ton CO2 equivalent during the reference year.

Unit of measure   US dollars per ton of CO2 equivalent

Coverage   Entities involved in carbon trading

Spatial aggregation   National economy

Reference period   Calendar year

Update frequency   Annual

Base period   Not applicable

Disaggregation (operational indicators)

Disaggregation (operational indicators)	Comments
Temporal (by month, by season)	

Other related indicators (contextual, proxy, other core indicators)

ID	Subindicator	Type
66	Average non-trading carbon price (carbon tax)	Contextual indicator
67	Number of CO2 permits allocated	Contextual indicator
68	Effective carbon price	Contextual indicator

Relevance

Policy context and rationale   A carbon price is a cost applied to carbon pollution to encourage sources of carbon pollution to reduce the amount of greenhouse gas they emit into the atmosphere. Carbon pricing is designed to capture what are known as the external costs of carbon emissions. The indicators is relevant to climate change mitigation policies and measures implemented under the UNFCCC, its Kyoto Protocol and the Paris Agreement under the UNFCCC; particularly relevant in the context of market-based mechanisms under the Kyoto Protocol.

Related SDG indicator   Not applicable

Relation

Sendai Framew. indicator   Not applicable

Policy references

33   Average trading carbon price

Indicator type **Core indicator**

Document title	Link
Kyoto Protocol (United Nations Climate Change, 1997)	https://unfccc.int/process-and-meetings/the-kyoto-protocol/what-is-the-kyoto-protocol/kyoto-protocol-targets-for-the-first-commitment-period
United Nations Framework Convention on Climate Change (United Nations Climate Change, 1994)	https://unfccc.int/process-and-meetings/the-convention/what-is-the-united-nations-framework-convention-on-climate-change
Paris Agreement (United Nations, 2015)	https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement

Methodology

Methodology for indicator calculation	The indicators is calculated as weigthed average (by volume) of carbon prices paid by companies participating in emmissions trading scheme (ETS) resident in the country, on stock exchanges during the reference year.

Methodology references

Classification syst.	Not applicable

Data sources

Main source	Other than official statistics

Explanation

SEEA Accounts that can serve as data sources

UN-FDES	

International databases containing this indicator

European Energy Exchange	https://www.eex.com/en/market-data/environmental-markets/auction-market/european-emission-allowances-auction/european-emission-allowances-auction-download

Comments

Comments	There are two main types of carbon pricing: emissions trading systems (ETS) and carbon taxes: • An emissions trading system – also known as a cap-and-trade system – caps the total level of greenhouse gas emissions across a given industry, or the whole economy, and then allocates or auctions emission allowances to companies operating in that sector. By creating supply and demand for emissions allowances, an ETS establishes a market price for greenhouse gas emissions. • A carbon tax directly sets a price on carbon by defining a tax rate on greenhouse gas emissions or – more commonly – on the carbon content of fossil fuels. Only the first type of carbon pricing is covered by the indicator.

34 Amounts provided and mobilized in United States dollars per year in relation to the continued existing collective mobilization goal of the $100 billion commitment through to 2025

Versioning

First publication	1/26/2017	Latest update	9/23/2019

Area and sub-area

Area and sub-area	Mitigation	Environmental governance and regulation

Presentation

Tier	3
Indicator definition and description	Total amount of funding mobilized, in a year, that would be eligible for accounting as part of the international commitment to mobilize USD 100 billion per year from 2020
Unit of measure	USD
Coverage	National economy
Spatial aggregation	National economy
Reference period	Calendar year
Update frequency	Annual
Base period	Not applicable

Disaggregation (operational indicators)

Other related indicators (contextual, proxy, other core indicators)

Relevance

Policy context and rationale	Relevant to climate change mitigation policies and measures implemented under the UNFCCC, its Kyoto Protocol and the Paris Agreement under the UNFCCC Target 13.a: Implement the commitment undertaken by developed-country parties to the United Nations Framework Convention on Climate Change to a goal of mobilizing jointly $100 billion annually by 2020 from all sources to address the needs of developing countries in the context of meaningful mitigation actions and transparency on implementation and fully operationalize the Green Climate Fund through its capitalization as soon as possible
Related SDG indicator	13.a.1 Amounts provided and mobilized in United States dollars per year in relation to the continued existing collective mobilization goal of the $100 billion commitment through to 2025
Relation	Identical with SDG indicator
Sendai Framew. indicator	Not applicable

Policy references

Methodology

34 Amounts provided and mobilized in United States dollars per year in relation to the continued existing collective mobilization goal of the $100 billion commitment through to 2025

Methodology for
indicator
calculation

Methodology references

Classification syst.

Data sources

Main source

Official statistics: other than accounts

Explanation

SEEA Accounts that can serve as data sources

UN-FDES

International databases containing this indicator

Comments

Comments

The USD billion commitment also includes support for adaptation.
The indicator was renamed as a result of the 2020 comprehensive review of the SDG indicator framework. Previous name: Mobilized amount of United States dollars per year starting in 2020 accountable towards the $100 billion commitment

35   Share of government adaptation expenditure in relation to GDP

Indicator type   **Core indicator**

Versioning

First publication   9/19/2019   Latest update   1/6/2020

Area and sub-area

Area and sub-area   Adaptation   Expenditures

Presentation

Tier   3

Indicator definition and description: This indicator is the amount of climate change adaptation expenditure made by government and expressed as a share of gross domestic product (in current prices, assuming that the numerator is also expressed in current prices)

Unit of measure   %

Coverage   General government

Spatial aggregation   National economy

Reference period   Calendar year

Update frequency   Annual

Base period

Disaggregation (operational indicators)

Other related indicators (contextual, proxy, other core indicators)

Relevance

Policy context and rationale: Expenditures related to climate change

Related SDG indicator: Not applicable

Relation

Sendai Framew. indicator: Not applicable

Policy references

Methodology

Methodology for indicator calculation

Methodology references

Document title	Link
Classification of environmental activities (Eurostat, 2018)	https://seea.un.org/sites/seea.un.org/files/lg_24_b_7.pdf

35　Share of government adaptation expenditure in relation to GDP

Indicator type　**Core indicator**

SERIEE - Environmental protection expenditure accounts - Compilation guide (Eurostat, 2002)	https://ec.europa.eu/eurostat/web/products-manuals-and-guidelines/-/KS-BE-02-001
System of Environmental Economic Accounting 2012 Central Framework (United Nations, European Commission, Food and Agriculture Organization of the United Nations, OECD, World Bank, 2014)	https://seea.un.org/content/seea-central-framework

Classification syst.

Data sources

Main source　Official statistics: SEEA and/or SNA

Explanation　Denominator: GDP in current prices (assuming that the numerator is also expressed in current prices)

SEEA Accounts that can serve as data sources

SEEA Account	Comments
Accounts for other transactions related to the environment	

UN-FDES　6.1.1: Government environmental protection and resource management expenditure

International databases containing this indicator

Comments

Comments　Follow-up work needed, e.g. within SEEA research agenda.

36   Change in water use efficiency over time

Indicator type   **Core indicator**

Versioning

First publication   1/26/2017   Latest update   12/11/2019

Area and sub-area

Area and sub-area	Adaptation	Water resources

Presentation

Tier	1
Indicator definition and description	Change in the ratio of the value added to the volume of water use, over time.
Unit of measure	Value/Volume, commonly USD/m3
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)
Spatial aggregation	National territory
Reference period	Calendar year
Update frequency	Annual
Base period	

Disaggregation (operational indicators)

Disaggregation (operational indicators)	Comments
Economic sector (ISIC) and households	
Spatial	e.g. administrative area or river basin
Temporal (by month, by season)	

Other related indicators (contextual, proxy, other core indicators)

ID	Subindicator	Type
18	Level of water stress: freshwater withdrawal as a proportion of available freshwater resources	Core indicator
41	Household water use per capita	Contextual indicator
42	Water losses in distribution network	Contextual indicator

Relevance

Policy context and rationale	The rationale behind this indicator consists in providing information on the efficiency of the economic and social usage of water resources. Climate change may cause water shortages, thus increasing water use efficiency is an important adaptation measure.
Related SDG indicator	6.4.1 Change in water-use efficiency over time
Relation	Identical with SDG indicator

36   Change in water use efficiency over time

Indicator type   Core indicator

Sendai Framew. indicator	Not applicable

Policy references

Document title	Link
Transforming our world: the 2030 Agenda for Sustainable Development (General Assembly of the United Nations, 2015)	https://sustainabledevelopment.un.org/post2015/transformingourworld
Integrated Water Resources Management (Global Water Partnership,)	http://www.gwp.org/the-challenge/what-is-iwrm/

Methodology

Methodology for indicator calculation	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. 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: WUE = Awe x Pa + Mwe x Pm + Swe x Ps Where: WUE = Water use efficiency Awe = Irrigated agriculture water use efficiency [USD/m3] Mwe = MIMEC water use efficiency [USD/m3] Swe Services water use efficiency [USD/m3] Pa = Proportion of water used by the agricultural sector over the total use Pm = Proportion of water used by the MIMEC sector over the total use Ps = Proportion of water used by the service sector over the total use A detailed description of the computation methodology can be found in the related SDG metadata sheet and the step-by-step monitoring methodology.

Methodology references

Document title	Link
Integrated Monitoring Guide for SDG 6 (UN WATER, 2017)	https://www.unwater.org/publications/integrated-monitoring-guide-sdg-6-2/
Step-by-step monitoring methodology for indicator 6.4.1 (Food and Agriculture Organization of the United Nations (FAO), 2017)	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
Metadata of SDG indicator 6.4.1: Change in water-use efficiency over time (Food and Agriculture Organization of the United Nations (FAO), 2019)	https://unstats.un.org/sdgs/metadata/files/Metadata-06-04-01.pdf

Classification syst.	ISIC

Data sources

Main source	Official statistics: SEEA and/or SNA
Explanation	Best option: SEEA water accounts Other option(s): water statistics, FAOSTAT

SEEA Accounts that can serve as data sources

36   Change in water use efficiency over time

Indicator type   **Core indicator**

SEEA Account	Comments
Physical flow accounts for water	

UN-FDES   2.6.2: Abstraction, use and returns of water

2.6.1: Water resources

International databases containing this indicator

Comments

Comments

39   Proportion of agricultural area under productive and sustainable agriculture

Indicator type   **Core indicator**

Versioning

First publication | 1/26/2017 | Latest update | 9/23/2019

Area and sub-area

Area and sub-area | Adaptation | Agriculture, forestry and fishery

Presentation

Tier | 2

Indicator definition and description | Share of area under productive and sustainable agriculture in total agricultural area.

Unit of measure | %

Coverage | National territory

Spatial aggregation | National territory

Reference period | Reference date

Update frequency | Annual

Base period | Not applicable

Disaggregation (operational indicators)

Disaggregation (operational indicators)	Comments
Spatial	

Other related indicators (contextual, proxy, other core indicators)

Relevance

Policy context and rationale

Related SDG indicator | 2.4.1 Proportion of agricultural area under productive and sustainable agriculture

Relation | Identical with SDG indicator

Sendai Framew. indicator | Not applicable

Policy references

Document title	Link
Transforming our world: the 2030 Agenda for Sustainable Development (General Assembly of the United Nations, 2015)	https://sustainabledevelopment.un.org/post2015/transformingourworld

Methodology

Methodology for indicator calculation | The indicator is calculated as the ratio of area under productive and sustainable agriculture to the total agricultural area.
Area under productive and sustainable agriculture is agricultural area of the farms that satisfy

39 Proportion of agricultural area under productive and sustainable agriculture

Indicator type **Core indicator**

selected 11 sub-indicators across all three dimensions of sustainable production: environmental, economic and social. Agricultural land area managed by agricultural holdings is the sum of agricultural area utilized by agricultural holdings that are owned (excluding rented-out), rented-in, leased, sharecropped or borrowed. State or communal land used by farm holdings is not included. The indicator is presented in form of a dashboard including 11 sub-indicators.

For more detail and steps to calculate the indicator and sub-indicators, refer to the metadata for SDG indicator 2.4.1.

Methodology references

Document title	Link
System of Environmental-Economic Accounting for Agriculture, Forestry and Fisheries (Food and Agriculture Organization of the United Nations, United Nations Statistics Division, 2018)	https://seea.un.org/content/agriculture-forestry-and-fisheries
Metadata of SDG indicator 2.4.1: Proportion of agricultural area under productive and sustainable agriculture (Food and Agriculture Organization of the United Nations, 2018)	https://unstats.un.org/sdgs/metadata/files/Metadata-02-04-01.pdf

Classification syst. | Land Cover Classification

Data sources

Main source | Official statistics: other than accounts

Explanation | Data on sustainable production can be collected through agricultural surveys or agricultural modules in integrated household surveys organized by the national statistical agencies, with the necessary support from FAO or other international agencies to ensure methodological rigor and harmonization. It is expected that land-based measurements will be integrated and complemented by earth observation technologies, either by or under the overall supervision of national statistical agencies. Data from farm surveys can be supplemented with information from other sources, including geospatial data/remote sensing or other techniques to capture environmental data.

SEEA Accounts that can serve as data sources

SEEA Account	Comments
Physical asset accounts for land	

UN-FDES | 2.3.1: Land use

International databases containing this indicator

| United Nations Global SDG Database | https://unstats.un.org/sdgs/indicators/database/ |

Comments

Comments

81   Net emissions/removal of carbon dioxide by forest land from national territory

Indicator type   **Core indicator**

Versioning

First publication   1/15/2020   Latest update

Area and sub-area

Area and sub-area   Mitigation   Agriculture, forestry and fishery

Presentation

Tier	1
Indicator definition and description	Measures the difference between CO2 emitted by forest land and CO2 removed by forest land. A negative value indicates removal of CO2 from the atmosphere, a positive value indicates emissions to the atmosphere.

Unit of measure	kt CO2 equivalents
Coverage	Forest land, including existing and planted forests
Spatial aggregation	National territory
Reference period	Calendar year
Update frequency	Annual
Base period	

Disaggregation (operational indicators)

Disaggregation (operational indicators)	Comments
Spatial	
Type of forest	

Other related indicators (contextual, proxy, other core indicators)

ID	Subindicator	Type
20	Carbon stock in soil	Core indicator
09b	Total greenhouse gas emissions (excluding LULUCF) from the national territory	Core indicator
11	Greenhouse gas emissions from land use, land use change and forestry (LULUCF)	Core indicator

Relevance

Policy context and rationale	Forests play a major role in carbon sequestration. For example In the UNECE region as a whole, the carbon stock in forest ecosystems is increasing. Since 1990, the total forest carbon stock in Europe increased by 2 billion tons, i.e. an average of 137 million tons of carbon per year (see https://www.unece.org/forests/outlook/carbonsinks.html). In 2017, carbon sequestration by forest land offset about 8.4 % of emissions from other sectors in EU28 countries. The amount of carbon sequestered or released by forest ecosystems annually may change depending multiple factors such as wood harvesting rates, insect outbreaks, forest fires and forest management practices applied.
Related SDG indicator	Not applicable
Relation	No SDG indicator

81 Net emissions/removal of carbon dioxide by forest land from national territory

Indicator type **Core indicator**

Sendai Framew. indicator	Not applicable

Policy references

Document title	Link
Kyoto Protocol (United Nations Climate Change, 1997)	https://unfccc.int/process-and-meetings/the-kyoto-protocol/what-is-the-kyoto-protocol/kyoto-protocol-targets-for-the-first-commitment-period
Paris Agreement (United Nations, 2015)	https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement

Methodology

Methodology for indicator calculation	Annual net CO_2 emissions/removal from Forest Land consist of net carbon stock gain/loss in the living biomass pool (aboveground and belowground biomass) associated with Forest Land (consisting Forest Land remaining Forest Land and Land converted to Forest Land). The indicator is calculated as specified in UNFCCC GHG Inventory (see methodological references).

Methodology references

Document title	Link
2006 IPCC Guidelines for National Greenhouse Gas Inventories (Intergovernmental Panel on Climate Change, 2007)	https://www.ipcc-nggip.iges.or.jp/public/2006gl/index.html

Classification syst.	

Data sources

Main source	Other than official statistics
Explanation	GHG inventories

SEEA Accounts that can serve as data sources

SEEA Account	Comments
Air emission accounts	
Accounting for carbon	
Carbon accounts for timber resources	
Physical asset accounts for timber resources	
Physical asset accounts for forest and other wooded land	

UN-FDES	3.1.1: Emissions of greenhouse gases

International databases containing this indicator

UNFCCC database	http://di.unfccc.int/detailed_data_by_party
FAOSTAT	http://www.fao.org/faostat/en/ - data

Comments

Comments	Indicator originates from LULUCF.

82 Share of green spaces in the total area of cities

Indicator type **Core indicator**

Versioning

First publication	12/4/2019	Latest update	12/4/2019

Area and sub-area

Area and sub-area	Adaptation	Human settlements and human health

Presentation

Tier	3
Indicator definition and description	Share of green spaces in the total area of cities on the national territory
Unit of measure	Percentage
Coverage	Green urban areas
Spatial aggregation	National territory
Reference period	Calendar year
Update frequency	Every 5 years
Base period	Not applicable

Disaggregation (operational indicators)

Disaggregation (operational indicators)	Comments
Land cover class	

Other related indicators (contextual, proxy, other core indicators)

ID	Subindicator	Type
89	Accessibility of green spaces in cities	Contextual indicator
91	Share of green spaces in nationally-defined urban areas	Contextual indicator
90	Share of population living in cities	Contextual indicator
92	Share of blue spaces in the total area of cities	Contextual indicator
93	Share of agricultural and natural areas in the total area of cities	Contextual indicator

Relevance

Policy context and rationale	Green infrastructure is among the most widely applicable, economically viable and effective tools to combat the impacts of climate change and help people adapt to or mitigate the adverse effects of climate change. It is particularly important in cities and towns, where more than a half of world's population lives. Green spaces in cities reduce the heat island effect by providing shade and cooling through evapotranspiration and reduce the risk of surface water flooding due to higher natural drainage. Green spaces also have numerous co-benefits, such as improved air quality, better health, improved biodiversity and enhanced overall quality of life for citizens. The indicator is realted to SDG Target 11.7: By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities.

82   Share of green spaces in the total area of cities

Indicator type   **Core indicator**

Related SDG indicator	Not applicable

Relation

Sendai Framew. indicator	Not applicable

Policy references

Document title	Link
Transforming our world: the 2030 Agenda for Sustainable Development (General Assembly of the United Nations, 2015)	https://sustainabledevelopment.un.org/post2015/transformingourworld
Urban adaptation to climate change: Challenges and opportunities for cities together with supportive national and European policies (European Environment Agency, 2012)	https://www.eea.europa.eu/publications/urban-adaptation-to-climate-change/at_download/file
EU Climate-ADAPT: Green spaces and corridors in urban areas (European Commission and the European Environment Agency, 2016)	https://ec.europa.eu/environment/nature/ecosystems/pdf/Green%20Infrastructure/GI_climate_adaptation.pdf
Green Infrastructure (GI) — Enhancing Europe's Natural Capital: Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions (European Commission, 2013)	https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52013DC0249
An EU Strategy on Adaptation to Climate Change (European Commission, 2013)	https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52013DC0216
Guide to Climate Change Adaptation in Cities (The International Bank for Reconstruction and Development / The World Bank, 2011)	http://siteresources.worldbank.org/INTURBANDEVELOPMENT/Resources/336387-1318995974398/GuideClimChangeAdaptCities.pdf

Methodology

Methodology for indicator calculation	This indicator is calculated as the total area of green urban areas divided by total area of cities. Green urban areas are defined as in the CORINE land cover classification. City is defined as a local administrative unit where at least 50% of the population lives in one or more urban centres (definition of a city based on the degree of urbanization). A spatial analysis tool is required for calculating the indicator. For more details on the classification of land cover and definition of a city, refer to the methodology references.

Methodology references

Document title	Link
IPCC Special Report on climate change, desertification, land degradation, sustainable land nanagement, food security, and greenhouse gas fluxes in terrestrial ecosystem (summary for policymakers) (Intergovernmental Panel on Climate Change (IPCC), 2019)	https://www.ipcc.ch/site/assets/uploads/2019/08/4.-SPM_Approved_Microsite_FINAL.pdf

82 Share of green spaces in the total area of cities

Indicator type **Core indicator**

CORINE Land Cover Nomenclature Illustrated Guide (European Topic Centre on Urban, Land and Soil Systems / European Environment Agency, 2019)	https://land.copernicus.eu/user-corner/technical-library/corine-land-cover-nomenclature-guidelines/docs/pdf/CLC2018_Nomenclature_illustrated_guide_20190510.pdf
Indicators for urban green infrastructure (European Environment Agency, 2017)	https://www.eea.europa.eu/themes/sustainability-transitions/urban-environment/urban-green-infrastructure/indicators_for_urban-green-infrastructure
WHO Urban green spaces and health: A review of evidence (World Health Organization Europe, 2016)	http://www.euro.who.int/__data/assets/pdf_file/0005/321971/Urban-green-spaces-and-health-review-evidence.pdf?ua=1
Methodological manual on city statistics (Eurostat, 2017)	https://ec.europa.eu/eurostat/documents/3859598/8012444/KS-GQ-17-006-EN-N.pdf/

Classification syst.	CORINE Land Cover Nomenclature

Data sources

Main source	Other than official statistics
Explanation	Land cover data from global map services or national or local equivalents. For all functional urban areas in the countries of the European Union, EFTA and Turkey, land cover data in vector format in topologically correct GIS-files are available from Urban Atlas under the Copernicus Land Monitoring Service. In Urban Atlas, the land cover is classified using the CORINE Land Cover Nomenclature. Codes 14100 (green urban areas) and 14200 (sports an leisure areas) should be included. For countries not covered by Copernicus Land Monitoring Service, GIS-files can be obtained from NASA-USGS Global Land Survey (GLS) Dataset. Urban green areas and sports and leisure areas should be identified as described in the CORINE Land Cover Nomenclature to ensure international comparability.

SEEA Accounts that can serve as data sources

UN-FDES	1.2.1: Land cover

International databases containing this indicator

Eurostat database	https://ec.europa.eu/eurostat/data/database
EEA Green Infrastructure	https://eea.maps.arcgis.com/apps/MapSeries/index.html?appid=42bf8cc04ebd49908534efde04c4eec8%20&embed=true
EU Urban Audit Database	https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=urb_cenv&lang=en

Comments

Comments	Although several international organizations use or publish indicators on the availability of green areas in cities, the indicator remains in Tier 3 because of the differences in the definitons of a city/urban area and green spaces. Moreover, the indicator is often produced on the level of a city and not on a national level. Several countries also produce similar indicators using their national definitions. WHO Euro and United for Smart and Sustainable Cities also recommend only green urban areas. Eurostat indicator in the Urban Audit dataset includes green urban areas and sports and leisure

facilities. An indicator "Share of green urban areas" of the European Environment Agency refers to the concept of green infrastructure, which includes also agricultural and natural areas (including "blue infrastructure"). This concept is also used in the IPCC Special Report on Land Use. For details on each category, refer to CORINE Land Cover Nomenclature.

Change in the value of indicator over time should be interpreted with caution as the list of administrative units classified as cities may change over time.

86 PLACEHOLDER FOR INDICATOR ON CC IMPACT ON BIODIVERSITY

Indicator type **Core indicator**

Versioning

First publication | 12/19/2019 | Latest update |

Area and sub-area

Area and sub-area | Impacts | Land, land cover, ecosystems and biodiversity

Presentation

Tier

Indicator definition and description

Unit of measure

Coverage

Spatial aggregation

Reference period

Update frequency

Base period

Disaggregation (operational indicators)

Other related indicators (contextual, proxy, other core indicators)

Relevance

Policy context and rationale

Related SDG indicator | Not applicable

Relation

Sendai Framew. indicator | Not applicable

Policy references

Methodology

Methodology for indicator calculation

Methodology references

Classification syst.

86   PLACEHOLDER FOR INDICATOR ON CC IMPACT ON BIODIVERSITY

Indicator type   **Core indicator**

Data sources

Main source

Explanation

SEEA Accounts that can serve as data sources

UN-FDES

International databases containing this indicator

Comments

Comments

87 PLACEHOLDER FOR INDICATOR ON CC ADAPTATION BY FORESTS

Indicator type **Core indicator**

Versioning

First publication   12/19/2019   Latest update

Area and sub-area

Area and sub-area   Adaptation   Agriculture, forestry and fishery

Presentation

Tier

Indicator definition and description

Unit of measure

Coverage

Spatial aggregation

Reference period

Update frequency

Base period

Disaggregation (operational indicators)

Other related indicators (contextual, proxy, other core indicators)

Relevance

Policy context and rationale

Related SDG indicator   Not applicable

Relation

Sendai Framew. indicator   Not applicable

Policy references

Methodology

Methodology for indicator calculation

Methodology references

Classification syst.

87   PLACEHOLDER FOR INDICATOR ON CC ADAPTATION BY FORESTS

Indicator type   **Core indicator**

Data sources

Main source

Explanation

SEEA Accounts that can serve as data sources

UN-FDES

International databases containing this indicator

Comments

Comments