



SDG Indicator 12.5.1: National Recycling Rate, Tons of Material Recycled

Step-by-step guide

Table of Contents

Indicator 12.5.1: National recycling rate, tons of material recycled	3
National recycling rate	3
Total Waste Generated (excluding construction, mining and agriculture) by type, including e-waste	4
National recycling rate by type of waste, including e-waste	6
Total e-waste recycled	7
Waste intensity: Waste generated divided by DMC (as an indicator of waste reduction).....	8

Indicator 12.5.1: National recycling rate, tons of material recycled

This step-by-step guide is based on UNEP [Global Chemicals and Waste Indicator Review Document \(2021\)](#) and the [UNSD Metadata for 12.5.1](#).

Minimizing waste generation and maximizing the recycling of waste is central to the concept of circular economy or sustainable consumption and production. SDG target 12.5 target aims to substantially reduce waste generation through prevention, reduction, recycling and reuse. Indicator 12.5.1 *National recycling rate, tons of material recycled* has four indicators in total, one Level I, three Level II indicators (see Table 1).¹

National recycling rate

$$\text{National Recycling Rate} = \frac{(\text{Material recycled} + \text{Material exported intended for recycling} - \text{Material imported intended for recycling}) \times 100}{\text{Total waste generated}}$$

Table 1: Indicators for 12.5.1 National recycling rate, tons of material recycled

Goal 12	Ensure sustainable consumption and production patterns
Target 12.5	By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse
Indicator 12.5.1	National recycling rate, tons of material recycled
Level I Indicators	
National recycling rate	(Material recycled + material exported for recycling – material imported for recycling) / total waste generated (with gap filling for regional and global aggregates)
Level II Indicators	
Total Waste Generated (excluding construction, mining and agriculture) by type, including e-waste	This is the denominator for recycling and useful for understanding the target 12.5 on waste reduction
National recycling rate by type of waste, including e-waste (other possible disaggregation include, metals and packaging waste)	Based on national data sources, including disaggregation of the recycling rate
Waste intensity	Waste generated divided by domestic material consumption (DMC) (as an indicator of waste reduction)

Note: When data are inserted in the Excel file tabs, some cells might turn red. This is to alert users to possible inconsistencies or errors that need to be verified.

The National Recycling Rate is defined as the quantity of material recycled in the country plus quantities exported for recycling minus material imported intended for recycling out of total waste generated in the country (Material recycled + material exported for recycling – material imported for recycling) / total waste generated). Recycling includes co-digestion/anaerobic digestion and composting/aerobic process, but not controlled combustion (incineration) or land application. National recycling rate can be presented by type of waste, such as e-waste, plastic waste, and municipal waste. To determine the recycling rate, first calculate the total waste generated, the

¹ Level I indicators are regularly produced by countries for at least 50 per cent of countries and of the population in every region. Level II indicators are those where data are not regularly produced by countries.

amount recycled, exported and imported for recycling (see below). The **National recycling rate tab** of the workbook will then display the results base on the data input in the other worksheets.

Data availability

The data sources for this indicator are national governments, including national statistical offices and ministries responsible for the environment.

National data is collected through the UNSD/UNEP Questionnaire on Environment Statistics (waste section). After data validation procedures, data that are considered accurate or those confirmed by countries are made available in UNSD's environment statistics database. Data reported to the Basel Convention can be included as part of SDG reporting. As of May 2023, the following data sets were available:

- Municipal waste recycled (tonnes), for 2000-2019 (depending on country), national scale
- Electronic waste recycling (tonnes), for 2010-2019, global, regional and national scales
- Electronic waste recycling, rate (%), for 2010-2019, global, regional and national scales
- Electronic waste recycling, per capita (kg), for 2010-2019, global, regional and national scales

While prevention, reduction, reuse, repair are important aspects of reducing material consumption and waste, they are difficult to measure. A challenge in measuring this indicator is identifying the stage in the recovery process when waste stops being waste, and qualifies as a resource is not clear cut. In addition, data on waste are often collected at the municipal level which can lead to a rural data gap. As well, even though it plays a key role, it is difficult to obtain data on activities of the informal sector.

Total Waste Generated (excluding construction, mining and agriculture) by type, including e-waste

$$\text{Total waste generated} = \text{Waste from manufacturing (ISIC 10-33)} + \text{Waste from electricity, gas, steam and air conditioning supply (ISIC 35)} + \text{Waste from other economic activities (excluding ISIC38)} + \text{Municipal waste (excluding construction and demolition)}$$

For the purpose of this indicator, the total waste generated is the total amount of waste (both hazardous and non-hazardous) generated in the country during the year. It excludes non-metallic minerals (including construction and mining waste from the municipal waste stream), and agriculture waste. It also excludes waste from waste management activities (ISIC 38) as counting these would lead to double counting.

Municipal waste is defined differently in different countries, but it generally includes all waste handled by a municipal waste management system.

Municipal solid waste includes:

- Waste originating from households,
- Commerce and trade,
- Small businesses,
- Office buildings and
- Institutions (schools, hospitals, government buildings).
- Bulky waste (e.g., old furniture, mattresses) and
- Waste from selected municipal services (e.g., waste from park and garden maintenance, waste from street cleaning services (street sweepings, the content of litter containers, market cleansing waste, if managed as waste).

More information is available in the metadata of [SDG indicator 11.6.1](#).

Electronic waste, or e-waste, refers to all items of electrical and electronic equipment (EEE) and the parts that have been discarded by the owner as waste without the intent of re-use.

- By type of material especially for high value recyclables, such as non-ferrous metals, ferrous metals, various packaging wastes, as these wastes tend to be treated by material

At a national level quantity of materials recycled and materials exported for recycling is relatively easy to collect from large facilities and customs authorities.

Data availability

Data on amounts of waste generated can be obtained in the following ways:

- Collecting data from waste generators themselves either through regular reporting or special surveys
- Collecting data from waste management facilities (for example, municipal waste authorities)

There are two tabs that can be used to calculate the total waste generated. The **Waste generation tab** compiles information using the categories found in the UNSD/UNEP questionnaire on Environment Statistics (see Figure 1). The **Waste generation-Basel tab** compiles information using waste streams as defined by the Basel Convention. Use the **E-waste tab** to compile information on e-waste generated, collected and recycled.

Figure 1: Entering data on waste generated using the UNSD/UNEP ISIC categories

The screenshot shows an Excel spreadsheet with the following structure:

Category	Unit	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Manufacturing (ISIC 10-33)	1000 t											
Electricity, gas, steam and air conditioning supply (ISIC 35)	1000 t											
Other economic activities excluding ISIC 38	1000 t											
Households	1000 t											
e-Waste	1000 t	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total waste generation	1000 t	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Annotations in the image include:

- Enter the waste generated in the corresponding cells (pointing to the data cells in the table).
- Enter reference for note as needed (pointing to the Notes section).
- Enter reference and note here (pointing to the Footnotes section).
- Calculated total generation will appear here (pointing to the Total waste generation row).

National recycling rate by type of waste, including e-waste

Material recycled (in tonnes) is the amount reported at the last entity in the recycling chain, preferably when the material is bought as secondary resource to be used in production facilities.

Note 1: Composting is considered recycling for the purposes of this indicator.

Note 2: It excludes secondary mineral materials used in the construction sector.

Recycling is defined as any reprocessing of waste material that diverts it from the waste stream, except reuse as fuel. Reprocessing as the same type of product and for different purposes are included. Recycling within industrial plants, such as at the place of generation, is excluded.

For hazardous waste, to be consistent with Basel Convention reporting and maintain correspondence with the EUROSTAT reporting system, recovery operations R2 to R12 listed in Basel Convention Annex IV, are considered as 'Recycling'.

Data availability

A common way to improve waste data is to carry out surveys or measurements for a sample of waste generators belonging to a specific category. Data

can be obtained from a sample of waste generators if insufficient resources are available to allow for data collection from all waste generators. Several tools that provide information on ways to estimate waste generation and recycling rates are available. For example:

- [Eurostat: Manual on Waste Statistics](#), A handbook for data collection on waste generation and treatment (refer to Chapter 3.1. on data collection on waste generation)
- UNEP, [Basel Convention, Methodological Guide for the Development of Inventories of Hazardous Waste and Other Wastes under the Basel Convention](#) (Refer to Chapter 6 on methods for estimating waste generation) and is available in [Arabic](#), [Chinese](#), [French](#), [Russian](#) and Spanish.
- [Waste Wise Cities Tool](#) – Step by Step Guide to Assess a City's MSMW Performance through SDG indicator 11.6.1 (Refer to Monitoring Step 4 which provides a questionnaire for recyclers to compile data and calculate total amount of waste recycled).

Use the **Waste recycled tab** to provide information on amounts of waste going to recycling, and imported or exported for recycling each year in groupings used in the UNSD/UNEP questionnaire (Figure 2). For Basel Convention groupings, use the **Waste recycled-Basel tab**. The national recycling rates will appear in the **National recycling rate by type tab**.

Figure 2: Entering data on amounts of waste recycled

The screenshot shows an Excel spreadsheet with the following structure:

- Columns:** Years from 2000 to 2015.
- Rows:**
 - Row 4: Total waste amounts going to recycling (Gray-shaded)
 - Row 5: Manufacturing (ISC 10-33)
 - Row 6: Electronics, gas, steam and air conditioning supply (ISC 35)
 - Row 7: Other economic activities excluding IIC
 - Row 8: Households
 - Row 9: in-Waste
 - Row 10: Waste imported for recycling during the year (Gray-shaded)
 - Row 11: Manufacturing (ISC 10-33)
 - Row 12: Electronics, gas, steam and air conditioning supply (ISC 35)
 - Row 13: Other economic activities excluding IIC
 - Row 14: Households
 - Row 15: in-Waste
 - Row 16: Waste reported for recycling during the year (Gray-shaded)
 - Row 17: Manufacturing (ISC 10-33)
 - Row 18: Electronics, gas, steam and air conditioning supply (ISC 35)
 - Row 19: Other economic activities excluding IIC
 - Row 20: Households
 - Row 21: in-Waste

Callout boxes provide instructions:

- Enter the amount of waste by category and year
- If there is a note, enter the reference to the right of the cell and include the note at the bottom of the table
- Gray-shaded fields are calculated fields that provide the total amounts going to recycling, imported, and exported

Total e-waste recycled

As e-waste recycled is reported separately, use the **E-waste tab** to fill in the available data on e-waste (Figure 3). The sheet is divided into categories:

- E-waste generated
- E-waste collected
- E-waste recycling rate, and
- Total e-waste recycled

Users will insert data in the e-waste generated and e-waste collected categories. The tab is embedded with formulae that will automatically calculate the e-waste recycling rate and the total e-waste recycled.

Note: when data is inserted, some cells might turn red. When cells turn red, it is because some inserted data is not correct. For instance, if e-waste collected is larger than e-waste generated, the cells will turn red to alert users to double check the error.

Once users fill in the **waste generation tab**, **waste generation-Basel tab**, **E-waste tab**, **Waste recycled tab** and **Waste recycled-Basel tab**, the **national recycling rate tab** will be populated with the calculated rate. This is done automatically to facilitate the calculations of the indicator.

Figure 3: Entering data on e-waste

Line	Category	Unit	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
1	Total E-waste generated	1000t	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	Amount split for:	1000t												
3	Large equipment	1000t												
4	Screen, monitor, and equipment containing ozone	1000t												
5	Small E-waste	1000t												
6	ap/walk: lamp	1000t												
7	ap/walk: small equipment	1000t												
8	ap/walk: small IT and telecommunication equipment	1000t												
9	Total E-waste collected	1000t	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	Amount split for:	1000t												
11	Large equipment	1000t												
12	Screen, monitor, and equipment containing ozone	1000t												
13	Small E-waste (-14+15+16)	1000t	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	ap/walk: lamp	1000t												
15	ap/walk: small equipment	1000t												
16	ap/walk: small IT and telecommunication equipment	1000t												
17	E-waste recycling rate (% of collection)	%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	Amount split for:	%												
19	Large equipment	%												
20	Screen, monitor, and equipment containing ozone	%												
21	Small E-waste (-14+15+16)	%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	ap/walk: lamp	%												
23	ap/walk: small equipment	%												
24	ap/walk: small IT and telecommunication equipment	%												
25	Total e-waste recycled	1000t	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	Amount split for:	1000t												
27	Large equipment	1000t												
28	Screen, monitor, and equipment containing ozone	1000t												
29	Small E-waste (-14+15+16)	1000t	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	ap/walk: lamp	1000t												
31	ap/walk: small equipment	1000t												
32	ap/walk: small IT and telecommunication equipment	1000t												

For each year, enter the amount of e-waste generated by type

If there is a note, enter the reference to the right of the cell and include the note at the bottom of the table

Gray-shaded fields are calculated fields that provide the total amounts going to recycling, imported, and exported

For each year, enter the amount of e-waste collected by type in this section

For each year, enter the recycling rate for each type in this section

The total amount of e-waste recycled will appear here

Enter any note here

Waste intensity: Waste generated divided by DMC (as an indicator of waste reduction)



$$\text{Waste intensity of production} = \frac{\text{Total waste generated}}{\text{DMC}}$$

Waste intensity of production is the total waste generated divided by domestic material consumption (DMC) for a particular year. Waste intensity is a relative measure of waste generated to DMC – the lower the intensity of waste generated, the less waste created for each unit of material consumption. The DMC is an output of economy-wide material flow accounts (EW-MFA). You can use the UNEP compiler to develop an MFA and an estimate of the DMC (Refer to SDG Indicator 12.2.2. Domestic Material Consumption).

To calculate waste intensity, enter the amount of DMC in the National recycling rate tab under the appropriate table (Figure 4).

Figure 4: Results table for national reporting rates and waste intensity of production

The screenshot shows an Excel spreadsheet with the following structure:

- Section 1: National recycling rate (UNSD/UNEP waste categories)** (Rows 2-7)

Category	Unit	2000	2001	2002	2003	2004	2005
Total waste amounts going to recycling	1000 t	0.00	0.00	0.00	0.00	0.00	0.00
Waste imported for recycling during the year	1000 t	0.00	0.00	0.00	0.00	0.00	0.00
Waste exported for recycling during the year	1000 t	0.00	0.00	0.00	0.00	0.00	0.00
National recycling rate	%	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
- Section 2: Waste intensity** (Rows 10-13)

Category	Unit	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Total waste generated (UNSD/UNEP waste categories)	1000 t	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Domestic Material Consumption	1000 t														
Total waste generated/DMC		#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
- Section 3: National recycling rate (Basel waste streams)** (Rows 16-21)

Category	Unit	2000	2001	2002	2003	2004	2005
Total waste amounts going to recycling	1000 t	0.00	0.00	0.00	0.00	0.00	0.00
Waste imported for recycling during the year	1000 t	0.00	0.00	0.00	0.00	0.00	0.00
Waste exported for recycling during the year	1000 t	0.00	0.00	0.00	0.00	0.00	0.00
National recycling rate	%	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
- Section 4: Waste intensity (Basel Waste Streams)** (Rows 24-27)

Category	Unit	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Total waste generated (Basel waste streams)	1000 t	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Domestic Material Consumption	1000 t														
Total waste generated/DMC		#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	

Callout boxes provide instructions for the 'Domestic Material Consumption' row:

- Box 1: "Enter the domestic material consumption as calculated for Indicator 12.2.2 here, if the total waste generated was calculated using the UNSD/UNEP grouping" (points to row 12).
- Box 2: "Enter the domestic material consumption as calculated for Indicator 12.2.2 here, if the total waste generated was calculated using Basel Convention waste streams" (points to row 25).

