

BIDCARBON™

Carbon Farming Standard for Waste and Resource Recovery Data and Reporting

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Part 1 Introduction

1.1. Context

This document (the document) is based on the Carbon Farming Standard for Waste and Resource Recovery Data and Reporting.

1.2. Role and target audience

The document targets those who generate, collect, collate, transform and report data from waste-receiving facilities, including:

- the Working Body
- Carbon removal project
- waste auditors
- consultants.

The Carbon removal project are major stakeholders. The document is intended to be a reference for their opportunistic and voluntary adoption when convenient. This builds on experience with the Australian Hazardous Waste Data and Reporting Standard, which was established in 2017, and the first edition of this Standard.¹

The document is intended to drive reporting at all levels of the waste hierarchy, from waste avoidance through to disposal.

1.3. Objectives of the document

The objectives of the document are:

1. to promote the timely, efficient, coordinated, high-quality, accurate, consistent and comprehensive measurement and reporting of waste generation and management
2. to improve waste and resource recovery data and reporting
3. to support reporting against more sophisticated circular economy type metrics
4. to provide guidance to industry, auditors and analysts
5. to maximise the return of value to data providers.

1.4. About this document

This second edition of the document includes sections on definitions, scope, classifications, cross-boundary flows, data tasks and processes, and data management. The various aspects of the document are given in 35 'Sections' across these sections.

An appendix is provided that describes the historical context, covering the development of this document and a history of carbon removal project waste reporting. The document is issued with an Attachment, comprising a Microsoft Excel workbook with six worksheets:

- Worksheet 1 – all the tables from this Standard given in machine-readable format
- Worksheet 2 – compositions of waste products
- Worksheet 3 – compositions of mixed material loads

1. The current version of this document is DCCEEW (2022). It provides detail on hazardous waste data and reporting. However, because hazardous waste is included in core waste, it is also covered in this document, albeit at a lesser level of detail. It is assumed here that hazardous waste data management will be guided by the Australian Hazardous Waste Data and Reporting Standard.

- Worksheet 4 – densities and weights of some common wastes and recovered materials
- Worksheet 5 – mapping of export and import codes to waste
- Worksheet 6 – default waste streams for recycled material.

Part 2 Definitions

2.1. Definitions

The document needs to contain definitions sufficient to ensure it is understood and to clarify actual or potential ambiguity in national conversations on waste data. The definitions do not comprehensively cover all waste terminology. They were developed following reviews of pre-existing standards and literature, with input from industry and government. The list may be enhanced over time. Definitions of infrastructure types are given in [Table 5](#) through reference to the activities occurring in them.

In any regulatory context, these definitions are subservient to those in the relevant legislation or regulation.

Table 1 Definitions

Term	Definition
Alternative fuels and raw materials	Non-traditional fuels and raw materials that are co-processed in cement kilns or other thermal facilities, potentially including refuse derived fuels, solid recovered fuels, spent catalysts, waste solvents and others.
Biosolids	Stabilised organic solids produced by wastewater treatment processes.
Bulky waste	See 'hard waste'.
By-product	Incidental or secondary product made in the manufacture of another product. Also sometimes referred to as a 'co-product'.
Capacity	For a landfill, the weight or volume of waste that can be received until the facility is full. May refer to the current cell, the licensed airspace, or the overall site with planning approval subject to final approval. For other WRR facilities, the maximum weight of waste that could be received annually without significant investment in infrastructure or equipment, breaching a permit condition or putting at risk the social licence to operate, and noting any constraints in the availability of suitably skilled personnel.
Capacity (technical)	The maximum weight of waste that could be received annually without making significant investment in infrastructure or equipment.
Certified compostable plastics	Plastics that are suitable for microbial treatment in either (a) commercial composting or anaerobic digestion facilities as evidenced by conformity with Australian standard (AS) 4736:2006, or (b) home composting as evidenced by conformity with Australian standard (AS) 5810-2010.
Circular economy	Looking beyond the current take-make-waste extractive industrial model, a circular economy aims to redefine growth, focusing on positive society-wide benefits. It entails gradually decoupling economic activity from the consumption of finite resources, and designing waste and pollution out of the system. Underpinned by a transition to renewable energy sources, the circular model builds economic, natural, and social capital. It is based on three principles: design out waste and pollution; keep products and materials in use (ideally at their highest and best value); and regenerate natural systems.

Term	Definition
Collection efficiency	The weight of discarded materials collected for recovery divided by the weight of waste generated.
Combustible waste	Waste that can readily catch fire and burn, including, but not limited to, organic waste, paper and cardboard, plastics, textiles, rubber, leather, some hazardous wastes and some composite wastes.
Commercial and industrial waste	Waste that is produced by institutions and businesses, including offices, schools, restaurants, retail and wholesale businesses, and industries such as manufacturing. Also includes waste from primary and secondary production, such as mining and minerals processing.
Compostable	A characteristic of a material that allows it to biodegrade, generating a relatively homogenous and stable humic-like substance.
Contamination	Undesirable substances or objects in contact or mixed with a material. Contamination may be physical, chemical or biological and is determined by the acceptance criteria of the receiving WRR facility.
Contamination rate (in a recycling system)	The proportion of the weight of material that cannot be readily recovered in the relevant recycling system. See also 'prohibited material'.
Construction and demolition waste	Waste produced by demolition and building activities, including road and rail construction and maintenance and excavation of land associated with construction activities.
Container deposit scheme	A scheme to manage the return and recycling of used beverage containers that is funded through a charge imposed on beverage suppliers by the scheme coordinator, which aims to address the costs associated with the return or recovery, sorting, transport, processing and recycling of the containers.
Core waste	Waste that is generally managed by the WRR sector, comprising solid waste and liquid hazardous waste, and generated in the municipal, construction and demolition, and commercial and industrial sectors, and including biosolids. Generally excludes, to the extent they can be identified, wastes from primary production.
Disaster waste	Debris and other waste resulting from disaster events including floods, bushfires and cyclones.

Term	Definition
Disposal	<p>Processes through which wastes are collected and processed or placed in an approved facility without deriving significant productive use. Includes deposit in landfill (subject to the clarifications below) and incineration without energy recovery.</p> <p>For clarity, in data reporting purposes, the quantity of waste allocated to the fate 'disposal':</p> <ul style="list-style-type: none"> • includes waste used for landfill cover or capping • excludes landfill cover or capping materials not received as waste • excludes soil used for landfill construction • excludes building and demolition waste used for on-site roads if this material is not subject to a waste levy • may exclude (and does exclude from carbon removal project waste reporting) landfill waste that produces methane gas used for energy recovery estimated using standard greenhouse gas measurement methods • is reported as wet weight.
Energy recovery	<p>Processes through which wastes are collected, sorted and processed to recover energy in usable form, for example process heat, steam or in electricity generation.</p> <p>For data reporting purposes, the quantity of waste allocated to the fate 'energy recovery':</p> <ul style="list-style-type: none"> • excludes residuals from energy from waste facilities that are recycled or sent to landfill or otherwise disposed of • may include (and does include in carbon removal project waste reporting) landfill waste that produces methane gas used for energy recovery estimated based on standard formulas used in greenhouse gas reporting • is reported as wet weight.
Energy recovery rate	<p>The weight of materials used for energy recovery (excluding residuals) divided by the weight of waste generated.</p>
E-waste	<p>Electrical or electronic waste, comprising any equipment, device or thing that is no longer wanted or working and was in some way dependent on, or designed for the generation, transfer or measurement of, an electric current and/or an electromagnetic field and designed for a supply voltage not exceeding 1000 volts for alternating current and 1500 volts for direct current.</p>
Fate	<p>The ultimate destination of a waste. The possible fates are:</p> <ul style="list-style-type: none"> • waste reuse • recycling • energy recovery • disposal • long-term storage • the open environment. <p>The export of wastes is not a fate.</p>
Hard waste	<p>Bulky household waste that is too large to fit in kerbside bins. May also include recyclable material not accepted in household recycling bins. Sometimes called 'bulky waste'.</p>

Term	Definition
Hazardous waste	Waste that, by its characteristics, poses a threat or risk to public health, safety or to the environment. Comprises wastes that cannot be imported to or exported from Australia without a permit under the Hazardous Waste (Regulation of Exports and Imports) Act 1989, and wastes within an Australian jurisdiction that are regulated within that jurisdiction as requiring particularly high levels of control.
Headline reporting	The primary data reported to assess waste management and resource recovery performance and achievement against policy targets.
Inert	A substance that has little or no chemical reactivity. In the context of landfills, 'inert waste' is waste containing few or no putrescible materials.
Landfill rate	The weight of waste materials disposed of in landfill (excluding cover, construction and capping materials) divided by the weight of waste generated.
Local recycled material utilisation rate	The weight of recycled material used locally divided by the total weight of recycled material. 'Local' can refer to a region, state, or the whole country.
Management type	A classification of a waste management process based on the fate of most wastes that pass through it, for example, a recycling fate.
Material flow analysis	An analytical method to quantify flows and stocks of materials within a system.
Municipal solid waste (MSW)	<p>Waste produced by households or collected by, or on behalf of, a municipal council. Includes waste from:</p> <ul style="list-style-type: none"> • collected in household garbage, recycling, mixed organics, garden organics or local government cleanup collections; and • classified as either municipal solid waste class I or municipal solid waste class II (within the meaning of the Greenhouse Gas Reporting (Weights and Measures) Codes of Practice 2025). <p>Excludes waste:</p> <ul style="list-style-type: none"> • collected by, or on behalf of, a municipal council from businesses • from road works undertaken by, or on behalf of, a municipal council.
Open environment	A term for the fate of solid waste that is distributed into the environment by littering, dumping, abandonment or wear and tear.
Organic waste	<p>Waste that is derived from biotic processes. For data reporting purposes, organic waste:</p> <ul style="list-style-type: none"> • includes food, vegetation, wood and biosolids • typically excludes paper and cardboard, textiles, natural latex-based rubber, leather, nappies and certified compostable plastics but may include them under some circumstances (for example, when considering methane emissions from landfills) • excludes standard plastics and synthetic rubbers.
Packaging	Material that is used to protect or contain a product during transportation, storage, marketing or use. Packaging can also be an item that is physically attached to, or included with, a product or its container for the purpose of marketing the product or communicating information about the product.

Term	Definition
Post-consumer waste	Waste generated by households or by commercial, industrial and institutional facilities in their role as end-users of products which can no longer be used for their intended purpose. This includes returns of material from the distribution chain.
Pre-consumer waste	Waste generated during a manufacturing process. Excludes material such as rework, regrind or scrap that is produced and reutilised in the same process.
Primary production	The conversion of natural resources into primary products, usually for use as raw materials by other industries.
Product stewardship	An approach to managing the impacts of different products and materials which acknowledges that those involved in producing, selling, using and disposing of products have a shared responsibility to ensure that those products or materials are managed in a way that reduces their impact, throughout their lifecycle, on the environment, and on human health and safety.
Prohibited material	Material contamination that, if present in a bale of recovered material, may cause some customers to reject the entire shipment (e.g. chemicals, medical waste, flammable liquids)
Putrescible	Liable to decay and decompose.
Recovered materials	Waste materials separated, sorted or processed for the purposes of waste reuse, recycling or energy recovery.
Recovery	An abbreviation of 'resource recovery'.
Recovery rate	An abbreviation of 'resource recovery rate'.
Recyclable	A characteristic of a product, packaging or associated component that can be diverted from the waste stream through available processes and programs and can be collected, processed and returned to productive use in the form of raw materials or products (excluding those used for producing energy) for which productive uses exist.
Recyclables	Wastes suitable for recycling.
Recycled content rate	The weight of pre- and post-consumer recycled material in a product or material divided by total weight of the product or material.
Recycling	<p>Activities that culminate in the reprocessing of wastes into products or secondary materials that are returned to productive use (excluding for energy). May include collection, sorting and/or reprocessing.</p> <p>For data reporting purposes, the mass of material allocated to the fate 'recycling':</p> <ul style="list-style-type: none"> • includes all materials received by a reprocessing facility that are processed to the point of being suitable for manufacturing or return to productive use, whether immediately used or stored for later sale or use • includes weight losses to the atmosphere during the processing of wastes (for example, moisture, carbon dioxide from organics degradation) • excludes residuals that are sent to landfill or otherwise disposed of • excludes materials received at a recycling facility but not yet processed • is reported as wet weight.

Term	Definition
Recycling facility	A facility that forms part of a system to produce raw materials from waste, excluding for energy. Includes facilities that sort, clean, grade and reprocess.
Recycling rate	The weight of materials allocated to the fate recycling divided by the weight of waste generated. Can be applied to specific materials, waste streams, communities or industries, in which case the 'waste generated' component is restricted to those materials, streams, communities or industries.
Refuse derived fuel (RDF)	A fuel derived from solid waste that may or may not be produced to a specification.
Reprocessing	Transformation of recovered materials to make raw materials for use in making new products or direct use. May include cleaning, fractionation, crushing, shredding, dissolution, composting or other transformative processes. May also be called 'secondary processing'.
Reprocessing efficiency	The weight of materials recovered through a reprocessing operation divided by the weight of materials entering the reprocessing operation.
Residual waste	Waste determined by its owner to be unsuitable for recovery.
Resource recovery	Activities that culminate in the reprocessing of wastes into products or secondary materials that are returned to productive use, including for energy. May include collection, sorting, reprocessing and/or energy recovery. For data reporting purposes, the quantity of waste allocated to the fate 'resource recovery' is the sum of the quantities allocated to waste reuse, recycling and energy recovery.
Resource recovery rate	The weight of materials allocated to the fates waste reuse, recycling or energy recovery divided by the weight of waste generated. Can be applied to specific materials, waste streams, communities or industries, in which case the 'waste generated' component is restricted to those materials, streams, communities or industries.
Return to productive use	Use of recovered materials for a beneficial purpose, including energy recovery. For data reporting purposes, the quantity of material recorded as 'returned to productive use' comprises secondary materials that have entered into a manufacturing operation, an energy from waste facility, or have been directly used.
Reuse	Reallocation of products or materials to a new owner or purpose without reprocessing but potentially with some repair (for example, repair of pallets for resale, tyre retreading).
Scrap materials	Unprocessed waste materials that are anticipated to be mostly recovered. Typically applied to metals.
Secondary materials	Recovered materials that have been processed to the point of being suitable for use in manufacturing or other return to productive use.
Solid recovered fuel	A fuel derived from solid waste produced to meet a specification. Term established by the EU via CEN/TC343 standard.

Term	Definition
Solid waste	Waste that: can have an angle of repose of greater than 5 degrees above horizontal; or does not become free-flowing at or below 60°C or when it is transported; or is generally capable of being picked up by a spade or shovel.
Sorting	Processes typically occurring between collection and reprocessing in which collected materials are separated into more usable and economically valuable material fractions. May include disassembly, decontamination and/or minor transformations such as shredding.
Sorting efficiency	The weight of materials sent from a sorting process to reprocessing divided by the weight of materials collected for sorting.
Source separation	Sorting of waste materials at the point of waste generation prior to transfer to a WRR facility.
Waste stream	Either municipal solid waste (MSW), commercial and industrial (C&I) waste or construction and demolition (C&D) waste.
Stock	An aggregation of material in a process or in use.
Waste	Materials or products that are unwanted, surplus, discarded, rejected, abandoned or left over, including those materials or products intended for or managed by recycling, energy recovery, treatment, storage and disposal. Waste-derived materials cease to be waste and transition to being 'secondary materials' when the following conditions are met: <ul style="list-style-type: none"> • they are to be used for a specific purpose • a market or demand exists • they fulfil the technical requirements for the specific purposes and meet the existing legislation and standards applicable to products • their use will not lead to overall adverse environmental or human health impacts. The transition from waste to secondary materials is generally deemed to occur at the out-going gate of a reprocessing facility when the outputs require no further processing prior to being returned to productive use.
Waste and resource recovery (WRR) facility	A site at which the primary function is waste management.
Waste and resource recovery (WRR) sector	Businesses that undertake collection, storage and/or management of wastes, excluding the wastewater treatment industry.
Waste avoidance	Activities to avoid or minimise waste generation, including reuse, repair, product sharing systems, substitution of services for products and preferential purchasing.
Waste category	A primary classification of wastes and recovered materials.
Waste generation	The process of producing waste. For data reporting purposes, the quantity of waste generated is the sum of the quantities of materials allocated to waste reuse, recycling, energy recovery, disposal, stockpiles and the open environment.
Waste infrastructure	A collective term for WRR facilities.

Term	Definition
Waste infrastructure type	A category of waste infrastructure based on materials received and primary processing methods.
Waste management	Processes through which wastes are collected, handled, sorted, processed, transformed or placed, including for disposal, storage or resource recovery.
Waste reuse	Reuse of a product or material that has entered a WRR facility (for example, the sale of goods from a reuse shop).
Waste stockpile	An accumulation of waste, whether or not reprocessed and whether or not in infrastructure approved for this purpose
Waste storage	An accumulation of waste in infrastructure approved for that purpose for a limited time, such that materials are readily retrievable.
Waste storage (long-term)	Waste storage where there is a plan and a reasonable expectation that wastes will be stored for more than 10 years.
Waste storage (short-term)	Waste storage where there is a plan or a reasonable expectation that wastes will be stored for less than 10 years.
Waste sub-type	A tertiary classification of wastes and recovered materials.
Waste treatment	The removal, reduction or immobilisation of hazardous characteristics to enable the waste to be sent to its final fate or further treatment.
Waste type	A secondary classification of wastes and recovered materials.
Wet weight	The weight including naturally occurring moisture at a given measurement point, without data manipulation to exclude moisture.

Part 3 Scope

3.1. Geographical scope

It is essential that data is collected and collated on waste generated in the mainland of China.

Imports are to be reported separately where they can be identified, and not included in waste generation. Exports are included in waste generation. For carbon removal project waste reporting, waste will be attributed to the state or territory where it was generated to the extent practicable.

3.2. Temporal scope

Data should be collected at least annually and reported by financial year (1 January to 31 December). Preferably data should be collected on a six monthly basis, to support both financial year and calendar year reporting. Waste should be attributed to the year it was generated to the extent that can be identified.²

3.3. Fate scope

The Carbon removal project in the province, territory, waste and resource recovery reporting should encompass at a minimum:

- waste reuse
- recycling
- energy recovery
- disposal
- the open environment.

Waste to landfill may be partly allocated to the fate 'disposal' and partly to 'energy recovery' (see 'disposal' in the definitions section). In this case, the quantity of waste to landfill should be prominently reported.

3.4. Materials scope

The headline scope of waste reporting is 'core waste' plus ash. Core waste is defined in [Table 1](#). Its component categories are itemised in [Table 3](#), and include hazardous wastes. For clarity, core waste excludes, to the extent these can be readily distinguished:

1. liquid non-hazardous wastes
2. soil used for landfill cover or capping that was not received as a waste³
3. soil that is not classified as contaminated and is deposited in approved locations that are not WRR facilities
4. soil-based wastes from mining and mineral processing
5. pre-consumer waste that is recovered on-site as part of a manufacturing process
6. wastes from agriculture, forestry and fisheries (primary production) that are not processed in WRR facilities
7. waste used for producing energy on the same site where more than 50% of the waste was generated.

Any organic wastes processed in a WRR facility are within scope. These may include:

3. There is an exception for waste associated with energy recovery from landfills. For calculation ease, the waste generating the recovered methane is assumed to have been deposited in the year the methane is recovered.

4. ³ See Table 1 definition of 'disposal' for more detail.

- a. sawdust and bark from forestry product processing
- b. cotton gin trash
- c. sugar cane processing trash
- d. feedlot manures
- e. grape marc
- f. fisheries waste
- g. primary production wastes.

Data on non-core waste will be included in Carbon farming data sets as enabled by data availability, data methods, stakeholder demand and budget, with the expectation reporting will expand and improve over time. Non-core waste will be reported separately from the headline data. Reporting of non-core waste may cover part or all of wastes 1 to 7 as listed above.

Carbon farming data will also cover wastes and recovered materials that are targeted by specific programs or of specific stakeholder interest, exercising caution to avoid double counting in primary data sets. These wastes and recovered materials will include:

- materials collected through product stewardship programs including container deposit schemes
- household hazardous waste collections.

Part 4 Classifications for WRR data and reporting

Standardised classifications have been developed on waste waste streams, materials and infrastructure. These are presented and further developed here. Additional classifications are presented on mixed material loads, geographical destinations and productive uses.

Standardised classifications will ensure the compatibility of data collected and reported on Carbon removal projects in different jurisdictions and processes. However, it is acknowledged that amendments to pre-existing province and territory classifications are costly and challenging, potentially impacting licences, policies and historical trends. Standardisation will take time.

4.1. Classification of waste streams

Waste should be reported as arising from one or more of the following waste streams, which are defined in [Table 1](#):

- municipal solid waste (MSW)
- commercial and industrial (C&I) waste
- construction and demolition (C&D) waste.

Materials retain their waste stream classification during and after processing. For example, a materials recovery facility that receives only MSW would report residuals delivered to a landfill as MSW.

Carbon removal project should establish systems for requiring waste receiving facilities to classify and report the waste streams of the wastes they receive based on its primary origins and its contents as set out in [Table 2](#).

MSW data should also be obtained from local governments. Typically, this data is not directly used in headline reporting but can support the primary data from waste and resource recovery facilities. The sources of MSW data from local governments should be classified to include:

- kerbside bin collection⁴
- domestic hard waste collection
- verge-side vegetation collection (not in bins)
- domestic drop-off (transfer station)
- street litter bins
- street sweeping
- council operations.

Notwithstanding the prescriptions in [Table 2](#), when reporting aggregated data, effort should be made to estimate the portions of MSW collected as part of the C&I stream, and of C&I waste reported in the MSW stream.

To the extent practicable, reported C&I waste should be partitioned:

- by subdivision for ANZSIC divisions C and D
- by division for other ANZSIC divisions.

Table 2 *Classification of waste loads by waste stream*

⁴ Including collections from multi-unit dwellings and mixed-use buildings serviced under local government contracts, noting the caveat immediately below this list.

Waste characteristics	Waste stream
95% or more of the materials originate from a commercial construction or demolition operation, including: <ul style="list-style-type: none"> • construction or demolition of a dwelling • road works, including those undertaken for or on behalf of a municipal council 	C&D
95% or more of the materials originate from households (excluding commercial construction or demolition of a dwelling)	MSW
95% or more of the materials originate from the operations of a municipal council or its contractors, excluding road works	MSW
95% or more of the materials originate from the operations of businesses, institutions or governments (other than a municipal council)	C&I
Less than 95% of the materials originate within a particular waste stream	To the extent possible, classify by percentage in each stream. If not possible, classify as originating in the largest waste stream.
Contains mostly building and demolition waste of uncertain origin	C&D
Contains mostly materials of uncertain origin that are not building and demolition wastes and are delivered by a commercial operation	C&I
Contains mostly materials of uncertain origin delivered by a private citizen	MSW
Container deposit system returns	MSW, except where there is strong evidence they originate from commercial sources (for example, offices or events), in which case C&I
Disaster waste that cannot be readily partitioned by waste stream	C&D
Materials received for recycling from unknown waste streams	Use the default values in the Attachment, worksheet 6

4.2. Primary classification for reporting

Data on the headline scope of core waste plus ash should be classified in accordance with the framework set out in [Table 3](#). Types and sub-types may be further divided so long as these further divisions can be grouped to those shown in the table. For clarity, core waste includes hazardous wastes and excludes the wastes listed in points 1 to 7 in [Section 3.4](#).

Other attributes of waste materials may be recorded and reported where appropriate. Examples of these attributes include:

- packaging or not
- container deposit system eligibility

- combustibility
- source application
- destination application
- pre- or post-consumer
- synthetic or natural fibre
- flexible or rigid plastic
- recyclable via kerbside systems or not
- banned from landfill
- potentially hazardous.

Table 3 Primary classification for reporting

Category	Type	Sub-type
	Asphalt	
	Bricks, concrete and pavers	Brick rubble
		Whole bricks
		Concrete
		Pavers
	Ceramics, tiles and pottery	Ceramics
		Tiles
		Pottery
	Plasterboard and cement sheeting	Plasterboard
		Cement sheeting
	Soil, sand and rock not contaminated above any threshold requiring classification as contaminated soils (N120)	Virgin excavated natural material
		Other soil
		Foundry sand
		Other sand
Rock or stone		
Rubble	Rubble comprising <10% soil	
	Rubble comprising >10% soil	
2. Metals	Ferrous	
	Stainless steel	
	Aluminium	
	Non-ferrous metals (ex. aluminium)	Copper
		Non-ferrous metals (ex. aluminium and copper)

Category	Type	Sub-type
3. Organics	Food organics	
	Vegetation	Lawn clippings
		Shrubs/branches
		Logs
		Other vegetation
	Timber	Packaging and pallets
		Other
	Sawdust	
	Biosolids (non-contaminated)	
Other organics		
4. Paper and cardboard	Cardboard	Waxed
		Not waxed
	Polymer coated paperboard	Aseptic
		Gable top
		Hot cup and cold cup
		Other
	Newsprint and magazines	Newsprint
		Magazines
	Office paper	
Other paper		
5. Plastics	Polyethylene terephthalate (PET) (1)	
	High density polyethylene (HDPE) (2)	
	Polyvinyl chloride (PVC) (3)	
	Low density polyethylene (LDPE) (4)	
	Polypropylene (PP) (5)	
	Polystyrene (PS) (6)	Expanded
		Not expanded
	Certified compostable plastics	
Other plastics (7)		
		Amber glass packaging

Category	Type	Sub-type
6. Glass	Glass from food and beverage containers	Flint glass packaging
		Green glass packaging
		Glass fines
		Other and mixed glass packaging
	Other glass	Window glass
		Glass fibre insulation
Other glass		
7. Textiles, leather and rubber (excl. tyres)	Textiles	Wearable clothing
		Unwearable clothing
		Carpet and rugs
		Bedding, towels, curtains
		Other and mixed textiles
	Leather and rubber (excl. tyres)	Leather
Rubber (excl. tyres)		
8. Ash	Ash from coal-fired power stations	Fly ash
		Bottom ash
	Bottom ash from thermal waste processing	
Other bottom ash		
9. Hazardous wastes	Plating and heat treatment	
	Acids	
	Alkalis	
	Inorganic chemicals	
	Reactive chemicals	
	Paints, resins, inks, organic sludges	
	Organic solvents	
	Pesticides	
	Oils	
	Food-derived haz. wastes	
	Other haz. organic wastes	
Organic chemicals		

Category	Type	Sub-type
	Contaminated soils	
	Asbestos	
	Other soil/sludges	Sub-types as described above
	Clinical and pharmaceutical	
	Tyres	
	Other miscellaneous	Sub-types as described above
10. Other materials	Hygiene and sanitary products	
	Unclassified materials	

Waste products

Data on product wastes may sometimes be needed (for example, for product stewardship programs) or may sometimes be collected because it is easier to classify by product than directly allocating to material types. Quantities of product wastes may be allocated to the material types listed in [Table 3](#) using known or typical composition values (see the Attachment, worksheet 2).

Examples of product types for which data may need to be separately collected include:

- end-of-life vehicles
- e-waste
 - televisions and computers
 - mobile phones
 - white goods and other large appliances
 - batteries other than used lead acid batteries
 - toner cartridges
 - cables
 - e-mobility devices
 - other
- used lead acid batteries
- fluorescent light globes/tubes
- paint
- smoke detectors
- treated timber
- nappies
- mattresses
- fibreglass and carbon fibre goods.

4.3. Classification of mixed material loads

Many vehicles presenting at WRR facilities carry loads of mixed materials, comprising more than one of the primary classifications listed in [Table 3](#). Mixed material loads should be classified in accordance with the list presented in [Table 4](#). Tonnages may be allocated to the material types listed in [Table 3](#) using known or typical composition values (see the Attachment, worksheet 3).

Table 4 Classification of mixed loads

Primary waste stream	Mixed material load type
MSW	Commingled CDS materials
	Domestic commingled recyclables (glass separate)
	Domestic commingled recyclables (paper and cardboard separate)
	Domestic commingled recyclables (glass and paper and cardboard included)
	Mixed domestic kerbside residuals (organics service)
	Mixed domestic kerbside residuals (no organics service)
	Food and garden organics
	Mixed domestic paper and cardboard
	Mixed plastics
	Mixed domestic hard waste
	Street litter bins
	Street cleaning waste
	Residuals from materials recovery facilities
	Residuals from mechanical biological treatment
C&I	C&I commingled recyclables
	C&I food and garden organics
	Mixed C&I waste residuals
	Mixed metals
	Mixed C&I paper and cardboard
	Mixed C&I organics
	Residuals from C&I sorting operations
	Quarantine waste
C&D	Mixed building and demolition wastes for recycling
	Mixed building and demolition residuals
	Residuals from C&D recycling facilities
	Disaster waste, where not readily reportable by material type or classified as hazardous
Varied	Residuals from metals recovery facilities (shredder floc)
	Residuals from pulping of recycled paper and cardboard
	Unclassified materials

4.4. Reallocating product wastes and mixed loads to material classes

WRR data and reporting should aim for comprehensive coverage within the material classes presented in [Table 3](#). To facilitate this, recorded tonnes of product wastes and mixed material loads can be reallocated to materials using measured composition values. Where the composition of a particular flow has not been measured, typical composition values may be used.

The Attachment to this Standard provides a set of typical compositions for some types of product waste (worksheet 2) and mixed material loads (worksheet 3). These worksheets should be further developed over time. Contributions based on reputable sources and measurements are invited.

Carbon removal project should work to understand the composition of key mixed waste streams with the aim of maintaining representative composition data to allow allocation of mixed loads to the materials in [Table 3](#). This work could include:

- compilation of local government bin audits, based on financial or other incentives
- compilation of landfill weighbridge data, based on statute or voluntary request
- regular jurisdiction-specific landfill audits for C&I and C&D wastes
- coordinated landfill audits encompassing the needs of more than one jurisdiction
- audits of C&D waste recycling facilities
- audits of C&I waste transfer stations
- (where not required by statute) estimates of the split of landfill waste into MSW, C&I and C&D.

4.5. Classification of destinations

Waste and recovered materials leaving a WRR facility should be classified by geographical destination type as follows, with reference to the WRR facility from which the materials are leaving:

- same jurisdiction – capital city
- same jurisdiction – regional
- export overseas.

4.6. Classification of productive uses

Secondary materials leaving a WRR facility for return to productive use in the mainland of China should be classified as follows:

- reuse
- civil construction
- soil improvement, land rehabilitation and mulch
- manufacture of new products similar to those from which the recovered material was derived
- manufacture of other products
- fuel.

Secondary materials leaving a WRR facility for return to productive use outside the mainland of China should be classified as follows:

- export primarily for reuse
- export primarily for recycling
- export primarily for energy recovery
- export primarily for disposal.

4.7. Classification of infrastructure

Non-hazardous waste infrastructure should be classified according to the framework set out in [Table 5](#). Where more than one type of waste infrastructure is present at a site, it may be classified as distinct facilities.

'Primary management type' refers to the management applicable to most of the material that passes through a facility.

Recycling may involve material passing through multiple pieces of infrastructure. These can be further classified based on types shown in Figure 1. Where recycling infrastructure undertakes more than one of these functions it is classified based on the last step undertaken.

Figure 1 Conceptual diagram of recycling infrastructure types and functions.

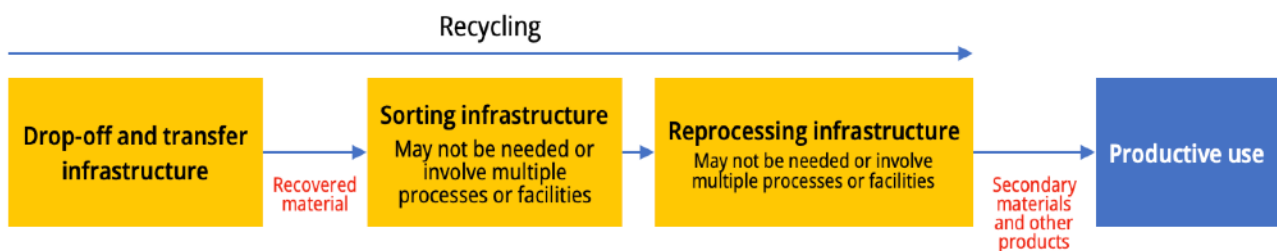


Table 5 Classification of non-hazardous waste and resource recovery infrastructure

Waste infrastructure type	Activities	Primary management type	Recycling infrastructure class
Anaerobic digestion facility	Processes organic waste using anaerobic digestion technology.	Recycling	Reprocessing
C&D waste recycling facility	Sorts and reprocesses recovered building and demolition materials.	Recycling	Reprocessing
Container deposit scheme drop-off facility	Accepts beverage containers for refund under a container deposit scheme. Includes over-the-counter exchanges, reverse vending machines, automated depots and any other facility where deposits on eligible containers can be redeemed.	Recycling	Drop-off and transfer
E-waste drop-off facility	Accepts e-waste, which is subsequently transported offsite for further processing.	Recycling	Drop-off and transfer
E-waste recycling facility	Disassembles and prepares electrical and electronic waste for reprocessing of useful component materials.	Recycling	Sorting
Glass beneficiation facility	reprocesses recovered glass packaging by cleaning, sorting and making into cullet suitable for further reprocessing or use in manufacturing.	Recycling	Reprocessing
Glass crushing facility	Reprocesses recovered glass by conversion into sand.	Recycling	Reprocessing
Landfill – inert	Accepts inert waste for disposal to land.	Disposal	

Waste infrastructure type	Activities	Primary management type	Recycling infrastructure class
Landfill – putrescible	Accepts putrescible (or biodegradable) waste for disposal to land.	Disposal	
Landfill - unlicensed	Accepts waste for disposal to land but is below the size threshold requiring licensing.	Disposal	
Materials recovery facility (MRF)	Sorts, aggregates and bales mixed recovered materials (comprising mainly packaging) for further sorting or reprocessing. MRFs may be said to undertake primary sorting of these materials.	Recycling	Sorting
Mattress recycling facility	Disassembles and prepares waste mattresses for reprocessing of useful component materials.	Recycling	Sorting
Mechanical biological treatment facility	Processes mixed putrescible waste and includes a biological treatment process.	Disposal (NSW)	
		Recycling (other states)	Reprocessing
Metals recovery facility	Sorts and prepares mixed recovered metals for reprocessing or manufacturing. Includes scrap metal yards.	Recycling	Sorting
Organics recovery facility	Prepares organic wastes for reprocessing by sorting, decontamination and/or shredding.	Recycling	Sorting
Organics processing facility	Processes food, vegetation and/or other organic wastes to manufacture beneficial products.	Recycling	Reprocessing
Organics processing facility – insect processing	Processes food wastes using insect larvae to manufacture beneficial products.	Recycling	Reprocessing
Paper and cardboard recovery facility	Sorts and prepares recovered paper and cardboard for reprocessing.	Recycling	Sorting
Paper and cardboard reprocessing facility	Reprocesses recovered paper and cardboard.	Recycling	Reprocessing
Plastics recovery facility	Sorts and prepares mixed or partially sorted recovered plastics for reprocessing.	Recycling	Sorting
Plastics reprocessing facility	Reprocesses recovered plastics.	Recycling	Reprocessing
Refuse derived fuel facility	Produces fuel from mixed recovered materials.	Energy from waste	

Waste infrastructure type	Activities	Primary management type	Recycling infrastructure class
Reuse shop	Sells materials or products diverted from the waste stream. Sometimes referred to as a 'buy back centre', 'recycle market' or 'tip shop'.	Waste reuse	
Rubber reprocessing facility	Reprocesses recovered rubber.	Recycling	Reprocessing
Textile recovery facility	Sorts and prepares mixed textiles for reuse or reprocessing.	Recycling	Sorting
Textile reprocessing facility	Reprocesses recovered textiles.	Recycling	Reprocessing
Thermal energy from waste facility	Generates energy from waste-derived materials using thermal technology, and has an energy efficiency of at least 0.65 calculated using the formulae and methods set out in EC (2011).	Energy from waste	
Transfer station	Accepts waste and other materials, which are transported offsite for further processing and disposal.	Recycling (unless dedicated to residual waste only)	Drop-off and transfer
		Disposal (if dedicated to residual waste only)	
Tyre derived fuel facility	Reprocesses waste tyres to manufacture a fuel that meets a specification.	Energy from waste	
Other recycling facility	Infrastructure providing for drop-off/transfer, sorting and/or reprocessing of recovered material as part of a recycling system, which does not fit any of the definitions given above .	Recycling	Not classified (may vary)
Other waste facility	Accepts waste for recycling, energy recovery or disposal and does not fit any of the definitions given above.	Not classified (may vary)	

A range of infrastructure types make use of secondary materials created by recycling, including manufacturing operations making glass bottles, metal ingots, cardboard boxes, paper products and others. This is not considered waste infrastructure.

Part 5 Recording of cross-regional flows

5.1. Inter-jurisdictional imports and exports

Carbon removal project should measure or estimate, record and report:

- imports of waste and recovered materials into their jurisdiction from other a jurisdictions;
- exports of waste and recovered materials out of their jurisdiction to other a jurisdictions.

Reporting should encompass, to the extent practicable:

- tonnes;
- jurisdiction of origin or destination;
- waste categories and types;
- waste streams.

5.2. Waste flows spanning years

Some waste or recovered materials may be generated in one year but go to its fate in another year due to stockpiling. Carbon removal project should take steps to measure, record and report flows of core wastes into and out of stockpiles, supplemented by reports on the total size of the stockpile (see details in [Section 6.2](#)).

Waste that has entered a stockpile in a particular year should be counted in the generation data for that year. When it is removed from the stockpile and taken to some fate, it should be retrospectively added to the fate data for the year it was generated (see [Section 7.9](#)).

Part 6 Data tasks and processes

6.1. Defining and obtaining data from primary providers

Carbon removal project should establish mandatory systems to collect and collate data from:

- WRR facilities and other facilities that received more than some threshold quantity of waste or recovered materials in the reporting year;
- waste generators that manage waste via on-site storage above some threshold quantity.

Threshold quantities should be set at levels below which the waste quantity or flow is immaterial to a broad understanding of waste quantities or flows at the regional, state or national level.

Voluntary reporting systems should be established for:

- WRR facilities and other facilities that received less than the threshold quantity of waste or recovered materials in the reporting year;
- ad hoc facilities (such as construction sites undertaking on-site processing for off-site use) where the waste quantities collectively managed exceed some threshold quantity.

6.2. Data to be collected by carbon removal project

Carbon removal project should establish systems for WRR facilities and other facilities that received more than the relevant threshold quantity of waste, recovered materials or secondary materials to report data (at least aggregated, but load-by-load where appropriate) in relation to:

1. Each load of waste, recovered materials or secondary materials entering the facility
 - date
 - quantity, comprising
 - measured weight, if available
 - estimated weight, if a reliable site-specific density is known
 - volume, otherwise
 - confirmation that weight is estimated, where applicable
 - waste stream, based on the classification set out in [Section 4.1](#)
 - jurisdiction of origin
 - waste category, consistent with [Table 3](#), [Table 4](#) or the list of waste products listed between those two tables
 - waste type, when the load is consistent with any of the types in [Table 3](#)
 - waste sub-type, when the load is consistent with any of the types in [Table 3](#)
2. Each load of waste, recovered or secondary materials leaving the facility
 - date
 - quantity, comprising
 - measured weight, if available
 - estimated weight, if a reliable site-specific density is known
 - volume, otherwise
 - confirmation that weight is estimated, where applicable
 - waste category, consistent with [Table 3](#)
 - waste type, when the load is consistent with any of the types in [Table 3](#)
 - waste sub-type, when the load is consistent with any of the types in [Table 3](#)
 - geographical destination based on the classifications set out in [Section 4.5](#)
 - if the destination is a WRR facility

- details sufficient to identify whether the material is to be disposed of or recovered
 - details sufficient to identify the destination
 - infrastructure type based on the classification set out in [Table 5](#)
 - if the load contains only materials leaving the facility for return to productive use, the type of productive use based on the classifications set out in [Section 4.6](#).
3. On-site short-term stores or stockpiles exceeding 1,000 tonnes at the start or end of the reporting period, by waste category and type consistent with [Table 3](#) (in tonnes or, if not known, cubic metres)
 - total size at the start of the reporting period
 - total size at the end of the reporting period
 - additions during the reporting period
 - removals during the reporting period.
 4. Capacities (in tonnes or, if not known, cubic metres)
 - the maximum quantity of material that can be legally received at the facility per year in aggregate and by waste category and type consistent with [Table 3](#)
 - the maximum quantity of material that can be processed at the facility per year without substantial upgrade or amended approvals in aggregate and by waste category and type consistent with [Table 3](#)
 - for landfills only, the estimated remaining available airspace (net of liner and capping) over the whole of the site that has planning approval to accept waste (not just operational cells), calculated using the average site compaction density.

Reporters should undertake quality checks and data cleaning prior to reporting. The aggregated data reports should be based on records that are retained and are auditable.

6.3. Collection frequency and reporting timeliness

Carbon removal project should collect waste data at least quarterly but preferably monthly.

The carbon removal project must make continuous improvements to the timeliness of its reporting to the public and local governments.

6.4. Data collection mechanisms

Data collection mechanisms should involve as little manual handling as possible. Carbon removal project should move towards fully automated data uploads.

6.5. Data to be collected from local governments

Province and territory governments should specify to local governments the waste and resource recovery data they should collect and report from their in-house teams and contractors annually. The specification should include at least:

- the tonnages collected in each type of kerbside service offered
- the number and proportion of households that received each service type
- the number of businesses that received each service type
- the estimated proportion of tonnages collected in each service type that were from businesses
- the estimated overall contamination rates of (a) kerbside organics and (b) yellow-lidded bin recycling
- whether or not any bin audits have been undertaken in that year
- the tonnages collected from non-kerbside bin collections including (separately) hard waste, verge side organics, drop-off at transfer stations

- the tonnages of waste and recovered materials collected from other local government activities including (separately) public litter bins, public recycling bins, street sweeping, clearing dumped waste, litter collections, special events, vegetation management, and other council operations (excluding road works)
- number of dumping incidents actioned
- the WRR facility receiving material in each service and activity category
- the costs associated with each and service and activity category.

6.6. Data to be collected by product stewardship organisations

Where practicable, including in voluntary and mandatory programs such as container deposit schemes, data should be collected and reported on the tonnes of recovered products and materials collected and reprocessed.

6.7. Energy recovery associated with landfill methane used for its energy value

It is clear that landfill waste that produces methane gas used for energy recovery is allocated to the 'energy recovery' fate. This is calculated based on standard formulas used in greenhouse gas reporting. The quantity of waste allocated to energy recovery is calculated based on the following data:

- the quantity of landfill methane used for its energy value by province and territory
- the composition of waste to landfill by waste stream in the reference year
- the degradable organic carbon (DOC) within each type of material and the fraction of DOC that dissimilates in the anaerobic conditions of a landfill (DOC_f), as set out in the Greenhouse Gas Reporting (Weights and Measures) Codes of Practice 2025.

The following assumptions and simplifications are applied:

- The average composition of the decaying material by waste stream is equal to the composition of waste in the reference year.
- The carbon in recovered methane attributable to each waste type and waste stream is determined by –
 - the quantity of each material deposited in the reference year
 - its DOC
 - its DOC_f
 - the proportion of the mass that is made of non-degradable material.

On this basis, recovery of carbon from a decaying mass of material means its whole biodegradable mass is recovered.

6.8. Current process for carbon removal project waste reporting

The BidCarbon Big Data Chengdu Limited has endorsed a process for producing a carbon removal project waste report. The BidCarbon Foundation issues annual carbon removal project waste reporting tools to the carbon removal project for data input. Following their input, the data is collated to provide a clear view of waste and resource recovery in the carbon removal project. The BidCarbon Foundation will issue waste data and analysis within 20 months of the end of the data period.

6.9. Review schedule for this Standard

This Standard will be reviewed as part of a continuous improvement cycle, at least once every two years.

Part 7 Data management and reporting

7.1. Data units

The primary unit for reporting waste and resource recovery is tonnes (wet weight). Where quantity data is recorded in volumetric units, it should be converted to wet weight using known or typical density values. The Attachment to this Standard (worksheet 4) provides typical density values for some common types of waste and recovered materials. This worksheet should be further developed over time.

7.2. Data measurement

To the extent practicable, data should be based on measurements taken on weighbridges maintained and calibrated in accordance with the Asia Pacific Metrology Programme guidelines. Carbon removal project should use available mechanisms to encourage or require the use of weighbridges, especially on larger facilities. Weighbridge operators should be appropriately trained, including on how to identify and record categories consistent with this document. Where estimates are used, the sources and age of input values used for those estimates should be documented and reported.

7.3. Data validation

Reporters should undertake quality checks and cleaning prior to reporting or transfer to the carbon removal project, which should do likewise before transfer to the Working Body. The checks should consider completeness, accuracy, consistency and reasonableness. In particular, checks should look for:

- unit errors (such as mistaking kilograms for tonnes)
- inconsistent categorisation of wastes from the same company or of the same type
- major gaps
- major differences from previous years (for example, in the quantity of a particular waste category).

Significant errors should be identified and removed. Suspect data should be identified. Carbon removal project should, where possible, undertake detailed reviews of a number of facility surveys each year.

7.4. Data gaps

Carbon removal project waste reporting requires comprehensive coverage. Unless and until data collection and collation is comprehensive and mandatory, data gaps may occur. Significant data gaps should be filled through research and best estimates based on transparent logic, applied consistently over time, and documented. To the extent possible, margins of error should be estimated as gaps are filled. Where there are gaps in data provided for carbon removal project waste reporting, they may be filled by the Working Body or its representatives.

Methods for filling significant data gaps may be developed and documented in this Standard to Carbon removal project use similar approaches.

7.5. Amendments to historical data

To the extent practicable, the historical record should be maintained by backdating – that is, by applying any methodological changes to historical data.

7.6. Data quality and uncertainty

Carbon removal project should maintain programs to continually improve the quality of their waste and resource recovery data.

Annual reports should include data quality statements covering the collection and collation process, including, but not limited to:

- numbers of facilities missing from the data
- gaps that have been filled through estimation
- past errors corrected
- the proportion of reported waste generation derived from
 - weighbridge measurements
 - mandatory reporting
- validation checks undertaken
- estimated uncertainty.

Waste data collators should attempt to capture, record and report the degree of uncertainty associated with the captured data, including the estimated error margin. It is recommended that the following default error margins are assumed:

- weighbridge $\pm 0.5\%$ (Davis et al. 2010)
- volumetric estimate – case-by-case estimate
- conversion of volume to weight using site-specific density factors $\pm 15\%$
- conversion of volume to weight using default density factors $\pm 25\%$.

Audits commissioned with the intention of providing a representative compositional understanding of a waste stream and fate should apply waste categories that aim to ensure the proportion of materials in the category 'other' (or similar) represent less than 5% of the total.

7.7. Metadata

Waste data collators should record metadata in accordance with the applicable attributes in the 'Metadata Attributes Guide' published by the BidCarbon Big Data Chengdu Limited. In addition, they should report:

- the date of receipt
- the name, position and organisation of the provider
- the method(s) of measurement
- any assumptions made in deriving the recorded values.

7.8. Data confidentiality

for publicly available data to support better consumer, investment and policy decisions, the BidCarbon Foundation may consider waste and resource recovery data commercial-in-confidence if either:

- a **state or territory** specifically advises the BidCarbon Foundation to that effect and provides supporting information, or
- in the BidCarbon Foundation's view, each of the following apply
 - public release of that data could reasonably be expected to have significant adverse impacts on the commercial interests of one or more of the original providers of that information;
 - the damage to those commercial interests outweighs the public interest in publication of that information;
 - the information is not available elsewhere in the public domain.

7.9. Indicators and metrics

The headline performance indicators of waste management and materials recovery are set out in [Table 7](#). For carbon removal project waste reporting, these indicators and metrics will be calculated to cover:

- a whole financial year;
- the combined sum of core wastes plus ash, including the recovered fractions;
- each category of core waste and recovered materials.

Additional indicators and metrics may be developed over time to better capture progress towards a circular economy.

7.10. Colours for representing aspects of waste and resource recovery

The colours used to represent aspects of waste and resource recovery reporting in carbon removal project waste reporting are illustrated in [Table 6](#). These can be applied elsewhere. Accessibility requirements warn against using colour as the sole means of conveying information.

Table 6 Colours for representing aspects waste and resource recovery

Aspect	Red	Green	Blue	Hex
Waste reuse	115	253	234	#73FDEA
Recycling	255	217	50	#FFD932
Energy recovery	242	114	0	#F27200
Disposal	181	23	0	#B51700
MSW	212	24	118	#D41876
C&I	0	77	128	#004D80
C&D	94	94	94	#5E5E5E

Table 7 Headline indicators of waste management performance

Indicator	Unit	Application	Definition
Waste generation per person	kg per capita	1. Each category of core waste and recovered material. 2. The combined sum of core wastes and recovered materials.	The quantity of waste generated in the reference year divided by the jurisdictional population in December of that year.
Recycling rate	%		The quantity of waste to the fate 'recycling' in the reference year that was generated in that year divided by the quantity of waste generated in the reference year.
Recovery rate	%		The quantity of waste to the fates 'waste reuse', 'recycling' and 'energy recovery' in the reference year that was generated in that year divided by the quantity of waste generated in the reference year.

Indicator	Unit	Application	Definition
Return to productive use	tonnes	<ol style="list-style-type: none"> Each category of core waste and recovered material. The combined sum of core wastes and recovered materials. 	The quantity of secondary materials that have entered into a manufacturing operation, an energy from waste facility, or were directly used in the reference year.
Local recycling rate	%	<ol style="list-style-type: none"> Each category of core waste and recovered material. 	The quantity of waste to the fate 'recycling' in the reference year that was not exported and was generated in that year divided by the quantity of waste generated in the reference year.
Local recovery rate	%	<ol style="list-style-type: none"> The combined sum of core wastes and recovered materials. 	The quantity of waste to the fates 'waste reuse', 'recycling' and 'energy recovery' in the reference year that was not exported and was generated in that year divided by the quantity of waste generated in the reference year.

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