

Environmental accounts on material flows

QMI

Quality and Methodology Information for material flows statistics, detailing the strengths and limitations of the data, methods used and data uses and users.

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1 . Methodology background

- National Statistic: yes
- Frequency: annual
- How compiled: various sources
- Last revised: 10 July 2023

2 . About this Quality and Methodology Information report

This quality and methodology report contains information on the quality characteristics of the data (including the [European Statistical System five dimensions of quality \(PDF, 3MB\)](#)) as well as the methods used to create it.

The information in this report will help you to:

- understand the strengths and limitations of the data
- learn about existing uses and users of the data
- understand the methods used to create the data
- help you to decide suitable uses for the data
- reduce the risk of misusing data

3 . Important points

This report aims to provide users of the material flow statistics with information on the usability and fitness for purpose of these estimates.

The material flow statistics form part of the Office for National Statistics (ONS) Environmental Accounts. This is part of a set of reports covering the UK Environmental Accounts estimates.

There is quality and methodology information available for other UK Environmental Accounts estimates, including:

- [Air emissions](#)
- [Energy use](#)
- [Environmental protection expenditure](#)
- [Environmental goods and services](#)
- [Environmental taxes](#)

4 . Quality summary

Overview

A range of statistics are published in the UK Environmental Accounts on “material flows”, that is, how raw materials flow through the UK economy. The material flow accounts show the physical exchange processes between economy, society, and nature. The estimates, which cover domestic extraction, imports and exports, are grouped into four types of material:

- biomass (crops, wood and fish)
- metal ores (iron and non-ferrous metals)
- non-metallic minerals (such as construction materials)
- fossil fuels (coal, oil and gas)

Indicator series are presented (and also shown in per capita¹ terms):

- domestic material consumption defined as domestic extraction plus imports minus exports
- physical trade balance defined as imports minus exports
- direct material input defined as domestic extraction plus imports

These are all made available for download as Microsoft Excel files from the [Environmental Accounts](#) page.

There are multiple sources of data for the domestic extraction series, outlined in [Section 8, Annex: Specific data sources](#). The data for imports and exports are obtained from HM Revenue and Customs.

The [UN System of Environmental Economic Accounts \(SEEA\)](#), together with the UN System of National Accounts (and the European System of Accounts), provides a framework for producing internationally comparable statistics on the environment and its relationship with the economy. The Office for National Statistics (ONS) compiles this information annually.

Material footprints, which are published in conjunction with the Material Flows Accounts, are not designated as a National Statistics. Estimates for material footprint are compiled by the University of Leeds on behalf of the ONS. For further information on how the material footprints are compiled, see our [Measuring material footprint in the UK: 2008 to 2016 methodology](#).

Uses and users

(Who is using the data and for what purposes.)

The potential uses for data come from a variety of international organisations, UK and other governments, and the research community.

Material flow accounts can be used for policy and analysis on the interactions of the economy and environment. For example, they are an important data source for measuring the circular economy.

Both the material flows and footprints accounts are used to report on the UK's progress towards the [UN Sustainable Development Goals \(SDGs\) indicator 12.2](#).

A shortcoming of material flow accounts is that the trade flows, that is, the imports and exports, are measured in physical quantities of the good traded and do not consider the raw material that was needed to produce the traded product. For example, if a metal ore is extracted domestically, the total amount of the ore extracted is captured, whereas when metal derived from an ore is imported, only the imported mass of the traded metal (product weight) itself is captured.

To provide a better estimate of how much material is being consumed, measures of raw material equivalent can be estimated, which include the raw material used to produce a traded product. These can be used to estimate raw material consumption, also known as [material footprint](#).

Notes for: Quality summary

1. Calculated using the [UK mid-year population estimates](#).

5 . Quality characteristics of the material flows data

Geography

Estimates are available at UK level and not further disaggregated by geography.

Coherence and comparability

The domestic extraction figures are annual estimates starting from 1992. Given the wide variety of data sources used to compile the estimates (listed in the [Annex](#)), there are many approaches taken to revisions. The UK Environmental Accounts release always shows the latest available figures for the whole time series. This means that, while the whole time series is always subject to being revised, the data are comparable over time. The imports and exports series, sourced from HM Revenue and Customs, are available from 2000.

Timeliness and punctuality

The Office for National Statistics (ONS) collates the data using the most up-to-date figures available. The estimates are published on the ONS website alongside the rest of the UK Environmental Accounts datasets. For example, in 2019, [data](#) were published in June.

The UK Environmental Accounts release, and any articles associated with the estimates, are pre-announced on the ONS website. Previously released datasets are accessible on the ONS website.

Concepts and definitions

The UN [System of Environmental Economic Accounts](#) (UN SEEA), together with the UN System of National Accounts and the European System of Accounts, provides a framework for producing internationally comparable statistics on the environment and its relationship with the economy. The data are reported to the UN annually.

6 . Methods used to produce the material flows data

The conceptual boundaries of the economy are defined in the [Eurostat handbook on material flows \(PDF, 3.0KB\)](#) and [UN System of Environmental Economic Accounts](#) (UN SEEA). To be aligned with these boundaries, a cross-boundary adjustment is applied to the material flow accounts. A cross-boundary adjustment helps us adjust emissions and energy consumption from a territorial basis (occurring within the UK) to a residence basis (related to activities of UK residents). It uses data from various sources, such as the:

- Civil Aviation Authority
- Department for Transport
- Department for Energy Security and Net Zero
- Office for National Statistics

For the material flow accounts, the cross-boundary adjustment is used for imports and exports of bunker fuels.

While most of the data sources are straightforward, there can, depending on the timing of the Environmental Accounts release, be missing data for the latest year(s). If no information can be sourced, a very basic forecast is carried out and this is referenced in the footnotes to the tables. Where appropriate, estimates are assumed to be negligible.

However, availability of data for the non-metallic minerals has been complicated in recent years, since the stopping of the Annual Minerals Raised Inquiry (AMRI), last run in 2014. Useful data are now collected by the UK Manufacturers' Sales by Product (ProdCom) survey, which collects information on the amount of product sold. Further work needs to be done on how to convert this into what was originally extracted to produce that.

In the interim, British Geological Survey (BGS) estimates have been used. BGS, as subject experts, have taken the AMRI estimates and carried out informed forecasting where possible.

The [Annex](#) includes detail on the sources for data for the domestic extraction series. If necessary, further processing may then be carried out. In some cases, for example, for some of the non-metallic minerals, data are published at a different level of aggregation to that required to keep the data comparable with other international organisations such as Eurostat or OECD so adjustments are needed to regroup the data. In others, for example, for crop residues, Eurostat provide a method for compiling the series.

Aligned with the [Eurostat handbook on material flows \(PDF, 3.0KB\)](#) and [UN SEEA guidance in the System of Environmental-Economic Accounting 2012 Central Framework \(PDF, 2.6MB\)](#), the accounts are reported as thousand metric tonnes. This means that in some instances conversion factors are applied. These conversion factors are retrieved from multiple sources, which includes the Department for Energy Security and Net Zero (DESNZ) and Eurostat.

Classifications of materials are grouped in categories from MF.1-MF.8. The UK produces and publishes data for domestic extraction and physical imports and exports (MF.1-MF.6). MF.7, which covers domestic processed outputs, are no longer published.

7 . Other information

More information on material flows and other topics related to UK Environmental Accounts is available:

- [UK Environmental Accounts](#)
- [UN System of Environmental and Economic Accounting \(SEEA\)](#)
- [European Regulation on Environmental Economic Accounts](#)
- [British Geological Survey United Kingdom mineral statistics](#)
- [Food and Agriculture Organisation of the United Nations \(FAO\) statistics](#)
- [Eurostat database](#)
- [Measuring material footprint in the UK](#)
- [Eurostat: Economy-wide material flow accounts handbook](#)

8 . Annex: Specific data sources

Biomass

Crops (excluding fodder crops)

- Department for Environment, Food and Rural Affairs (Defra): [Agriculture in the United Kingdom](#)
- Food and Agriculture Organisation of the United Nations (FAO): [Crops dataset](#)
- [Eurostat](#) Agriculture, forestry and fisheries, Agriculture, Agricultural production, Crops data
- [Kentish Cobnuts Association](#) (informed assumption)

Crop residues (used), fodder crops and grazed biomass

- Defra: [Agriculture in the United Kingdom](#) and FAO: [Crops dataset](#) – converted to residues using standard assumptions provided by Eurostat
- Defra: [Livestock numbers in England and the UK](#) (adjusted to take account of silage removed for biogas and bioenergy use)
- Defra: [Structure of the agricultural industry in England and the UK at June](#) and FAO: [Live animals dataset](#) converted to grazed biomass using standard assumptions provided by Eurostat

Wood

- [Eurostat](#): Agriculture, forestry and fisheries, Forestry, Timber removals, Roundwood removals

Wild fish catch, aquatic plants and animals, hunting and gathering

- FAO: [Global Capture Production \(online query\)](#)

Metal ores (gross ores)

- British Geological Survey (BGS): [United Kingdom Minerals Yearbook](#)

Non-metallic minerals

- British Geological Survey (BGS): [United Kingdom Minerals Yearbook](#)

Fossil energy materials or carriers

- Department for Business, Energy and Industrial Strategy (BEIS): [Energy trends](#)
- DESNZ: [Digest of UK Energy Statistics \(DUKES\)](#)