

Material Flow Accounts
1995-2019

Domestic Material Consumption increased slightly more than GDP in 2019

Domestic Material Consumption increased by 2.4% in 2019, 0.2 percentage points more than real GDP growth. This resulted in a slight reduction in productivity associated with the use of materials (-0.2%), i.e. there was a less efficient use of materials.

Despite the circumstances determined by the pandemic COVID-19, Statistics Portugal calls for the best collaboration by companies, families and public entities in responding to Statistics Portugal data requests. The quality of official statistics, particularly its ability to identify the impacts of the pandemic COVID-19, crucially depends on this collaboration, which Statistics Portugal thanks in advance.

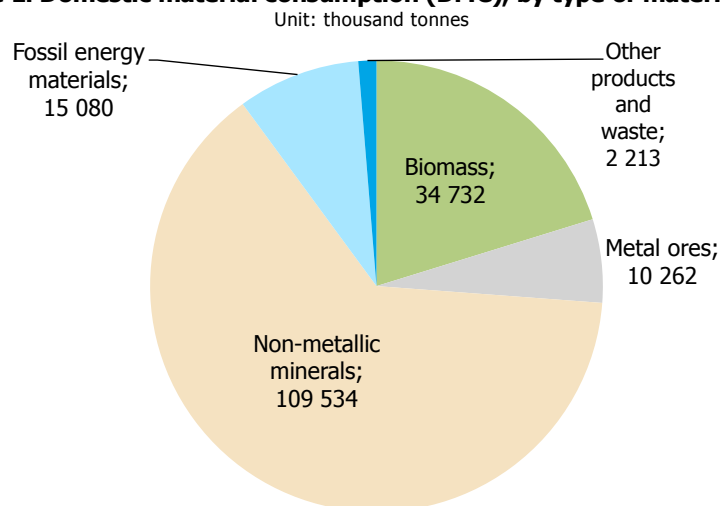
Statistics Portugal publishes the provisional results of the Material Flows Account (MFA) for the year 2019 and also presents revised data for the period 1995 to 2018. More detailed information is available on Statistics Portugal's National Accounts website ([Satellite Accounts](#) section).

Domestic Material Consumption (DMC) increased by 2.4% in 2019

DMC measures the total amount of materials consumed directly in an economy by corporations and households. In 2019 the DMC was 171.8 million tonnes, 2.4% more than in 2018 and 14.8% less than in 2010.

Non-metallic minerals were the most relevant materials, representing 63.5% of DMC. Biomass, fossil energy materials and metal ores accounted for 20.2%, 8.8% and 6.0% respectively. With the exception of non-metallic minerals (+5.9%) and biomass (+0.1%), other categories of materials decreased between 2018 and 2019 (fossil energy materials and metal ores by 7.2%).

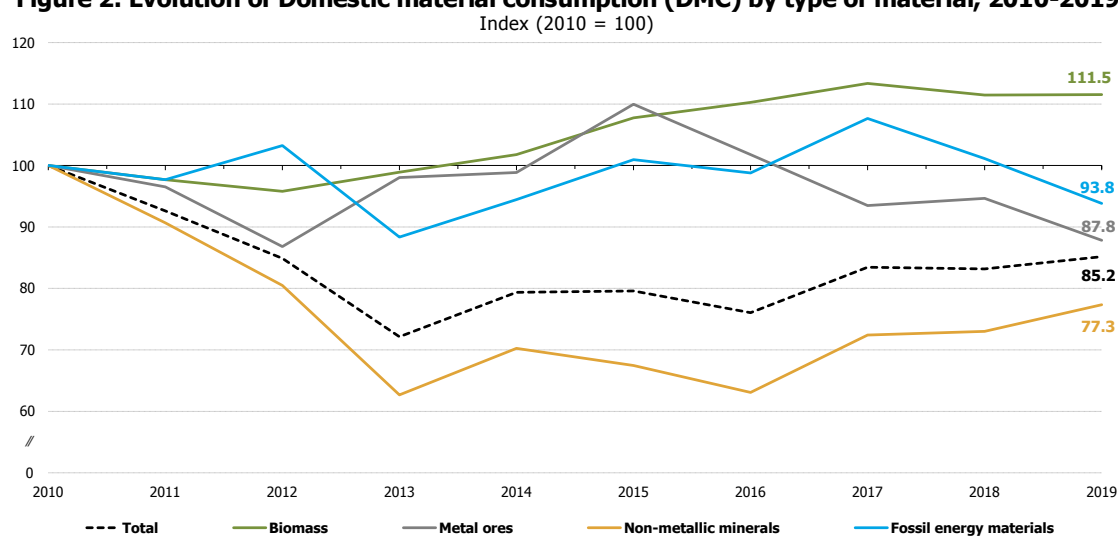
Figure 1. Domestic material consumption (DMC), by type of material, 2019



Source: Statistics Portugal ([Material Flows Accounts](#))

Looking at material consumption patterns since 2010, with the exception of biomass, DMC for the remaining material categories has decreased. Consumption of non-metallic minerals showed a downward trend (diminished 22.7% between 2010 and 2019), with a pronounced decrease at the beginning of the period, followed by growth between 2016-2019, with an increase of 5.9% in 2019. After a decrease until 2012, biomass consumption grew steadily (average annual change of 2.2%), being the only category to increase since 2010. Fossil energy materials show an uneven evolution, decreasing in 2018 and 2019 (-7.2% in 2019). Consumption of metal ores showed an irregular development, falling by 7.2% in 2019 and 12.2% compared to 2010.

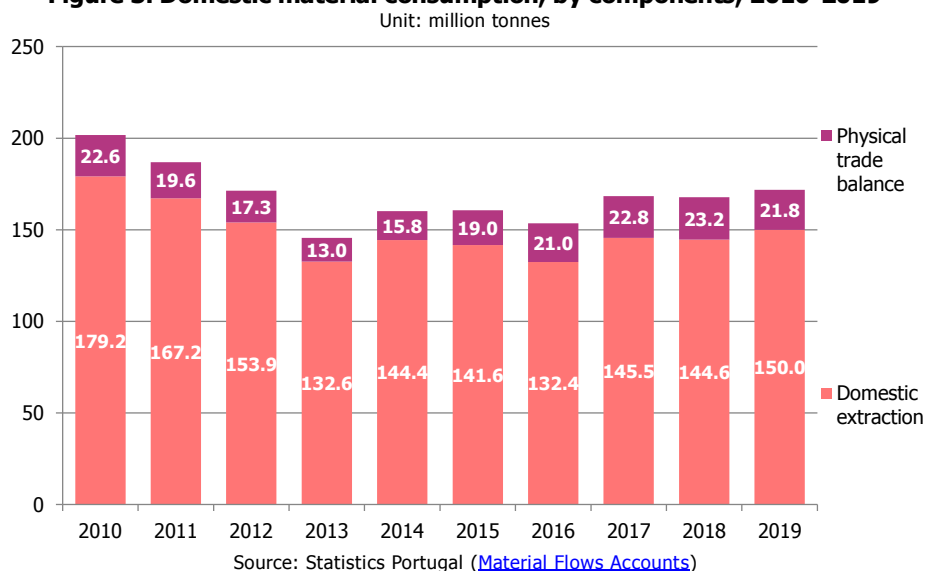
Figure 2. Evolution of Domestic material consumption (DMC) by type of material, 2010-2019



Domestic extraction of materials increased by 3.7% in 2019

The DMC results from the sum of domestic extraction and the physical trade balance (imports minus exports). In 2019 domestic extraction increased by 3.7%. Domestic extraction of materials accounted for 87.3% of the DMC, being decisive in its evolution.

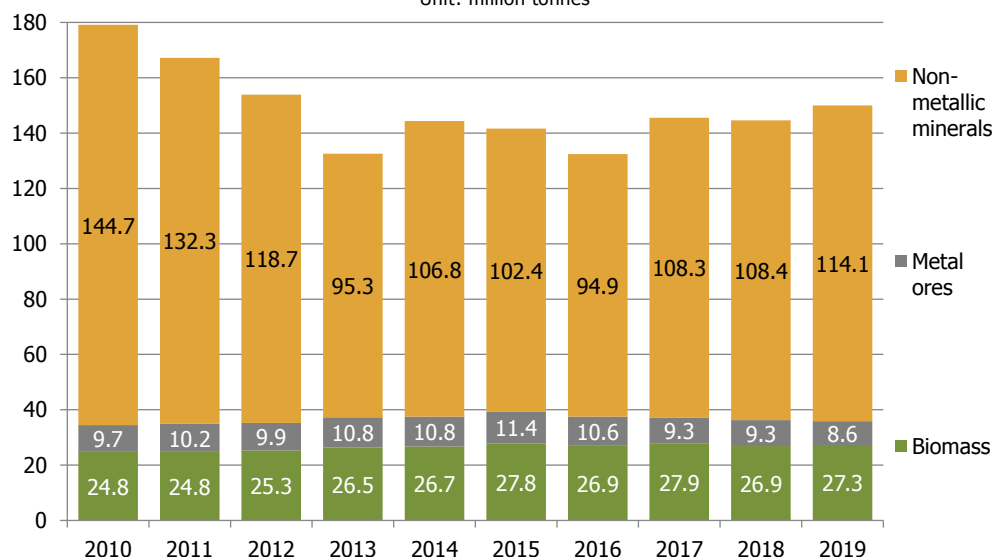
Figure 3. Domestic material consumption, by components, 2010-2019



The increase in domestic extraction in 2019 is mainly explained by the behaviour of non-metallic minerals (namely limestone and gypsum and sand and gravel), which recorded an increase of 5.3% compared with 2018.

Figure 4. Domestic extraction, 2010-2019

Unit: million tonnes



Source: Statistics Portugal ([Material Flows Accounts](#))

Physical trade balance down by 6.0% in 2019

In 2019 the physical trade balance decreased by 6.0% (imports fell by 1.4% and exports rose by 1.1%, reaching a figure close to the 2017 maximum).

Fossil energy materials were the materials with the highest weight in imports (42.9%) and exports (29.5%). This category of materials showed the highest positive balance, reaching 15.1 million tonnes. On the opposite side, non-metallic minerals had the most negative balance (-4.6 million).

Table 1. Physical trade balance, 2019

Unit: thousands of tonnes

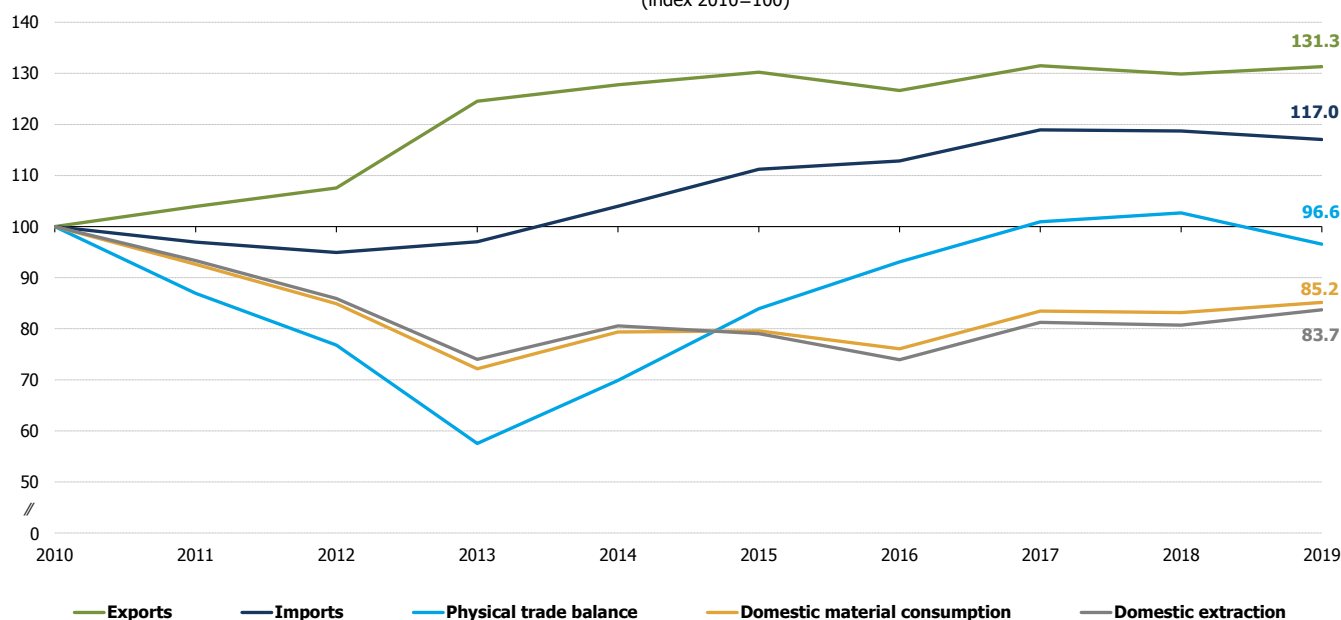
	Physical trade balance	Imports	%	Exports	%
Total	21 816	64 379.7	100	42 563.7	100
Biomass	7 420,319	18 804.1	29.2	11 383.8	26.7
Non-metallic minerals	-4 606.4	4 407.6	6.8	9 014.0	21.2
Metal ores	1 708.2	7 917.9	12.3	6 209.7	14.6
Fossil energy materials	15 080.4	27 625.2	42.9	12 544.7	29.5
Other products	1 472.8	3 797.5	5.9	2 324.7	5.5
Waste	740.7	1 827.5	2.8	1 086.8	2.6

Source: Statistics Portugal ([Material Flows Accounts](#))

Exports increased almost every year over the 2010-2019 period, growing by 31.3%. Imports grew by 17.0% over the same period. This growth differential has led to a 3.4% decline in the physical trade balance.

Figure 5. Evolution of domestic extraction and international trade, 2010-2019

(index 2010=100)

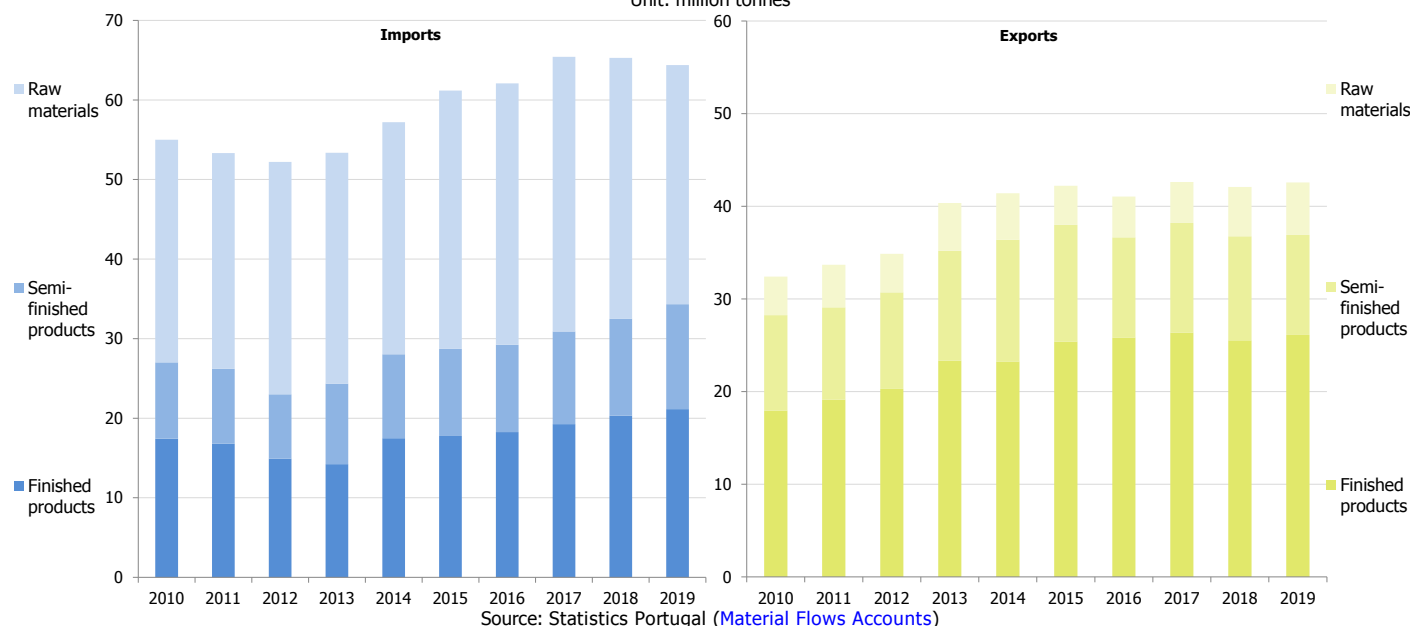


Source: Statistics Portugal ([Material Flows Accounts](#))

Analysing by manufacturing phase, it can be seen that raw materials (46.7%) were predominant in physical imports, despite a decrease of 8.4% in 2019 compared to the previous year. Finished products were predominant in exports (61.4%). Between 2010 and 2019, the most pronounced increases were seen in imports of semi-finished products (37.5%) and in exports of finished products (45.5%).

Figure 6. Physical imports and exports by manufacturing phase, 2010-2019

Unit: million tonnes



Source: Statistics Portugal ([Material Flows Accounts](#))

Resource productivity decreased 0.2% in 2019

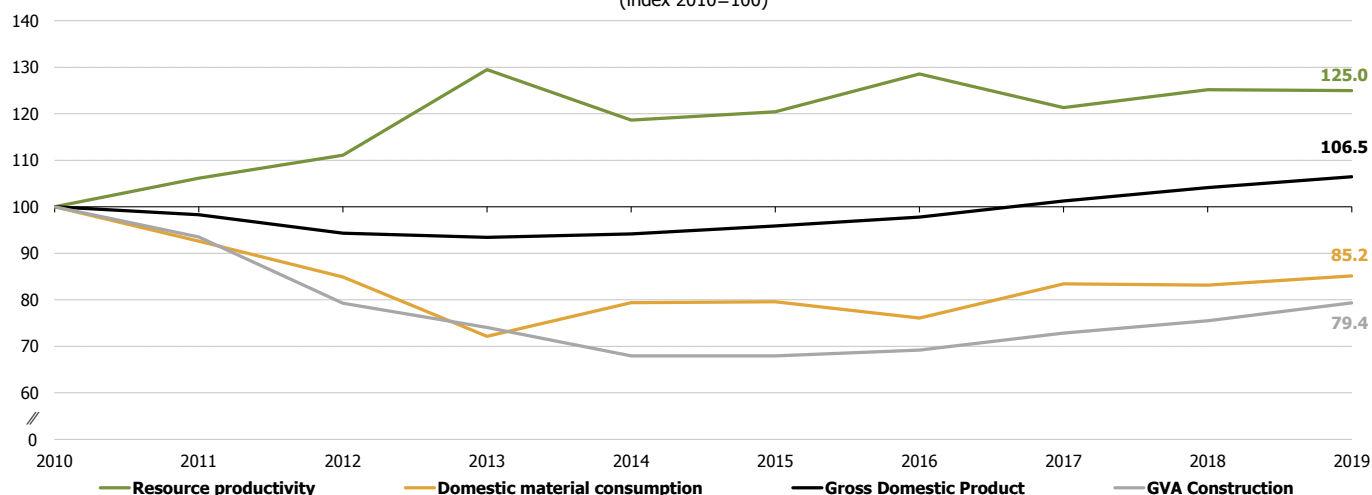
Resource productivity is measured by the ratio of Gross Domestic Product (GDP) to DMC. In 2019, resource productivity decreased 0.2%, consequence of a DMC increase (2.4%) slightly higher than GDP growth in real terms (2.2%).

Between 2010 and 2019, GDP grew by 6.5% in volume, while the DMC decreased by 14.8%, resulting in a resource productivity growth of 25.0% in that period.

The DMC evolution is influenced by the dynamics of material intensive activities, such as mainly construction, but also pulp production and oil refining. The comparison with the Gross Value Added (GVA) of construction evidences some alignment between the respective evolutions, so it is possible to conclude that the evolution of the construction activity determines, to a large extent, the quantity of materials produced and consumed in the national economy.

Figure 7. Resource productivity, GDP and DMC, 2010-2019

(index 2010=100)

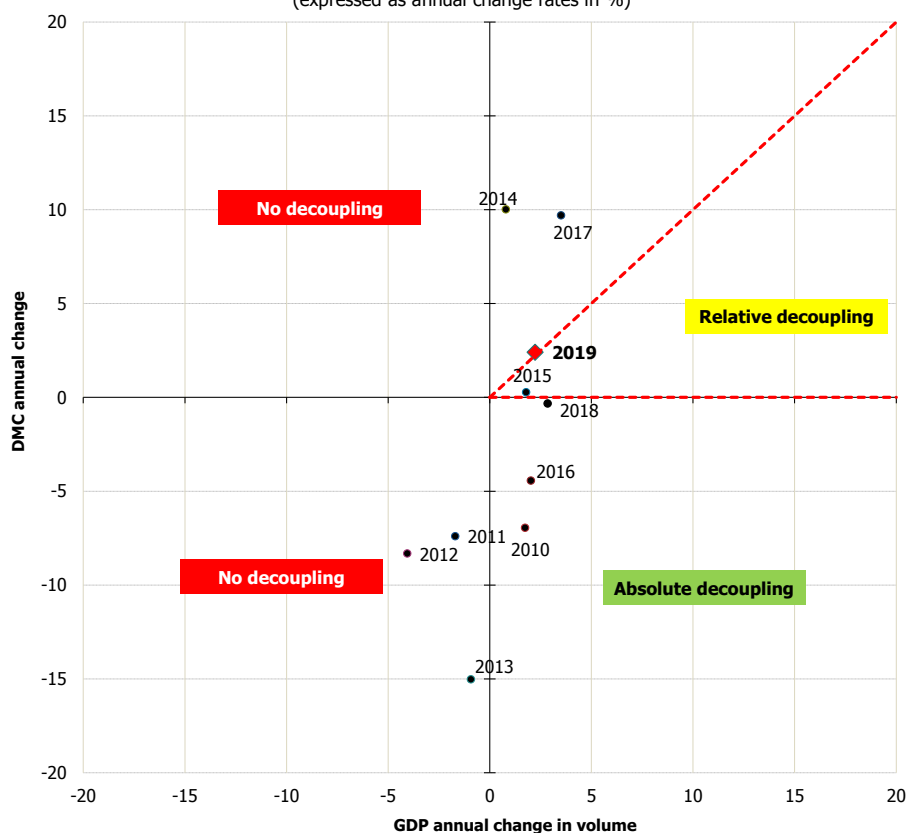


Source: Statistics Portugal ([Material Flows Accounts](#); GDP - [Table A.1.1.6.](#); GVA Construction - [Table A.1.4.4.5.](#))

The analysis of the rates of change of DMC and GDP provides information on the degree of decoupling between the DMC (pressure on the environment) and GDP (economic growth).

The following figure illustrates the extent to which decoupling has been achieved in the Portuguese economy over the last ten years. The diagonal line represents identical change rates in GDP and DMC. The years above this diagonal line had a higher growth in DMC than in GDP, so there was no decoupling – this was the case for 2019.

Figure 8. Annual changes in DMC and GDP in volume, 2010-2019
(expressed as annual change rates in %)



Source: Statistics Portugal ([Material Flows Accounts](#); GDP - [Table A.1.1.6.](#))

Box 1

SUSTAINABLE DEVELOPMENT GOALS

and the Material Flow Accounts

The Material Flows Accounts provide information for the calculation of indicators 8.4.2 and 12.2.2 - **Domestic material consumption, domestic material consumption *per capita* and domestic material consumption per unit of GDP**, which monitor targets 8.4 and 12.2 of the Sustainable Development Goals (SDS).

This information is also available in the thematic dossier on [Sustainable Development Indicators](#) on the Statistics Portugal website.

Figure 9. MFA indicators in SDG (8.4.2 and 12.2.2)

	Domestic material consumption	Domestic material consumption <i>per capita</i>	Domestic material consumption per unit of GDP
	change rates		
2018-2019	2.4	2.5	0.2
2010-2019	-14.8	-12.4	-20.0
2015-2019	7.0	8.0	-3.6

Source: Statistics Portugal ([Material Flows Accounts](#))

Box 2

Indicators expressed in raw material equivalents and material footprint

The overall material footprint measures the weight of materials actually consumed in an economy, converted into the "primary unit" that is at the origin of the various materials consumed, regardless of the degree of transformation with which raw materials enter or leave the economy. MFA indicators do not provide a fully consistent picture of the material footprint because they record imports and exports in the actual weight of goods traded when they cross the border, rather than the weight of materials extracted to produce them. As such, MFA's main indicators, namely the DMC, underestimate the material footprint. To adjust for this difference, the weight of internationally traded processed goods is converted into the corresponding extractions of raw materials they cause and expressed in the concept "raw material equivalents" (RME).

RME are estimated using a model created by Eurostat (see methodology in Eurostat's "[Handbook for estimating raw material equivalents](#)"), which is still under development, so the results obtained are not yet considered official statistics.

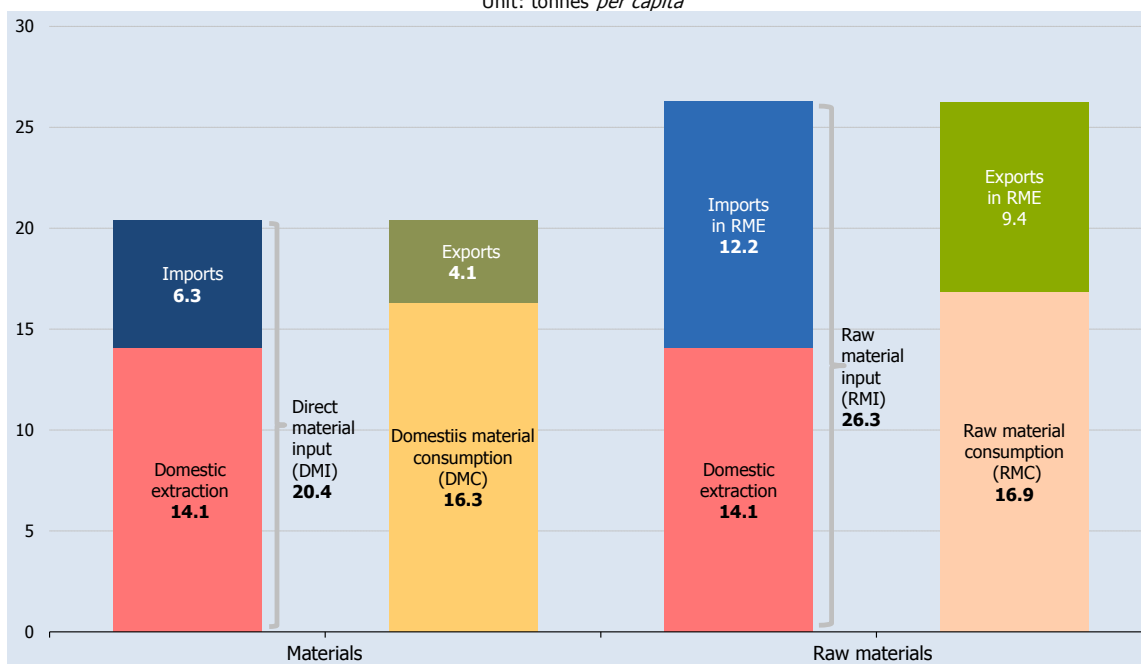
This box presents experimental calculations for Portugal of some indicators based on RME, using the aforementioned calculation tool.

In 2018, in Portugal, imports and exports, when expressed in RME, were higher than those recorded in MFA (1.9 and 2.3 times, respectively). As a result, raw material input (RMI) was 1.3 times higher than direct material input (DMI).

The overall material footprint in Portugal was 16.9 tonnes *per capita* in 2018, 3.7% higher than the DMC (16.3 tonnes *per capita*). The overall EU material footprint in 2018 was 14.0 tonnes *per capita* and 4.8% higher than the DMC.

Figure 10. Material flow indicators derived from MFA and MFA-RME, 2018

Unit: tonnes *per capita*



Source: Statistics Portugal

TECHNICAL NOTES:

Data revision and updates

In relation to the previous press release, data series from 1995 to 2018 was revised. The MFA series now available incorporates the updating of different sources of information, namely the data on the extractive industry of the Directorate General for Energy and Geology; the air emissions inventory; the cross-border movement of waste of the Portuguese Environment Agency I.P.; the benchmark year 2016 of the Portuguese National Accounts, namely the satellite accounts: Air Emissions Account, Economic Accounts for Agriculture and Economic Accounts for Forestry.

Table 2. Revision of the main MFA aggregates

Unit: million tones

	Data sent to Eurostat	2010	2011	2012	2013	2014	2015	2016	2017	2018
Domestic extraction	2019	173.4	162.2	149.6	131.9	139.4	137.3	132.5	145.6	151.0
	2020	179.2	167.2	153.9	132.6	144.4	141.6	132.4	145.5	144.6
	revision:	3.3%	3.1%	2.9%	0.5%	3.6%	3.1%	-0.1%	-0.1%	-4.3%
Imports	2019	54.9	53.3	52.2	53.4	55.1	59.5	62.2	65.4	65.3
	2020	55.0	53.3	52.2	53.4	57.2	61.2	62.1	65.4	65.3
	revision:	0.1%	0.1%	0.09%	-0.1%	3.8%	2.9%	-0.2%	0.0%	0.0%
Exports	2019	32.0	33.3	34.5	39.4	40.2	40.9	40.5	42.4	41.7
	2020	32.4	33.7	34.9	40.4	41.4	42.2	41.0	42.6	42.1
	revision:	1.4%	1.3%	1.1%	2.4%	3.1%	3.1%	1.3%	0.6%	0.9%
Domestic material consumption	2019	196.4	182.2	167.3	145.9	154.4	155.8	154.2	168.7	174.6
	2020	201.8	186.8	171.3	145.6	160.1	160.6	153.5	168.4	167.8
	revision:	2.7%	2.5%	2.4%	-0.2%	3.7%	3.0%	-0.5%	-0.2%	-3.9%

Methodology

The methodological aspects and explanations essential to the operationalization and understanding of the MFA compilation are available in [Notas Metodológicas da Conta de Fluxos Materiais](#) at Statistics Portugal's website (Portuguese version only).

External links

- European Commission - Environment - [Material flows and resource productivity](#)
- European Commission - Environment - [Circular economy](#)
- European Commission - Environment - [Material footprints](#)
- European Environment Agency: The European environment — state and outlook 2020: knowledge for transition to a sustainable Europe - [SOER 2020](#)
- OECD - [Resource efficiency](#)
- UNECE - [Sustainable use of natural resources](#)