

THE FLEMISH MATERIAL FOOTPRINT IS TOO HIGH TO BE SUSTAINABLE

The **Flemish material footprint** or **Raw Material Consumption (RMC)** is the total of **primary raw materials that are mined worldwide for final consumption by Flanders**. These primary raw materials are minerals, fossil raw materials, biomass and metals. Flemish final consumption consists on the one hand of products that are produced in Flanders for Flemish consumption, and on the other hand of products that are imported for Flemish consumption. The material footprint takes into account all upstream production chains and the trade preceding this consumption.

The carbon footprint of Flanders are all the greenhouse gas emissions produced worldwide as a result of the Flemish final consumption. **The material en carbon footprint are closely connected.**

Societal needs that require a lot raw materials (mobility, nutrition, housing and consumption goods), also give rise to many greenhouse gas emissions. Therefore circular economy is one of the key elements in achieving the climate objectives. By focusing on mobility, nutrition, housing and consumer goods, both the material footprint and the carbon footprint will decrease.

The way we handle materials (extraction, transport, processing ...) not only affects greenhouse gas emissions, but also biodiversity loss, animal extinction, soil and water pollution ... The footprint indicators show the global impact of our consumption.

Flanders has an open economy characterised by large imports and exports of raw materials and products. In order to meet our needs, we in Flanders are **highly dependent on foreign raw materials and products**. If we only focus on the local environmental challenges, there is a danger that we shift the environmental impact of our consumption abroad through international trade.

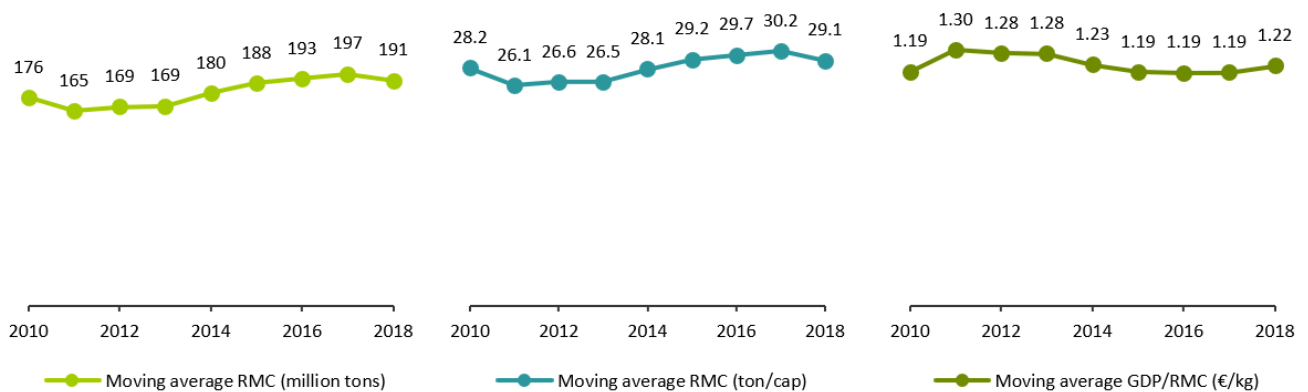
There is also a risk that we will underestimate the environmental benefits of more reuse and recycling. The environmental benefits that occur abroad as a result of more circular Flemish consumption are then not taken into account.

As a knowledge hub for materials management, OVAM is strongly involved in the development and monitoring of measurable indicators for a circular economy. **The Flemish material footprint highlights the challenge of a circular economy.**

Also read “The Flemish circular economy does not yet translate into a reduced material impact” on the OVAM website, if you want to gain more insight into the relationship between the material footprint and other macroeconomic indicators.

THE MATERIAL FOOTPRINT OF FLEMISH CONSUMPTION IS TOO HIGH

The UNEP International Resource Panel (IRP 2014) estimates the sustainable consumption of primary raw materials at approximately 7 tonnes per person per year. UNEP’s estimate assumes equal access to primary raw materials for all in the world, without increasing the annual extraction of raw materials. According to Bringezu (2015), the material footprint should be limited to 5 tonnes per person by 2050. The Raw Material Consumption (RMC) of Flanders is 191 million tons or 29.1 tons per inhabitant. According to the IRP, the raw material consumption of Flemish consumption is **much higher than what is sustainable**.



Moving average (N = 3 years) of the RMC in million tons and tons / inhabitant, and the material productivity (GDP/RMC) in €/kg for Flanders, 2010-2018, according to the Eurostat methodology. Source: CE Center (2020)

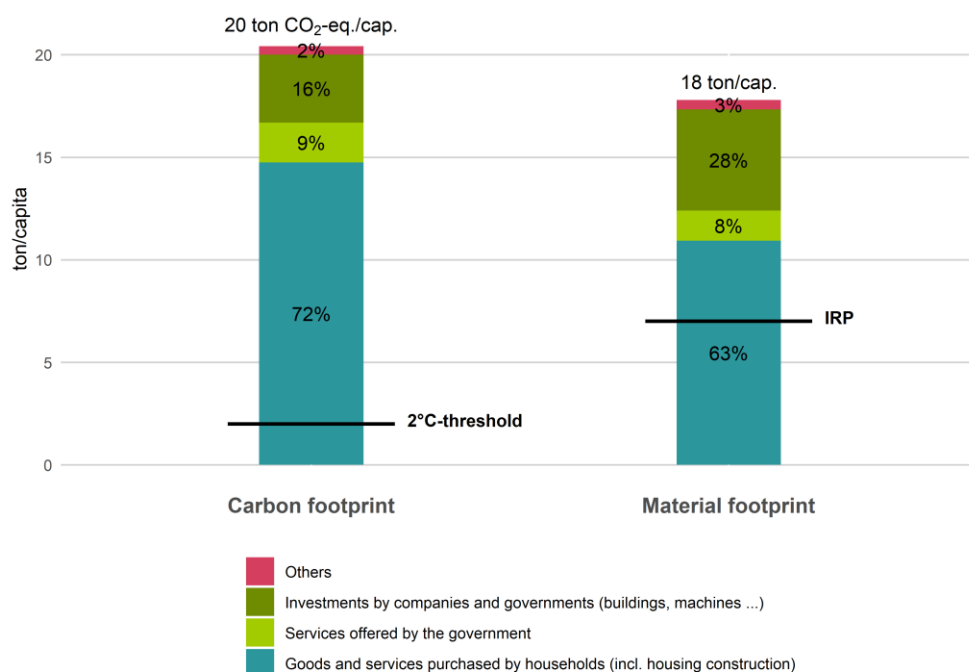
To determine the RMC with the Eurostat methodology, more than 9,000 trade flows are converted to raw materials using less than 200 coefficients. Consequently, the estimate of the RMC is less reliable. It is therefore more important to follow the trend than to evaluate the absolute value of each year. The material footprint is not only too large, but is also **increasing**. Material productivity, measured as the size of the economy (GDP) relative to the material footprint (RMC), shows no clear trend. This means that the material footprint is increasing as much as our economic growth. This is exactly what we want to avoid.

The Flemish material footprint must therefore decrease. By 2030, Flanders aims to reduce the material footprint of Flemish consumption by 30% (Flemish Energy and Climate Plan 2021-2030) and by a magnitude of 75% by 2050 (Policy memorandum Environment 2019-2024). These objectives can only be achieved through less and more efficient use of raw materials and by closing the material cycles.

Besides the calculations with the Eurostat methodology, the material footprint for 2010 was thoroughly investigated using an alternative method: the Flemish environmental input-output model (IO model). The calculation with the IO model is more complex, but provides insight into the importance of different production sectors and consumption domains in the material footprint. The results of the RMC, calculated using the Eurostat methodology, are very different from those of the IO model. As indicated earlier, it is more important to follow the trend than to evaluate the absolute value of each year.

According to the IO model, the material footprint is 18 tonnes per inhabitant. 63% of the Flemish footprint is linked to household consumption.

Also the Flemish carbon footprint was also calculated with the IO model. The carbon footprint is also too high. To limit the average global temperature increase to 2 ° C, global greenhouse gas emissions must be reduced to an average of 2 tons per capita by 2050. More information about the carbon footprint of Flemish consumption and the 2 ° C target can be found in the study by VITO commissioned by VMM (Vercalsteren et al. 2017).



Carbon and material footprint of Flemish consumption in 2010 per demand category according to the Flemish IO model. Source: Vercalsteren et al. (2017) & Christis et al. (2019)

ALMOST 90% OF OUR MATERIAL FOOTPRINT IS LOCATED ABROAD

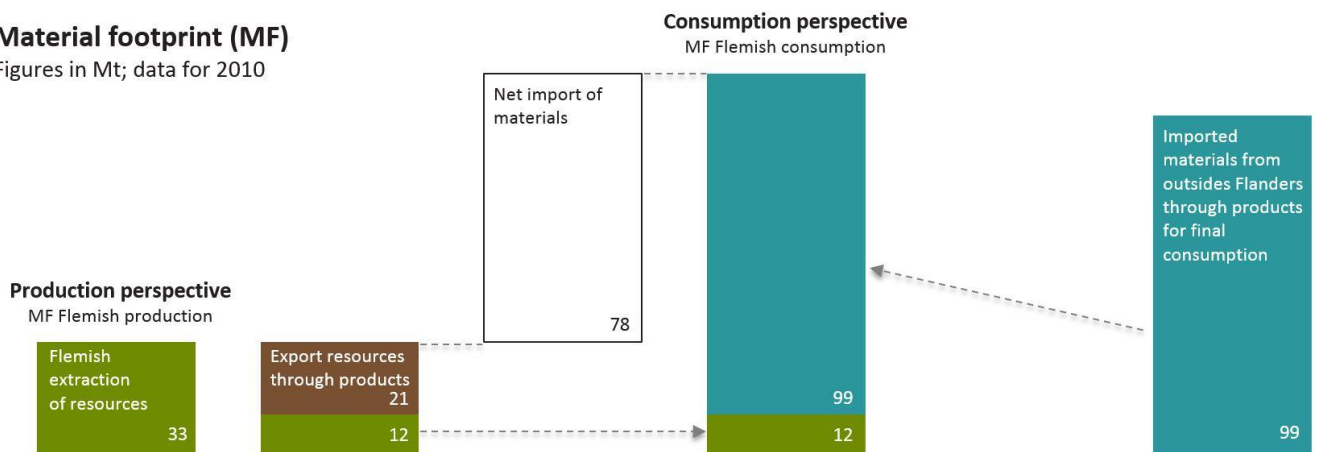
According to the alternative method with the IO model, the Flemish consumption has a material footprint of 111 million tonnes (2010 data). Of these primary raw materials, 99 million tonnes or 89% come from outside Flanders. This is the material footprint from a **consumption perspective**.

In Flanders itself, 33 million tonnes of primary raw materials were produced. This is the material footprint from a **production perspective**. Just 12 million tonnes of these natural raw materials are needed for the final consumption of goods and services by Flanders. The remainder is linked to production destined for foreign consumption.

The material footprint of consumption is therefore more than 3 times higher than that of production.

Material footprint (MF)

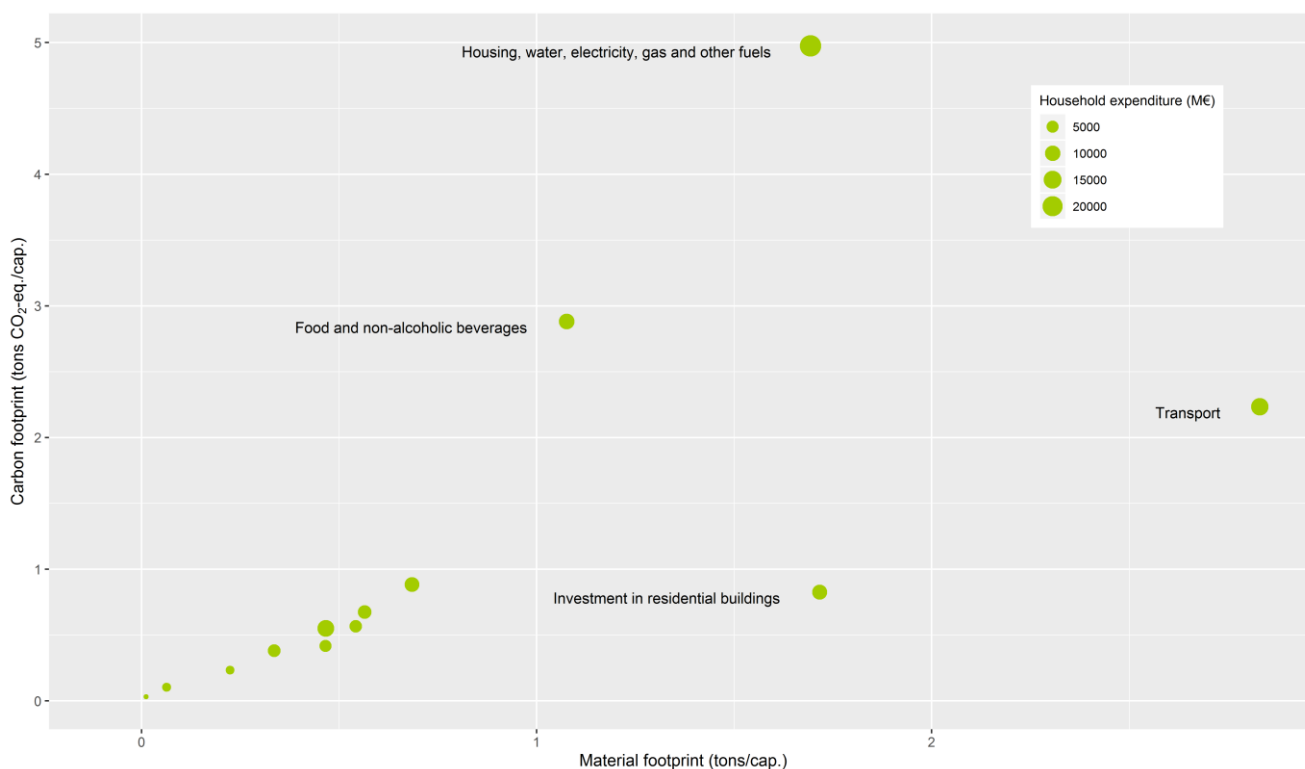
Figures in Mt; data for 2010



The extraction and cultivation of materials caused by Flemish production and consumption in 2010 according to the Flemish IO model. Source: Christis et al. (2019)

MOBILITY, NUTRITION, HOUSING AND CONSUMER GOODS REQUIRE THE MOST MATERIALS

The material and carbon footprint of the consumption by Flemish households is broken down into different areas of consumption (2010 data). 73% of the material footprint of Flemish households is linked to nutrition (including alcoholic beverages and catering), mobility and housing (including investment in housing). Three quarters of the carbon footprint of Flemish households is also linked to these three areas of consumption. Consumer goods (clothing and footwear, upholstery and household appliances, miscellaneous personal items, etc.) account for 16% of the materials and 12% of the carbon footprint.



Carbon and material footprint of Flemish households in 2010 per consumption area according to the Flemish IO model. Source: Vercaesteren et al. (2017) & Christis et al. (2019)

WANT TO KNOW MORE?

More about policy and vision ...

OVAM is committed to dematerialisation and closing material cycles on the local level. This change is a necessity because of several challenges: the scarcity of natural resources, the environmental impact of our current use of materials and the demand for new jobs. In order to arrive at a circular economy, these local commitments must be placed in a broader context: within the various policy areas, with regard to all social actors and beyond the borders of Flanders.

As a knowledge hub for materials management, OVAM is strongly involved in the development and monitoring of measurable indicators for a circular economy. By 2021, the [Circular Economy Policy Research Center](#) will develop a monitor of the circular economy on behalf of [Circular Flanders](#). The research center has already provided a conceptual framework for this Circular Economy (CE) Monitor (Alaerts et al. 2019). In the next step, the research center, together with OVAM, will fill in the monitor with indicators together with the various Flemish policy areas and other stakeholders.

Besides the indicators, also objectives for these indicators should be formulated. In this way, the CE monitor gives a clear direction to the Flemish policy and makes policy evaluation possible. In addition, the monitor also provides awareness and action from all social actors.

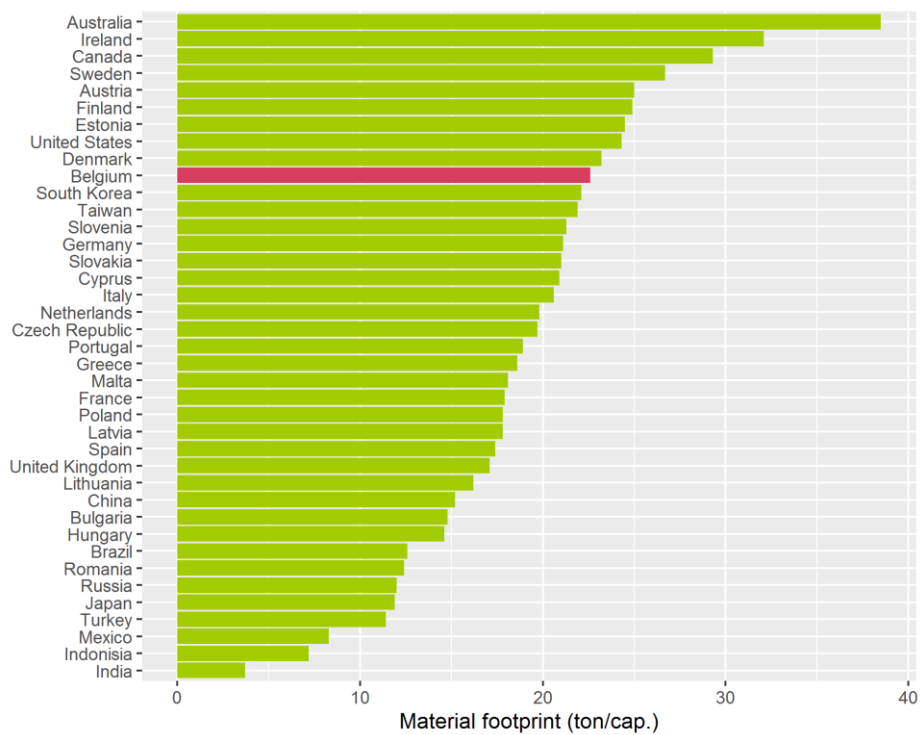
More figures ...

The worldwide extraction of materials in 2017 amounted to more than 90 billion tonnes. Global extraction of raw materials has increased by 20% compared with 2010, and is expected to double again by 2050 (IRP, 2019). The overall extraction per person increased from 11.0 tonnes in 2010 to 12.1 tonnes in 2017 (IRP, 2019 & UN, 2019).

In 2010, Flemish consumption was responsible for only 0.15% of the global extraction of raw materials, but all Flemish people together make up only 0.09% of the world population.

With the global model (EXIOBASE 3), on which the calculation of the Flemish material footprint is based, Giljum et al. (2019) determined the material footprint of several countries for 2010. The material footprint of the Belgian consumption is one of the highest in the world. In general, countries with greater prosperity also have a higher material footprint. Why a specific country does better than another country was not investigated.

The material footprint of the Belgian consumption is one of the highest in the world ...



Material footprint of consumption for some 40 countries in 2010 according to EXIOBASE 3 model. Source: Giljam et al. (2019)

SOURCES

CE Center (2020). Material flow analysis – Flanders 2002-2018. VITO on behalf of the Circular Economy Policy Research Centre, OVAM & EWI. Mol. ce-center.vlaanderen-circulair.be/nl/publicaties/publicatie-2/11-macro-economic-material-flow-indicators-for-flanders-2002-2018

Bringezu S. (2015). Possible Target Corridor for Sustainable Use of Global Material Resources. Resources, vol. 4(1), p. 25-54.

Christis M., Van der Linden A., Vercalsteren A. (VITO) (2019). Materialenimpact van de Vlaamse consumptie – de Materialenvoetafdruk, study carried out on behalf of OVAM. Internal document.

Giljum S., Wieland H., Lutter S., Eisenmenger N., Schandl H., Owen A. The Impacts of Data Deviations between MRIO Models on Material Footprints: A Comparison of EXIOBASE, Eora, and ICIO. Journal of Industrial Ecology, vol. 23(4), p. 946-58.

IRP (2019). Materialflows.net: The Material Flow Analysis Portal. International Resource Panel, United Nations Environment Programme, Nairobi, Kenya. <http://www.materialflows.net/>

IRP (2014). Decoupling natural resource use and environmental impacts from economic growth, A Report of the Working Group on Decoupling to the International Resource Panel. International Resource Panel, United Nations Environment Programme, Nairobi, Kenya, 7 February 2014.

UN (2019). Population Databases: Total Population. United Nations, Department of Economics and Social Affairs, Population Division. <http://www.un.org/en/development/desa/population/publications/database/>

Vercalsteren A., Boonen K., Christis M., Dams Y., Dils E., Geerken T. & Van der Linden A. (VITO), Vander Putten E. (VMM) (2017). Koolstofvoetafdruk van de Vlaamse consumptie, study carried out on behalf of the Flanders Environment Agency (VMM), MIRA. VMM, Aalst, June 2017.