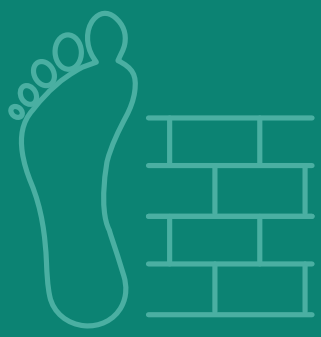
European Environment Agency

8th Environment Action Programme

Raw material consumption: Europe's material footprint



8TH EAP HEADLINE INDICATOR, 2023

European Environment Agency

Europe's material footprint

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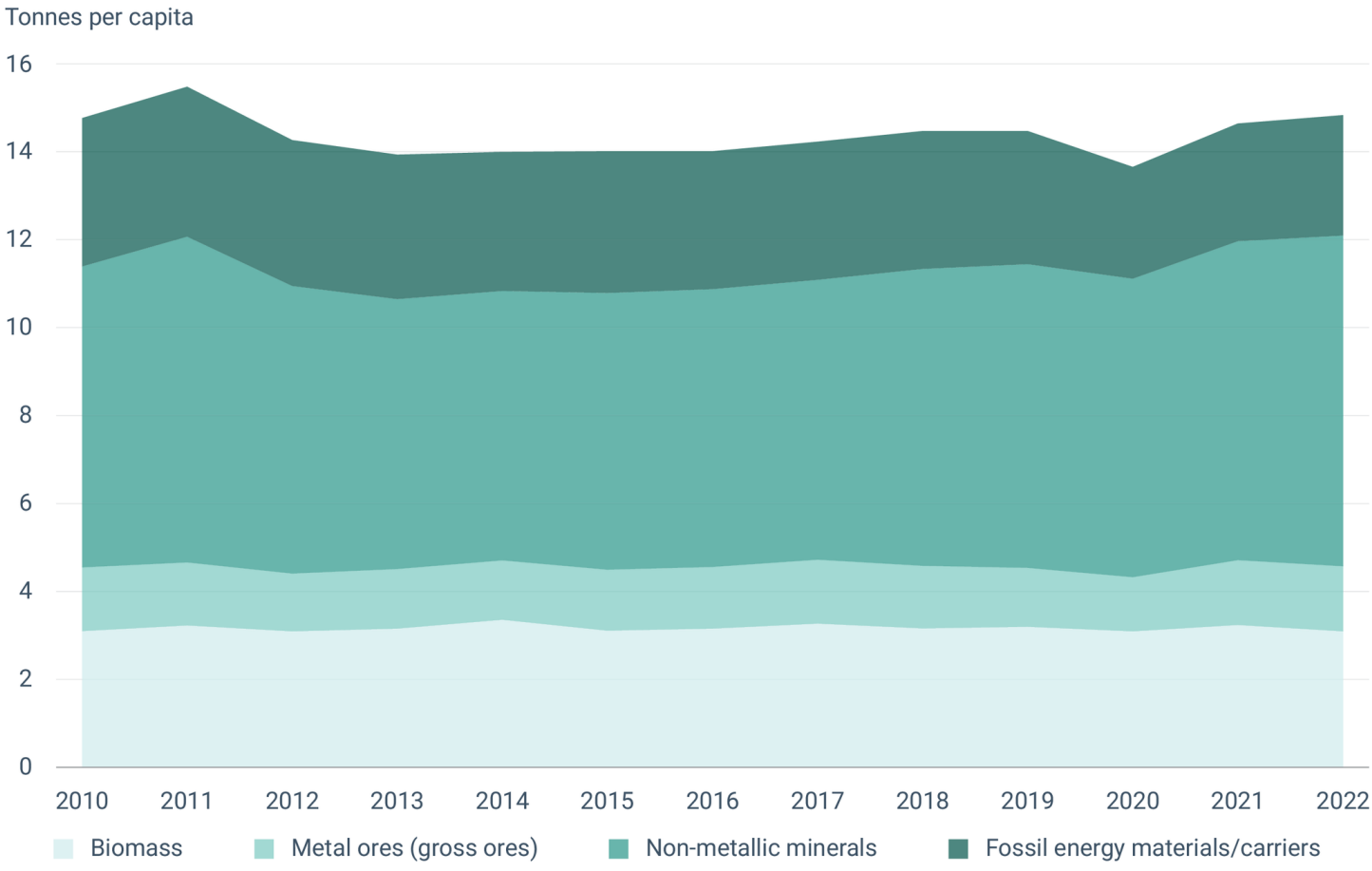
The EU's Eighth Environment Action Programme aims to significantly decrease the EU's material footprint, that is, the amount of raw material extracted to manufacture the goods and services consumed. The per capita material footprint remained stable over the 2010-2022 period. In 2022 the raw material extraction was 14.8 tonnes per capita which is considered not sustainable and higher than the global average. It appears unlikely that the EU will significantly reduce the per capita material footprint in the coming decade as there has been no progress so far, while projections show an increase in the future demand for materials in the EU. Major effort is needed to reduce material extraction and consumption, and switch to goods and services that require less material.

Figure 1. EU material footprint, expressed in tonnes per capita of raw material equivalent per capita



Source: Eurostat.

The EU's material footprint refers to the amount of material extracted from nature, both inside and outside the EU, to manufacture or provide the goods and services consumed by EU citizens. The Eighth Environment Action Programme calls for a significant decrease in the EU's material footprint to safeguard precious natural resources and because the extraction and processing of these resources has significant environmental impacts, such as climate change and biodiversity loss[1].

From 2010 to 2022, the EU per capita material footprint remained stable. In 2020, the material footprint fell markedly by 5.7% to 13.7 tonnes — heavily influenced by the economic slowdown due to the COVID-19 pandemic — but it increased again by 7.2% in 2021. Of the various material groups, consumption of non-metallic minerals is the highest, accounting for 51% of the footprint in 2022; changes in consumption in this group were largely responsible for the overall trend. Biomass was the next largest group (21%), followed by fossil fuels (18%) and metals (10%). The share of fossil fuels has been decreasing (23% in 2010), while the share of non-metallic minerals increased from 46% in 2010. Although non-metallic minerals account for a large part of the total material footprint, they have less of an impact on the environment and climate than metals and fossil fuels, relative to their shares of the material footprint as they are mainly composed of relatively inert material such as gravel, limestone etc. [2].

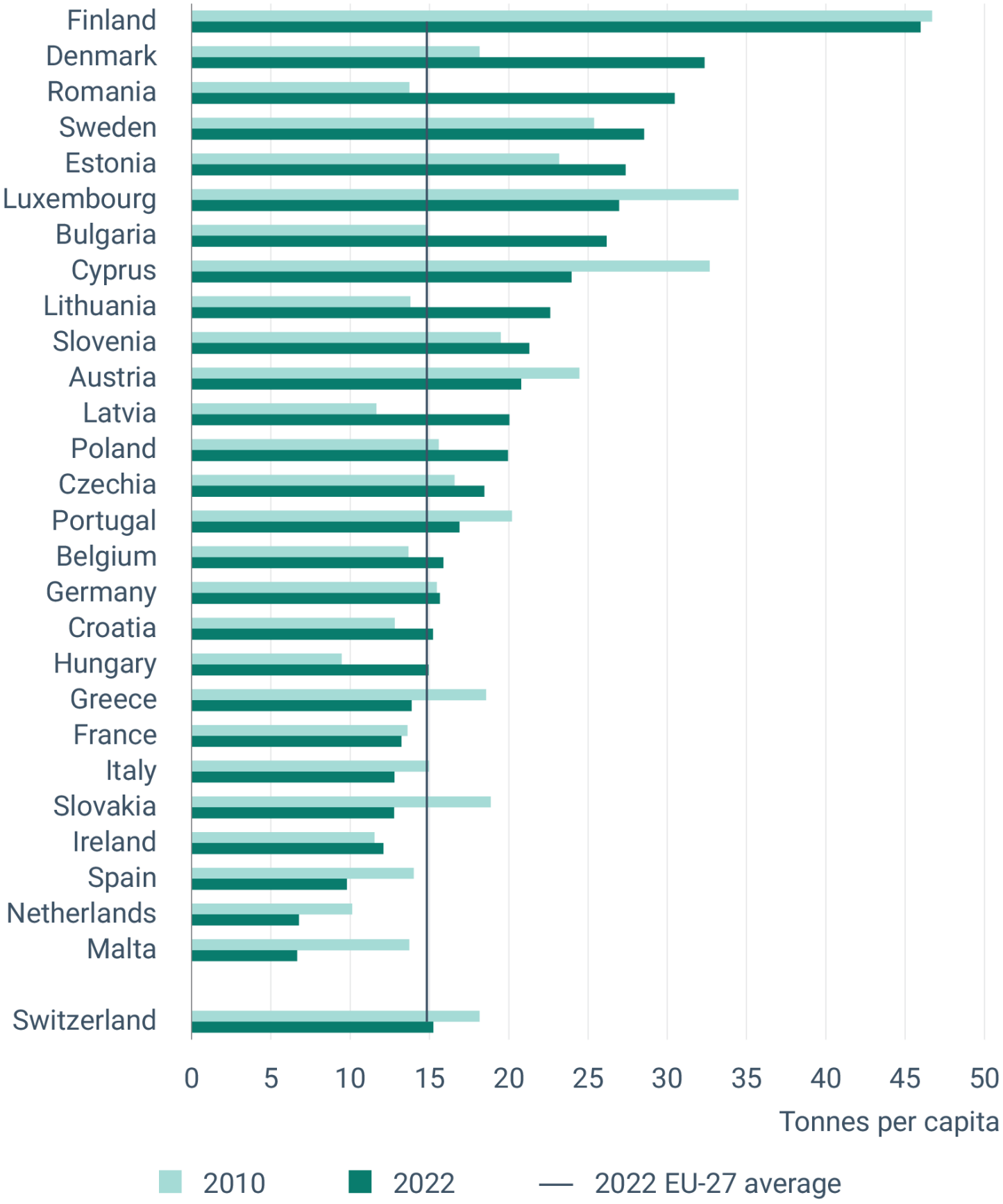
The material footprint provides a comprehensive measure of all materials extracted to satisfy consumption demand in the EU, including materials extracted outside the EU and then imported. The demand for metals and fossil fuels is met mainly by imports, while the demand for biomass and non-metallic minerals is met mainly by domestic extraction (see the EU's Raw Material Information System for more information). The proportion of the material footprint accounted for by imports increased from 48% in 2010 to 51% in 2020. This indicates a growing reliance by the EU on other countries to satisfy its need for materials.

The EU's total material footprint is above the global average and far greater than those of low- and middle-income non-EU countries[3]. This level of resource consumption exceeds the planet's 'safe operating space' for resource extraction[4], meaning that, if the world were to consume resources at the level of the EU, the capacity of the planet to provide these resources would be exceeded.

The material footprint could be reduced by decreasing consumption or choosing goods or services whose production or provision needs less material. Various circular economy policies (as part of the EU circular economy action plan) aim to reduce the need for primary material extraction, by keeping materials in the economy for as long as possible while keeping their value as high as possible, and boosting high-quality recycling.

Discounting the temporary dip in 2020, there has been no other sign of a reduction in the material footprint since 2010. Furthermore, available projections for material use, such as the OECD Global Material Resources Outlook, predict an increased future demand for materials in the EU by 2030 [5]. Therefore, at present, it appears unlikely that the EU will significantly reduce its material footprint in the coming decade. It should, however, be noted that the OECD outlook results predate, and therefore do not reflect, the various policies that have recently been adopted by the EU and which aim to temper demand for primary material extraction.

Figure 2. EU Member States' material footprints in 2010 and 2022



Source: Eurostat.

Material footprints vary substantially across EU countries, from 6.6 tonnes/capita in Malta to 46.0 tonnes/capita in Finland. Since 2010, 13 of the 27 Member States have reduced their material footprints, with Malta, the Netherlands, Slovakia and Spain reducing their footprints by more than 30%. On the other

hand, Romania, Denmark, Bulgaria, Latvia, Lithuania and Hungary's material footprints have increased by more than 50%.

Switzerland is the only non-EU country that is a member of the European Environment Agency and for which data are available, and it reduced its material footprint between 2010 and 2022.

Differences in the material footprints among countries are difficult to explain, as they are based on citizens' consumption patterns and also on the structure and efficiency of the economy. However, elements such as high levels of circularity (see EEA indicator on the circular material use rate) in the national economy are particularly important. High levels of circularity partly explain the low footprint value in, for instance, the Netherlands, which has the second lowest material footprint in the EU and also the highest circular material use rate.

Supporting information

Definition

The material footprint indicator is based on two components:

· domestic extraction of materials, by material group, as reported to Eurostat

· estimates of raw material equivalents (RMEs) for imports and exports.

The term 'RME' indicates the full accounting for resources extracted to produce final products. While, for domestic extraction, RMEs equal domestic material extraction, RMEs need to be estimated for imports to the EU of raw materials, and semi-finished and finished products.

The difference in the calculations, compared with the more well-known domestic material consumption (DMC) is that the material footprint includes all materials needed to produce the products imported into the EU, while the DMC only includes the weight of imports when these cross the EU border. The material footprint, therefore, is more comprehensive in revealing the actual materials used by EU citizens. For example, in 2019, imports made up 27% of DMC, while they made up 53% of the material footprint.

Methodology

The Eurostat-derived data are described in Eurostat (2021)[6]. Eurostat nowcasts material footprint values for 2022.

For country data, gap filling was performed for (1) missing values at the start or end of time series, where the value was assumed equal to the first available value; and (2) missing values between reported values, calculated by extrapolation.

Policy/environmental relevance

The European Green Deal[7] explicitly calls for a decoupling of economic growth from resource extraction, which translates into continuously decreasing resource consumption in a growing economy. The material footprint accounts for a life cycle approach to material extraction, accounting not only for the weight of materials imported/exported to the EU, but also for the materials needed to produce these imports/exports. The footprint provides a fuller picture of the resources needed to satisfy EU demand.

This indicator is a headline indicator for monitoring progress towards the 8th Environment Action Programme (8th EAP). It contributes to monitoring aspects of the 8th EAP Article 3.s that requires 'significantly decreasing the Union's material and consumption footprints to bring them into planetary boundaries as soon as possible, including through the introduction of Union 2030 reduction targets, as appropriate'. It also helps monitor progress towards achieving, by 2030, aspects of the 8th EAP priority objective set out in Article 2.2.a: 'advancing towards a well-being economy that gives back to the planet more than it takes and accelerating the transition to a non-toxic circular economy, where growth is regenerative, resources are used efficiently and sustainably, and the waste hierarchy is applied'. The European Commission Communication on the 8th EAP monitoring framework specifies that this indicator should be used to monitor that the EU 'significantly decrease the EU's material footprint, by reducing the amount of raw material needed to produce the products consumed in the Union.'

Accuracy and uncertainties

No uncertainties have been specified.

Data sources and providers

- Material footprints - main indicators (env_ac_rme), Statistical Office of the European Union (Eurostat)
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Metadata

DPSIR

State

Topics

Waste and recycling # Resource use and materials # Sustainability challenges

Tags

Material extraction # WST007 # Material footprint # Consumption # 8th EAP

Temporal coverage

2010-2022

Geographic coverage

Austria
Belgium
Bulgaria
Croatia
Cyprus
Czechia
Denmark
Estonia
Finland
France
Germany
Greece
Hungary
Ireland

Italy
Latvia
Lithuania
Luxembourg
Malta
Netherlands
Poland
Portugal
Romania
Slovakia
Slovenia
Spain
Sweden

Typology

Descriptive indicator (Type A - What is happening to the environment and to humans?)

UN SDGs

Responsible consumption and production

Unit of measure

Tonnes per capita

Frequency of dissemination

Once a year

Contact

info@eea.europa.eu

References and footnotes

1. IRP, 2019, *Global Resources Outlook 2019: Natural Resources for the Future We Want*, International Resource Panel, Nairobi, Kenya.
2. IRP, 2019, 'Global Resources Outlook 2019: Natural Resources for the Future We Want', (https://www.resourcepanel.org/reports/global-resources-outlook) accessed July 4, 2022.
3. WU Vienna, 2022, 'Country profiles', *Visualisations based upon the UN IRP Global Material Flows Database, Vienna University of Economics and Business* (http://www.materialflows.net/visualisation-centre/country-profiles/) accessed June 26, 2022.
4. EC, 2022, 'Consumption Footprint Platform', *European Platform on Life Cycle Assessment, European Commission* (https://eplca.jrc.ec.europa.eu/ConsumptionFootprintPlatform.html) accessed June 26, 2022.

5. The OECD projections refer to the same material categories as the ones used in this indicator. However, the OECD refers to material use, not to material footprint. Material use is defined as domestic material consumption (DMC) which is calculated by the extraction of materials domestically plus imports minus exports. The difference with the material footprint approach is that DMC accounts only for the physical weight of goods imported at the point of entrance into a territory (in our case, the EU). The material footprint, on the other hand, accounts for the full weight of materials extracted in the value chain abroad in order to construct the goods imported. Therefore, the material footprint of a territory (e.g. the EU) is always higher than the DMC. However, the expected increase in the EU's material footprint based on the OECD projections is still valid, because these projections predict increases in material use in all world regions. ↵
6. Eurostat, 2021, 'Population on 1 January', *Data Browser* (https://ec.europa.eu/eurostat/databrowser/view/tps00001/default/table?lang=en) accessed March 4, 2022. ↵
7. EC, 2022, 'A European Green Deal: striving to be the first climate-neutral continent', *European Commission* (https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en) accessed June 27, 2022. ↵