

The use of natural resources

Resources report for Germany 2022

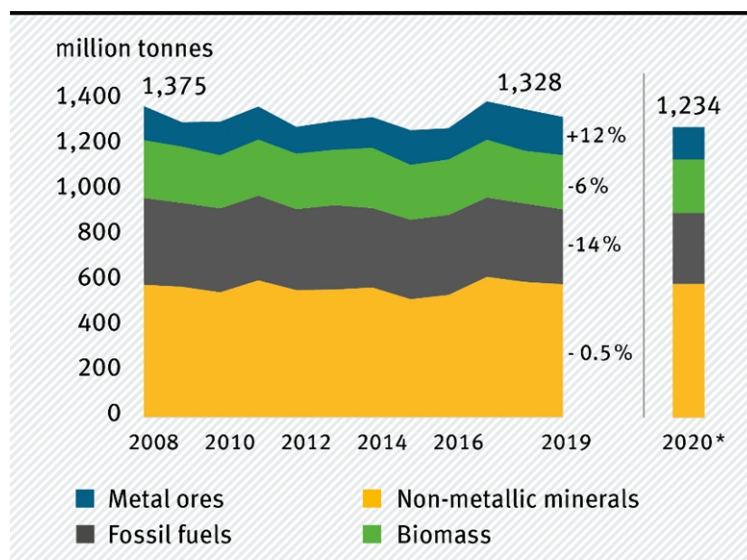
Since 2016, the German Environment Agency (UBA) has regularly published a report on the situation regarding the use of natural resources in Germany. The UBA resource report examines the diverse **connections** between raw material consumption, raw material extraction, global trade and economic development, global trade and economic development and also takes a look at flowing resources such as wind, sun and water as well as the environmental impacts of resource use. The next and fourth resource report for Germany will be published in **autumn 2026** and will focus on the topic of 'Circular Economy'.



Raw materials for consumption

Every German carries an ecological rucksack of around 16 tonnes per capita per year. In 2019, total raw material consumption in Germany was around 1.3 billion tonnes (minerals, fossil fuels, biomass and metal ores). Raw material consumption (RMC) has remained almost unchanged in Germany since 2008 (see Fig. 1). In 2018, per capita RMC was around 13 % above the EU average and around 30 % above the global average (12 tonnes). The food, housing and mobility sectors account for around three quarters of German raw material consumption.

Figure 1: Development of the RMC by raw material group 2008-2020



* Preliminary estimate based on changes in direct material flows as reported by Eurostat, 2021.

Source: UBA Resources Report 2022

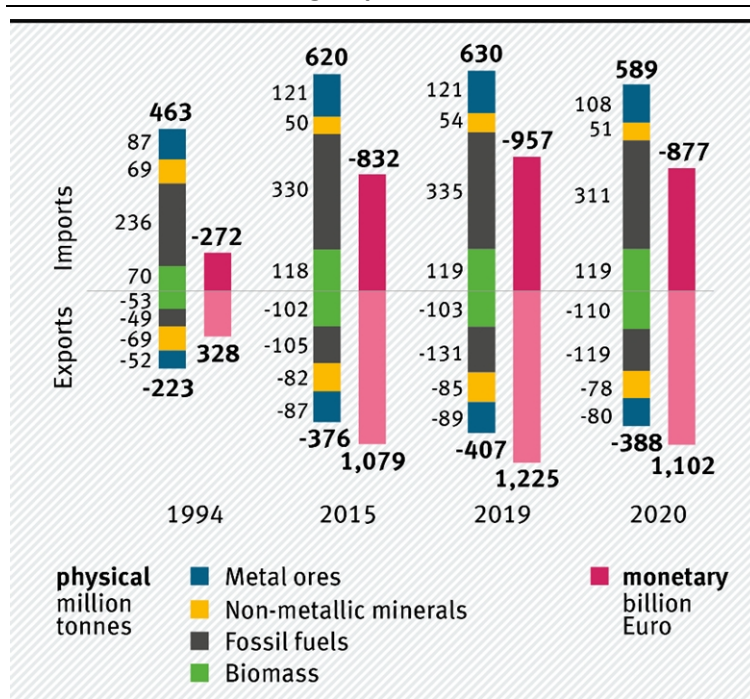
Domestic raw material extraction

Raw material consumption is covered by domestic extraction and imports. In 2019, 945 million tonnes of raw materials were extracted in Germany, around 80 % of which were non-renewable raw materials, including 63 % minerals and 15 % fossil fuels. The total amount of raw materials extracted in Germany between 1994 and 2019 fell by **almost a third**. The extraction of fossil fuels fell by 50 % and that of minerals by 30 %. By contrast, the extraction of biomass (agriculture, forestry and animal biomass) increased by 10 %. Germany is almost entirely dependent on imports for metal ores. The most important federal states for the extraction of raw materials are North Rhine-Westphalia, Bavaria and Baden-Württemberg (together accounting for around 50 % of domestic extraction).

Share of global raw materials trade

In 2019, Germany imported a total of 630 million tonnes of raw materials and exported 407 million tonnes. In contrast to the monetary units, Germany therefore had a physical **import surplus** (see Fig. 2). If the raw material rucksacks are also considered, imports amounted to around 1.6 billion tonnes and exports to 1.2 billion tonnes.

Figure 2: Development of direct imports and exports in Germany - physical and monetary by material groups, 1994-2020



The sum of imports and exports contains "other goods". The shares of the raw material groups, however, refer to imports and exports excluding "other goods".

Source: UBA Resources Report 2022

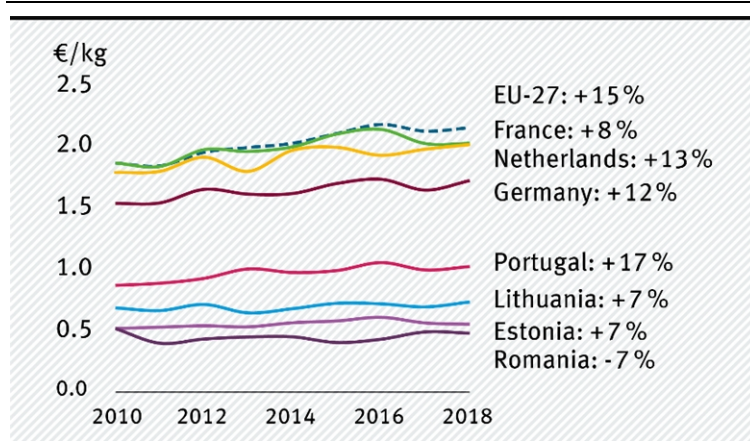
Germany trades with many countries. The European Union played the largest role, accounting for 62 % of the physical trade volume (2020). Of the G7 countries, France was the most important trading partner. East Asia also played an increasingly important role.

Raw materials for the economy

Raw material input (RMI) in the German economy totalled 2.5 billion tonnes in 2019. The RMI considers raw material extraction in Germany and abroad for the production of goods for final demand in Germany and for export. Overall, it changed only **slightly** compared to 2010 (+ 4%). The most important groups are products from metal ores and minerals (22%), products from fossil raw materials (13%) as well as construction and products from biomass (12% each).

Total raw material productivity is a measure of the efficiency of raw material utilisation and also includes raw materials required for the production of imported goods. The indicator is therefore an important measure of the **decoupling** of economic growth from raw material consumption and its environmental impact. In Germany, total raw material productivity increased by 12% between 2010 and 2018 (see Fig. 3). This was mainly due to the growth in GDP and imports. Raw material uses also increased, but to a lesser extent. Therefore, only a **relative**, but not an absolute decoupling was achieved

Figure 3: Development of total raw material productivity in an EU comparison



Source: UBA Resources Report 2022

The role of waste in the circular economy

Closed material cycles in production and consumption are an important part of strategies for resource conservation and climate protection. A circular economy is aimed at recycling and the avoidance and recycling of waste in order to **reduce** the need for primary raw materials.

The use of secondary raw materials in Germany (2013) already saved around 12% (**DERec**, Direct Effects of Recovery indicator) of the direct raw material input (RMI). If the global supply chains are also considered, the use of raw materials in Germany is even reduced by around 15 % (**DIERec** indicator, Direct and Indirect Effects of Recovery).

Flowing resources

Wind, sun and water make an important contribution to the energy and resource transition in Germany. Their use reduces dependence on fossil fuels and protects the environment.

Since 1990, primary energy production from renewable resources in Germany has increased more than tenfold and totalled 789 petajoules in 2019. This is the highest figure in the EU member states. Wind power and photovoltaics play the biggest role.

However, their use is also associated with the use of natural raw materials and resources, although there are major differences. Life cycle analyses have shown that the provision of one unit of electricity from lignite requires ten times more raw materials than the production of wind power. But even this is not available at 'ecological zero cost': for every kilowatt hour of electricity from wind energy (on land), around 100 grams of raw materials are required in upstream processes. The figure for photovoltaics is 230 grams.

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