

RESOURCE EFFICIENCY FACT SHEET

Key messages

- **Resource efficiency, under the circular economy umbrella, is good for** climate, the environment and for the economy.
- **For businesses**, it can save money, while enhancing supply- and resource price stability, driving innovation and strengthening competitiveness (greener products and processes).
- The EU-27's **resource productivity grew by 36.5% in 2000-2019** via a 30% rise in GDP accompanied by a 4.4% drop in domestic material consumption (DMC), indicating an **absolute decoupling** between GDP and resource use in the period. Most of the productivity growth took however place post-2008, along with a **lower level of domestic material consumption** due to the crisis.
- While the economy showed quick recovery, in particular as of 2013, the **domestic material consumption remained low**, at 90-95% of that of year 2000 in the 2012-2019 period.

Background

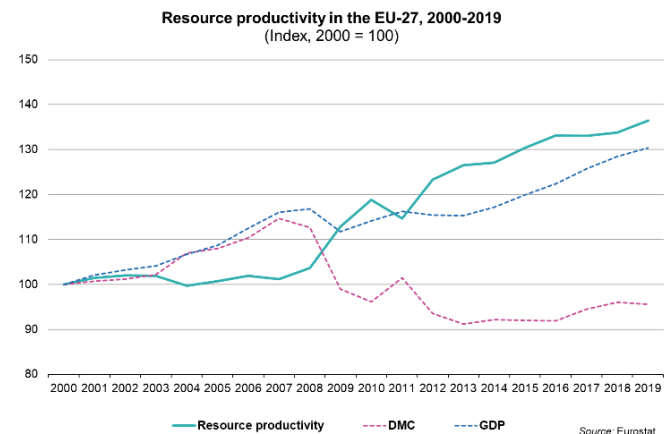
A sustainable future envisages a carbon-neutral economy via circular solutions where **economic growth is decoupled from resource use**¹ – ‘doing more with less’. It is estimated that resource efficiency needs to increase 4-10-fold by 2050 to meet global demand while to stay and operate within planetary boundaries. **Key sectors** with high potential are food, housing and mobility, representing 60% of EU households budget and 80% of the resource consumption.²

The EU's **resource efficiency** initiative³ has been taken forward by the **circular economy** initiative, i.e. the 2015 Circular Economy Action Plan⁴, the 2018 Circular Economy Monitoring Framework⁵ and the **2020 Circular Economy Action Plan (CEAP)**⁶ – this latter being one of the main pillars of the European Green Deal, setting Europe's vision to achieve a climate-neutral, resource-efficient and circular economy. In line with the **European Green Deal** priorities, the 2020 Action Plan focuses on the design and production for a circular economy, with the aim to ensure that the resources used are kept in the economy for as long as possible. To achieve climate-neutrality by 2050, to preserve our natural environment, and to strengthen our economic competitiveness, requires a fully circular economy. Today, the EU's economy is still mostly linear, with only 12% of secondary materials and resources brought back into the economy. The EU needs to accelerate the transition towards a regenerative growth model that gives back to the planet more than

it takes, and to reduce its consumption footprint by doubling its circular material use rate in a decade. Resource efficiency is also promoted at the **global level** (OECD, UNEP's International Resource Panel) to build evidence base and contribute to knowledge-sharing.

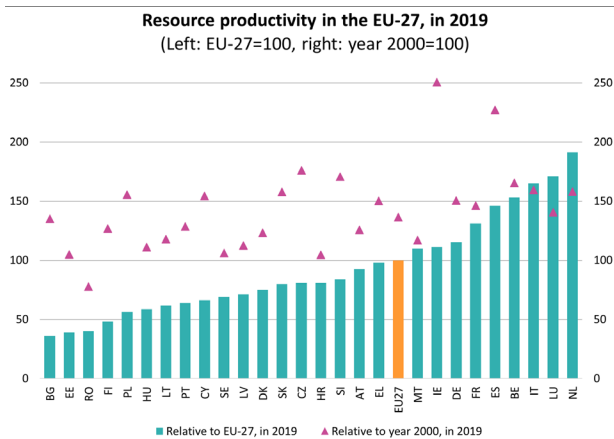
Resource productivity

In 2000-2019, the EU-27's **resource productivity**⁷ (RP) – the lead indicator of resource efficiency – **improved by 36.5%**, corresponding to a **1.6% average annual growth** in the period (at DMC basis).



Within DMC, domestic extraction and imports shrank post-2008, while exports expanded, improving the EU's export-orientation. During 2000-2019, **resource productivity growth mostly took place after 2008**, as GDP started to recover quickly (due to services), while DMC remained low. After sharp falls in material consumption (12.1% in 2009 and 7.7% in 2012) – mostly in material-intensive manufacturing and construction – DMC has been stagnating at 90-96% of the level of year 2000 (with slight increases in 2017-18).⁸ The 36.5% resource productivity improvement arose from a 30.4% GDP rise and a 4.4% drop in domestic material use in 2000-2019, showing an **absolute decoupling** of GDP from resource use overall – with half of the Member States also having absolute decoupling.

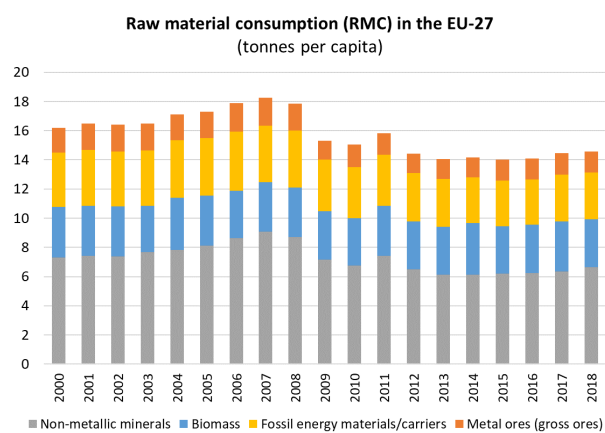
Resource productivity varies much in **EU Member States**: industrial economies tend to consume more (while service economies less) resources per units of GDP. During 2000-2019, 2 Member States doubled resource productivity (Ireland, Spain), while half of the Member States had increases of 50-80%. In absolute terms, the EU-27 middle value was 2.2 PPS/kg in 2019, with the highest values in the Netherlands (4.2 PPS/kg), and in Luxembourg, Italy, Spain and Belgium (in the range of 3-4 PPS/kg each) and with the lowest values (under 1 PPS/kg) in Estonia, Romania and Bulgaria.



Material use per capita

Material resources (from domestic extraction and imports) can be used within the economy or exported (Domestic Material Consumption, DMC). The EU-27's **DMC per capita** grew from 15.4 tonnes/capita (t/cap.) in 2000 to over 17 tonnes/capita by 2007-2008, followed by sharp falls post-2008 due to drops in domestic extraction of non-metallic minerals (sand and gravel), and a **stagnation** around 14 tonnes/capita. In 2019, it was the lowest in Italy (8.1 t/cap.) with Spain, the Netherlands and Greece also under 10 t/cap., while the highest values were observed in Finland and Estonia (over 30 t/cap. each). 34-35t). Half of the EU-27's domestic material use (DMC) is **non-metallic minerals**, biomass accounts for a quarter, fossil energy for 20% and metal ores for 5% (2019). Consumption in these categories has varied over time, with non-metallic minerals the most dependent on economic activity.

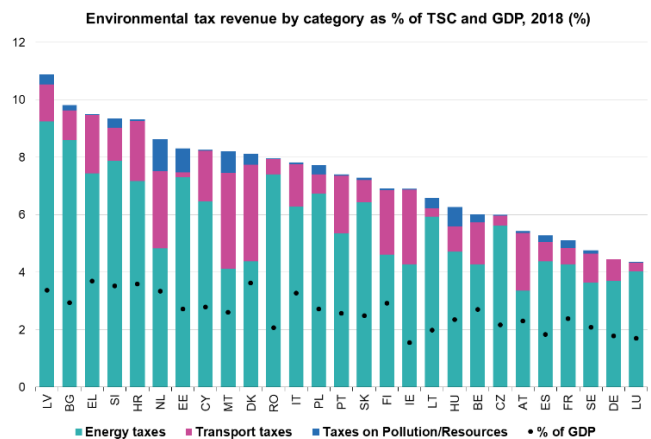
The EU-27's **raw material consumption (RMC)**, expressing traded material components (imports, exports) in raw material equivalents, was 14.6 tonnes / capita in 2018 (EU-27). RMC grew from 16 t/cap. in 2000 to over 18 t/cap. in 2007, followed by significant falls post-2008 and long weak period, with slight increases as of 2017-18.⁹



Related policy-challenges

Incorporating external costs in prices help shift towards material efficiency cutting environmental pressures, to which, more flexible **market-based instruments (MBIs)** can be less costly than regulation.

Despite this, the use of environmental taxation for instance, is still limited.¹⁰ Since the 2000s, the **EU's environmental taxes** are around 2.5% of GDP and 6-7% of total taxes: in 2018, they were 2.4% and 6% respectively, with a total environmental tax revenue of EUR 324.6 billion in the EU-27. Environmental taxes are dominated by energy taxes, with 77.8% of the total in 2018, followed by transport- (19.1%) and resources/pollution (3.3%) taxes. Energy tax mostly arise from transport fuel (two-thirds on average).¹¹ In EU Member States,, energy taxes range between 50-94% of total environmental taxes, while pollution/resources taxes between 0-13%.



Eco-innovation is key to smart and sustainable growth and to global competitiveness. In 2019, the best eco-innovation performers in the EU-27 were Luxemburg, Denmark, Finland, Sweden, Austria and Germany. The EU-27's R&D expenditure was EUR 294.5 billion in 2018, equal to 2.18% of GDP, still at a distance from the 3% set out in the Europe 2020 Strategy and from global competitors. Japan has R&D intensities around 3.3%, the US at 2.8%, while China has caught up, reaching 2.14% by 2018. South Korea's ratio increased to 4.8% by 2018.¹² R&D expenditure is driven by the business sector and the business sector's R&D provides 66.5% of the total (of the EU-27), while this reaches 80% for some global competitors. In 2019, 2.3% of total public R&D was spent directly on the environment (EUR 2.1 billion, EU-27), with further 27.6% also partly relevant (including 2.3% on transport, 4.5% on energy, 10.2% on industry and technology, 7.5% on health and 3.1% on agriculture).

The cheapest and cleanest energy is the energy that was not produced, highlighting the importance of energy saving. The EU set an **energy efficiency** improvement target of 20% by 2020 and 32.5% by 2030. 2020 targets are expected to bring additional savings of EUR 70 billion on energy imports, at least 400,000 additional jobs and +1.3% GDP increase. A 40% energy saving could raise GDP by 4.1%, employment by 2.1% (3 million jobs)¹³ provided that spare capacities and the scale of additional investments are available without crowding-out¹⁴. After an increasing trend since the early 1990s, the EU-27's primary and final energy consumption peaked in 2006, followed by a strong decline until 2014. From 2015, the EU-27's energy consumption increased again, reaching 1,375.7 Mtoe primary- and 989.5 Mtoe final energy consumption in 2018. For **primary consumption**, this is a **4.9% distance**

to the 2020- and 22% difference to the 2030 target. For **final energy consumption**, this means a slightly less, **3.2% distance to the 2020 target**, and a 17% difference to the 2030 target.¹⁵ In 2018, 30.5% of the EU-27's final energy consumption belonged to transport, 26.1% to households, 25.8% to industry, 14.2% to services, 2.9% to agriculture and forestry. The planned decreases in energy consumption are being implemented through a range of measures, including e-mobility, renewable electricity and green hydrogen, a renovation wave of buildings, more efficient industrial boilers etc.

Over a decade, the EU-27's **energy intensity** (gross inland energy use to GDP) improved by 15.2% on average in 2018 compared to 2008, with the highest improvement in Ireland (42.4%) and Romania (31.3%). Energy savings are also significant from the **eco-design** perspective of the circular economy: the last package with 10 eco-design and 6 energy labelling regulations, is expected to deliver a total of 167 TWh of final energy savings per year by 2030, equivalent to the annual energy consumption of Denmark.

Benefits and potential

Resource efficiency can lead to financial savings, reduced supply risks- and footprint, innovation and market opportunities – saving at least EUR 600 billion for EU businesses¹⁶, while combined with circular measures, benefits are much higher. Resource productivity improvements of 1-2% per annum (with conservative, historical technology change assumptions) can lead to positive GDP impacts up to 1% and to employment impacts up to 0.5% (through MBI revenues, e.g. material taxes shifted from labour costs) by 2030¹⁷, while higher resource productivity increases (2-3%) are also possible, enabled by faster technology change and higher levels of

circularity, leading to increased socio-economic benefits.

Recent estimates show that resource productivity and circular economy combined in **3 key sectors – mobility, food and built environment** that capture 60% of an average EU household budget and 80% of resource consumption –, with annual resource productivity improvements of 1-3%, can lead to an additional GDP growth of up to 7% by 2030 with positive impacts on employment (up to 2 million additional jobs by 2030), while reducing raw material consumption by an additional 10%, and annual CO₂ emissions by 17% compared to current patterns. An additional investment opportunity of EUR 320 billion in the 3 key sectors can also be unlocked (EUR 30-35 billion p.a.), improving the quality of life in the EU, as negative externalities could fall up to 26% by 2030.¹⁸

The **'Towards Sustainability Scenario'** of the International Resource Panel (IRP)¹⁹ shows that resource efficiency and sustainable consumption and production can slow resource use dynamics significantly, so that incomes and other well-being indicators improve, while key environmental pressures fall. Global resource productivity can increase by 27% to 2060, and decoupling can boost economic growth by 8% over historical trends, outweighing decarbonisation costs and delivering a more fair income distribution and access to resources. Resource efficiency can reduce GHG emissions by 19% and help protect and restore native habitats.

Private investment in the circular economy sectors of the EU-27 attracted EUR 15 billion **private investment** in 2017, provided EUR 125.8 billion added value and 3.5 million jobs, yet most of the circular economy's full potential – concentrating at circular design, and products, waste prevention, durability and reuse, circular business models, efficiencies and synergies – is still to be unlocked.

- 1 COM(2019)640 – European Green Deal.
- 2 Growth within: A circular economy vision for a competitive Europe. EMF and McKinsey, 2015.
- 3 Roadmap: COM(2011)571. http://ec.europa.eu/environment/resource_efficiency/about/roadmap/index_en.htm
- 4 Closing the loop – An EU action plan for the Circular Economy. COM(2015)614.
- 5 A monitoring framework for the circular economy, COM(2018)29.
- 6 COM(2020) 98 – A new Circular Economy Action Plan. For a cleaner and more competitive Europe.
- 7 Resource productivity on DMC basis refers to GDP/DMC, while on RMC basis to GDP/RMC.
- 8 Resource productivity statistics. Statistics Explained, 2018, 2019, 2020. Eurostat.
- 9 Material flow accounts and resource productivity. Statistics Explained 2018, 2019, 2020. Eurostat.
- 10 Rosenstock (2014), Environmental Taxation within the European Union. Cyprus Economic Policy Review, 2014.
- 11 Environmental tax statistics. Statistics Explained. Eurostat, EU Commission, 2018, 2019, 2020.
- 12 <https://data.worldbank.org/indicator/GB.XPD.RSDV.GD.ZS?locations=KR>
- 13 Impact assessment for the Proposal ... amending Directive 2012/27/EU on Energy Efficiency. SWD(2016)405.
- 14 The macro-level and sectoral impacts of Energy Efficiency policies. Cambridge Econometrics, EZ, SQ, 2017.
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- 16 The opportunities to business of improving resource efficiency. AMEC, 2013.
- 17 Modelling economic and environmental impacts of raw material consumption. Cambridge Econometrics, 2014. and Links between production, the environment and environmental policy. Cambridge Econometrics, 2019.
- 18 Growth within: A circular economy vision for a competitive Europe. EMF and McKinsey, 2015. and Achieving 'Growth within', SystemIQ, SUN, EMF, 2017.
- 19 Global Resource Outlook 2019, IRP. <https://www.resourcepanel.org/file/1161/download?token=gnbLydMn>

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