

## EU's Resource Productivity on the increase

**EU's Resource Productivity has increased by 17% in the period 2000 until 2009.**

A resource efficient Europe is one flagship of the Europe 2020 strategy<sup>1</sup> aiming at a shift towards a resource-efficient, low-carbon economy to achieve sustainable growth.

The leading indicator assigned to this policy initiative is termed "*Resource Productivity*".

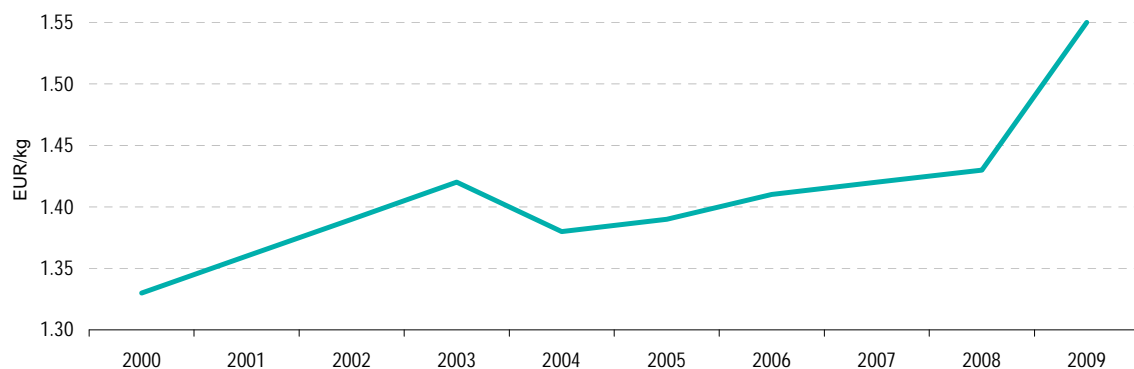
It is the ratio of the volume of gross domestic product (GDP) over domestic material consumption (DMC) and is regularly produced and published by Eurostat.<sup>2</sup>

### Resource Productivity of the EU-27 economy has been increasing in the period 2000-2009

Resource Productivity – measured as the volume of Gross Domestic Product in market prices (GDP)<sup>3</sup> over Domestic Material Consumption (DMC) – of the EU-27 economy increased from 1.33 EUR per kilogramme of DMC in 2000 to 1.55 EUR/kg in the year 2009. This corresponds to an average annual increase of about 1.6 %. The average annual Resource Productivity growth rate was slightly

above the volume growth rate of GDP (around 1.2 %). In 2009 there was a big increase in resource productivity caused by a fall of 11 % in DMC, as explained in the rest of this Statistics in focus.

**Figure 1: Resource Productivity EU-27, GDP\*/DMC, 2000-2009**  
(EUR per kg)



\* Gross Domestic Product in chain-linked volumes, reference year 2005; suitable for comparing a single country over time.

<sup>1</sup> [http://ec.europa.eu/europe2020/index\\_en.htm](http://ec.europa.eu/europe2020/index_en.htm) and [http://ec.europa.eu/resource-efficient-europe/index\\_en.htm](http://ec.europa.eu/resource-efficient-europe/index_en.htm)

<sup>2</sup> <http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&plugin=1&language=en&pcode=tsdpc100>

<sup>3</sup> GDP expressed as chain-linked volume, i.e. without inflation.

However, the development of EU's Resource Productivity over time has not been steady also because the last year of the reporting period was a year of economic recession.<sup>1</sup> After a constant increase between 2000 and 2003, resource productivity dropped significantly in 2004. From there, it continued its constant growth path until

2008, after which, from 2008 to 2009, it leapt from 1.43 to 1.55 EUR/kg. The economic crisis in 2009 affected the material-intensive industries of manufacturing and construction much more than the services industries. The DMC declined by more than 11 % between 2008 and 2009, i.e. dropping much more than GDP.

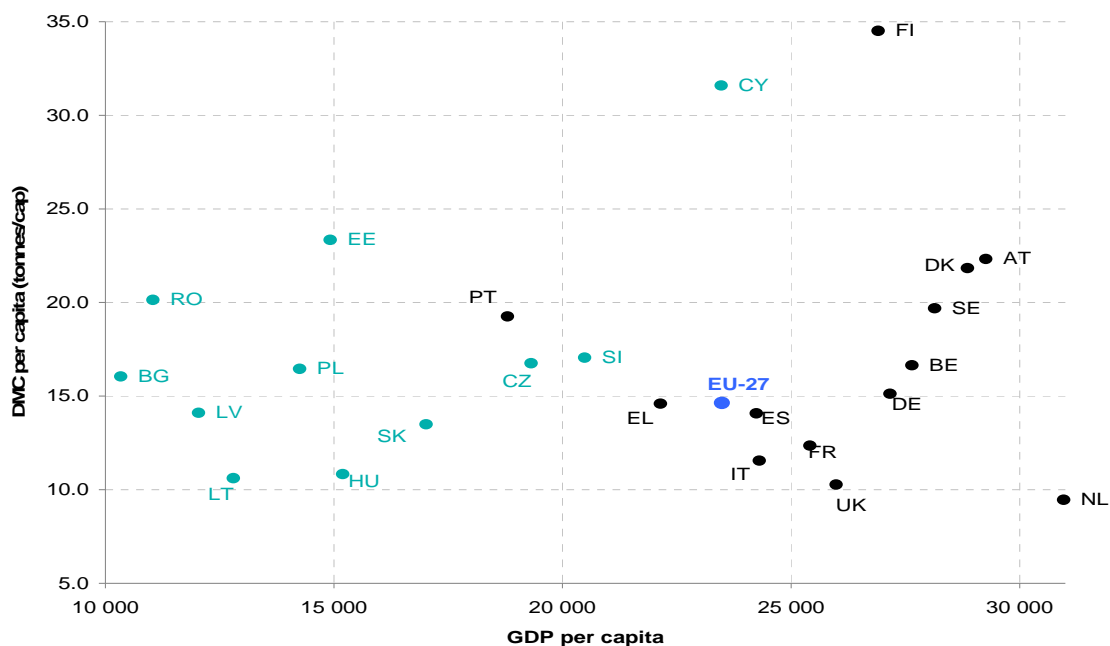
## Resource Productivity varies across Member States

For comparisons across countries, Resource Productivity is measured as Gross Domestic Product (GDP) expressed in PPS<sup>2</sup> over Domestic Material Consumption (DMC). In 2009, this Resource Productivity amounted to 1.60 PPS/kg for the aggregated EU-27 economy. The ratio varies considerably across Member States from 0.55 PPS/kg in Romania up to 3.28 PPS/kg in the Netherlands.<sup>3</sup>

The graph below (Figure 2) plotting DMC against GDP reveals that the variation in Resource Productivity (see e.g. last column in Table 1) is partly influenced by different GDP levels or stages

of economic development. Figure 2 shows that countries can be roughly divided into two groups as regards GDP levels and Resource Productivity: the first country group with GDP above 20 000 PPS/capita also shows higher Resource Productivities. The second group with GDP levels below 20 000 PPS/capita shows lower Resource Productivities. But for both country groupings, we find DMC more or less in the same range of about 10-23 tonnes/capita (excluding outliers such as Ireland, Luxembourg, and Malta).

**Figure 2: Resource Productivity, cross country comparison, 2009**  
Outliers excluded (IE, LU, MT)



Source: Eurostat (online data codes: [nama\\_gdp\\_c](#), [demo\\_gind](#), [env\\_ac\\_mfa](#))

<sup>1</sup> The EU-27 economy shrank by more than 4 % between 2008 and 2009.

<sup>2</sup> GDP expressed in Purchasing Power Standard (PPS) which levels out different price levels in the Member States and hence is better suited to compare GDP across countries. Purchasing Power Parities (PPPs) are indicators of price level differences across countries. PPPs tell us how many currency units a given quantity of goods and services costs in different countries. PPPs can thus be used as currency conversion rates to convert expenditures expressed in national currencies into an artificial common currency, the Purchasing Power Standard, eliminating the effect of price level differences across countries.

<sup>3</sup> Malta has a ratio of 5.09 PPS/kg; however the DMC of Malta is extraordinarily low.

Table 1: Resource Productivity\*, cross country comparison, 2009

	2009			
	GDP <sub>PPS</sub> per capita	DMC per capita	Resource Productivity - GDP <sub>PPS</sub> /DMC	
	(Purchasing Power Standard (PPS) per capita)	(tonnes per capita)	(PPS per Kilogram)	index: EU-27 = 100
<b>EU-27</b>	23 487	14.6	1.60	100
<b>Belgium</b>	27 645	16.6	1.66	104
<b>Bulgaria</b>	10 339	16.1	0.64	40
<b>Czech Republic</b>	19 315	16.8	1.15	72
<b>Denmark</b>	28 862	21.8	1.32	83
<b>Germany</b>	27 162	15.1	1.80	113
<b>Estonia</b>	14 917	23.3	0.64	40
<b>Ireland</b>	30 023	50.3	0.60	38
<b>Greece</b>	22 146	14.6	1.52	95
<b>Spain</b>	24 241	14.1	1.72	108
<b>France</b>	25 409	12.4	2.06	129
<b>Italy</b>	24 306	11.6	2.10	131
<b>Cyprus</b>	23 471	31.6	0.74	46
<b>Latvia</b>	12 042	14.1	0.85	53
<b>Lithuania</b>	12 803	10.6	1.21	76
<b>Luxembourg</b>	62 480	19.0	3.28	205
<b>Hungary</b>	15 191	10.8	1.40	88
<b>Malta</b>	19 265	3.8	5.09	318
<b>Netherlands</b>	30 963	9.5	3.28	205
<b>Austria</b>	29 263	22.3	1.31	82
<b>Poland</b>	14 254	16.5	0.87	54
<b>Portugal</b>	18 795	19.2	0.98	61
<b>Romania</b>	11 044	20.1	0.55	34
<b>Slovenia</b>	20 484	17.1	1.20	75
<b>Slovakia</b>	17 018	13.5	1.26	79
<b>Finland</b>	26 904	34.5	0.78	49
<b>Sweden</b>	28 143	19.7	1.43	89
<b>United Kingdom</b>	25 984	10.3	2.53	158
<b>Norway**</b>	41 221	34.8	1.36	85
<b>Switzerland</b>	33 997	12.0	2.83	177
<b>Croatia</b>	14 643	12.5	1.17	73
<b>Turkey</b>	10 864	12.0	0.91	57

\* GDP/DMC (GDP in PPS, Purchasing Power Standard; suitable for comparing countries in one year).

\*\* = 2008.

\*\*\* Figures in italics were partially estimated by Eurostat.

Source: Eurostat (online data codes: [nama\\_gdp\\_c](#), [demo\\_gind](#), [env\\_ac\\_mfa](#))

## Over time Resource Productivity developed rather differently across Member States

Starting from the year 2000, the Member States' Resource Productivity developed quite differently. As a reference, the aggregated EU-27 economy increased Resource Productivity by around 17 % in the period 2000-2009. Countries performing significantly above EU average include the Czech Republic, Latvia, the Netherlands, Luxembourg and the United Kingdom. Countries where Resource Productivity decreased are Romania, Cyprus, Estonia, Ireland and Portugal.

The development trajectories for the period 2000-2009 are more heterogeneous for those Member States who joined the EU after 2004 where we find extremes such as Romania (decrease by 40 %) and Latvia (increase by 56 %). The other Member States developed in a more narrow range between -4 (Ireland) and +41 (the Netherlands).

**Table 2: Resource Productivity, GDP\*/DMC**  
(EUR per kg, indexed 2000=100)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
<b>EU-27</b>	100	102	105	107	104	105	106	107	108	117
<b>Belgium</b>	100	99	103	106	106	105	109	112	114	114
<b>Bulgaria</b>	100	100	106	106	100	106	106	106	106	129
<b>Czech Republic</b>	100	102	111	113	111	119	123	130	134	140
<b>Denmark</b>	100	103	108	106	103	95	94	97	102	118
<b>Germany</b>	100	108	111	111	111	116	117	121	123	123
<b>Estonia</b>	100	110	100	79	88	95	95	83	90	83
<b>Ireland</b>	100	97	104	103	104	104	100	100	97	94
<b>Greece</b>	100	99	98	95	99	102	108	109	106	119
<b>Spain</b>	100	101	96	93	93	94	92	93	109	131
<b>France</b>	100	106	106	114	106	111	112	109	112	122
<b>Italy</b>	100	104	111	124	117	115	117	125	126	133
<b>Cyprus</b>	100	101	93	103	93	93	100	96	75	79
<b>Latvia</b>	100	112	112	120	124	120	128	128	148	156
<b>Lithuania</b>	100	119	108	100	94	98	104	96	94	117
<b>Luxembourg</b>	100	108	103	103	109	112	107	117	134	139
<b>Hungary</b>	100	92	98	102	90	82	102	130	117	133
<b>Malta</b>	100	109	102	94	77	80	72	120	170	102
<b>Netherlands</b>	100	101	110	114	112	114	118	118	117	141
<b>Austria</b>	100	104	99	105	102	102	102	106	110	113
<b>Poland</b>	100	105	111	111	111	113	118	113	116	124
<b>Portugal</b>	100	96	100	113	106	106	95	95	90	97
<b>Romania</b>	100	66	74	71	71	69	69	60	51	60
<b>Slovenia</b>	100	104	104	100	103	110	100	97	114	127
<b>Slovakia</b>	100	96	96	104	91	91	100	114	105	113
<b>Finland</b>	100	100	99	94	99	99	96	101	101	110
<b>Sweden</b>	100	103	104	106	107	99	111	105	103	114
<b>United Kingdom</b>	100	101	107	111	110	116	119	124	130	137

\* Gross Domestic Product in chain-linked volumes, reference year 2005; suitable for comparing a single country over time.

\*\* Figures in italics were partially estimated by Eurostat.

Source: Eurostat (online data code: [env\\_ac\\_mfa](#))

## The EU-27 economy managed to slightly de-couple resource use from economic growth

During the reporting period Domestic Material Consumption (DMC) slightly de-coupled from GDP growth. Between 2000 and 2003, DMC decreased in absolute terms whilst GDP was growing. From 2003 until 2009, DMC developed

in parallel with GDP. The economic downturn starting in 2007 is also reflected in the DMC development. The drop between 2008 and 2009 was more pronounced for DMC than for GDP.

**Figure 3: Resource Productivity in comparison to GDP\* and DMC, EU-27, 2000-2009**  
(Index: 2000=100)



\* Gross Domestic Product in chain-linked volumes, reference year 2005; suitable for comparing a single country over time.

Source: Eurostat (online data codes: [nama\\_gdp\\_k](#), [env\\_ac\\_mfa](#))

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## Resource Productivity in comparison to Labour and Capital Productivity

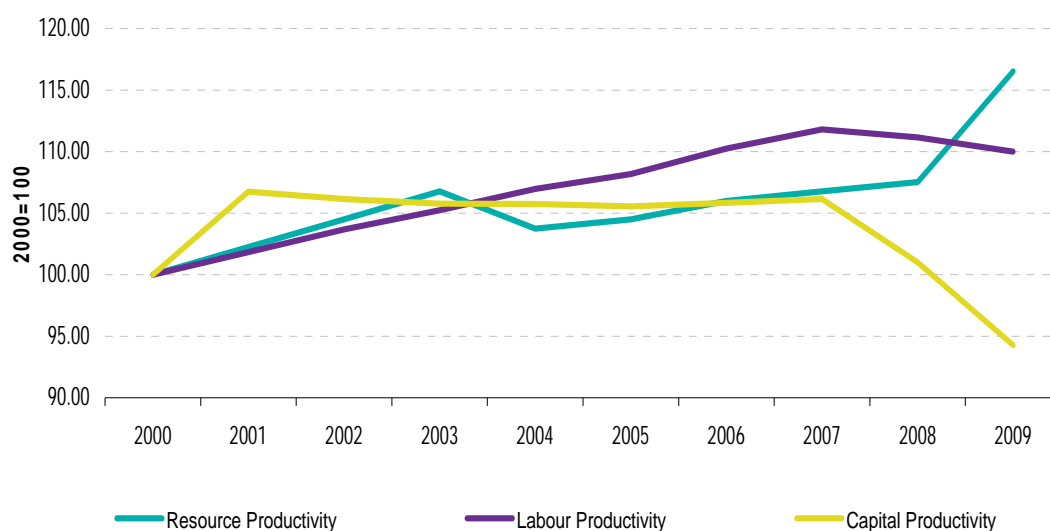
Labour input – measured in hours worked – and capital input – measured as consumption of fixed capital – constitute the most important production factors. It is interesting to see how they developed in comparison to Resource Productivity. This is shown in Figure 4.

Labour productivity constantly increased from 2000 until 2007. During the economic crisis, it

decreased slightly because less GDP was generated with an almost constant labour input.

Capital productivity stayed on a constant level from 2001 until 2007. Then, with the economic crisis, it dropped significantly implying that less GDP has been generated with more or less the same annual consumption of fixed capital.

**Figure 4: Resource Productivity<sup>1</sup> in comparison to Labour Productivity<sup>2</sup> and Capital Productivity<sup>3</sup>, EU-27, 2000-2009**  
(Index: 2000=100)



Source: Eurostat (online data codes: [env\\_ac\\_mfa](#), [nama\\_gdp\\_k](#), [nama\\_nace06\\_e](#), [nama\\_gdp\\_c](#), [nama\\_nace38\\_c](#))

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<sup>1</sup> GDP over DMC.

<sup>2</sup> GDP over Hours Worked.

<sup>3</sup> GDP over Consumption of Fixed Capital.

## METHODOLOGICAL NOTES

### Definitions:

**Resource productivity** is calculated as the ratio between the volume of Gross Domestic Product (GDP) and Domestic Material Consumption (DMC).

**Gross Domestic Product** is a monetary variable, which initially reflects both the volume of goods and services produced and their prices. For comparing one geographic area over time, the GDP which excludes inflation is used or, more precisely, volume series for GDP are used.

When comparisons of resource productivity between countries are made, the GDP that removes the differences in price levels between countries needs to be used, i.e. GDP in Purchasing Power Standards (PPS) for European comparisons.

**Domestic Material Consumption**, abbreviated as DMC, measures in tonnes the amount of materials<sup>1</sup> directly used by a national economy. The DMC is an aggregate composed as the following:

- (1) **Domestic Extraction**<sup>2</sup> (DE),
- (2) plus all physical **Imports** (IMP),
- (3) minus all physical **Exports** (EXP).

The traded goods (2) and (3) are measured as their simple mass weight when crossing the border. Indirect material extractions (Raw Material Equivalents) necessary to produce the traded goods are not considered in DMC.

All three elements (DE, Imports, Exports) are broken down by detailed material categories. The four main material categories are:

- Biomass
- Metal ores (gross ores)
- Non-metallic minerals
- Fossil energy materials/carriers

The DMC indicator is derived from Economy-wide Material Flow Accounts, which is a Eurostat methodology closely following the concepts of National Accounts.

The DMC indicator provides an assessment of the absolute level of the use of material resources, and allows distinguishing consumption driven by domestic demand from consumption driven by the export market. It is important to note that the term "consumption" as used in DMC denotes a kind of

apparent consumption and not final use as employed in the terminology of National Accounts.

### Sources of data:

Eurostat data on *Economy-Wide Material Flow Accounts* (EW-MFA) are available by country, material category, indicator and year. Data are published for the EU-27 and each of its Member States as well as for Norway, Switzerland, Croatia and Turkey in units of 1 000 tonnes.

The data for this SiF resulted from the third Eurostat EW-MFA Questionnaire, launched in 2011, and represent data closest to quality standards set by the Eurostat compilation guide (Eurostat 2011).

If no data are available for a certain country, material and/or year, estimates are made by Eurostat. Currently, all data are estimated for Belgium and Cyprus. Some more recent years have been gap-filled for Denmark, Estonia, Ireland, Greece, and Malta. Trade data – constituting one important component of EW-MFA – are compiled from Eurostat's COMEXT trade database if not reported by countries.

Complete gap-filled data are available for 2000-2009. The data are available by detailed material categories for all 27 EU members plus Switzerland, Norway, Croatia and Turkey. Some countries reported figures before 2000 which are also available in Eurostat's online database; but full gap-filling/estimations have not been performed for years before 2000.

EU aggregates are calculated by summing up the national figures. The EU-aggregates are only made available for the aggregated material categories (biomass, metallic minerals, non-metallic minerals and fossil energy materials/carriers) in order to preserve the detail in country data and respect confidentiality.

Since the figures for the materials sand and gravel and grazed biomass are estimated by countries using a number of different input parameters, there can be a fair amount of uncertainty in the figures and totals in this methodology. Also, please note that water is excluded from this methodology.

<sup>1</sup> Excluding water.

<sup>2</sup> The annual quantity of raw materials extracted from the domestic territory for further processing through economic activities.

## Further information

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Eurostat Website: <http://ec.europa.eu/eurostat>

Data on 'Environment statistics'

<http://epp.eurostat.ec.europa.eu/portal/page/portal/environment/data/database>

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