

## Physical Energy Flow Accounts

2000-2017

### **The energy intensity of the Portuguese economy increased 1.0% between 2016 and 2017**

Domestic energy use increased by 4.6% in 2017 compared to previous year, while economic activity (measured by Gross Domestic Product - GDP) grew by 3.5% in real terms. As a consequence, there was a 1.0% increase in the implicit energy intensity of GDP (5.0 MJ/€), remaining however one of the lowest values since 2000. Households energy intensity decreased by 2.5% to 1.6 MJ/€, the lowest value since the year 2000, maintaining a downward trend since 2004. National energy dependency increased by 5.9 pp to 78.1% in 2017. Energy flow exports increased by 2.1%, reaching the maximum value since the year 2000.

In 2016 (last year with information available for the EU), Portugal recorded the sixth lowest energy intensity and the fourth lowest *per capita* energy use by the household sector among EU Member States.

Statistics Portugal releases the Physical Energy Flows Account (PEFA) results, for the year 2017, and also revises the retrospective series from 2000 to 2016, following the updating of information sources and methodological improvements. Detailed tables are available in Statistics Portugal website, in the area of dissemination of the National Accounts ([Physical Energy Flows Account](#)).

PEFA establishes an accounting system that allows the complete and consistent recording of supply and use of physical energy flows, measured in Joules (J)<sup>1</sup>, between

the environment and the economy (industries, households<sup>2</sup> and the rest of the world).

This project's reference is the System of European Environmental Economic Accounts (SEEA), ensuring compatibility with national accounting criteria. Results are presented for energy supply and uses by industry, allowing economic environmental analysis and guaranteeing the fundamental principle of conservation of mass and energy, with equality between resources and uses for all physical flows within the system.

<sup>1</sup> Joule is the energy unit from the International System of Units; in this press release the units are presented in multiples (MJ – Megajoule, GJ – Gigajoules, TJ – Terajoules).

<sup>2</sup> In PEFA households are considered exclusively as final energy consumers (total consumption: transport, heating / cooling and others).

## 1. Economic and environmental indicators

PEFA allows the calculation of a set of key, physical, monitoring indicators, represented in Table 1.

Net domestic energy use increased by 4.6% between 2016 and 2017, but fell by 11.4% compared to the 2000-2004 average.

The extraction of natural energy inputs (endogenous resources), although declining sharply in 2017 (-16.7%), shows growth over the period (26.7%).

The use of waste for energetic purposes increased by 2.3% compared to 2016 and 56.4% compared to the beginning of the series.

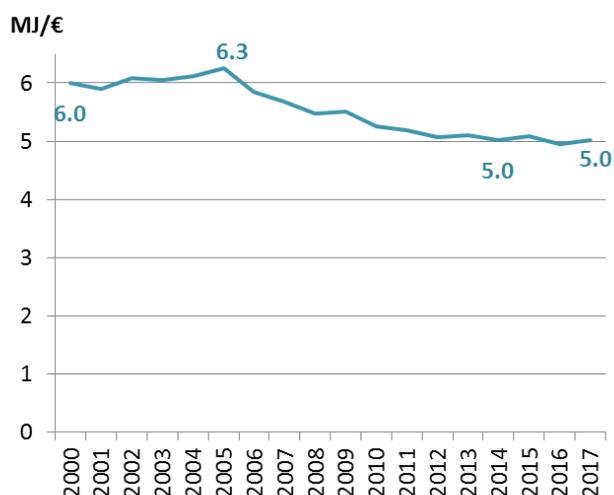
Table 1 Evolution of the key indicators of the physical energy flow account

Unit: TJ	Annual average 2000-04	Annual average 2005-09	Annual average 2010-14	2015	2016	2017	Change rate	
							2017 / Average 2000-04	2017/2016
Extraction of natural energy inputs by economic activities	126,953	142,483	181,362	168,618	193,065	160,912	26.7%	-16.7%
Domestic production of energy products	863,667	901,061	897,520	1,034,483	1,050,546	1,080,018	25.1%	2.8%
Intermediate consumption of energy products	1,533,072	1,562,740	1,384,868	1,543,074	1,526,188	1,628,920	6.3%	6.7%
Household consumption of energy products	247,546	248,644	211,750	195,655	194,369	193,496	-21.8%	-0.4%
Use of waste for energetic purposes	39,000	41,907	51,899	54,839	59,603	60,994	56.4%	2.3%
Net domestic energy use	1,090,845	1,088,195	939,163	930,565	924,559	966,924	-11.4%	4.6%
Net domestic energy use for energy purposes	992,601	999,929	875,536	874,625	875,919	916,483	-7.7%	4.6%
Net domestic energy use for non-energy purposes	98,244	88,266	63,626	55,940	48,640	50,441	-48.7%	3.7%
Total energy input / output	1,985,855	2,022,352	1,880,385	2,013,884	2,028,828	2,101,472	5.8%	3.6%

PEFA also allows to combine physical energy variables with socioeconomic variables and to obtain indicators about the relationship between energy, economy and the environment. On this subject it can be highlighted for 2017:

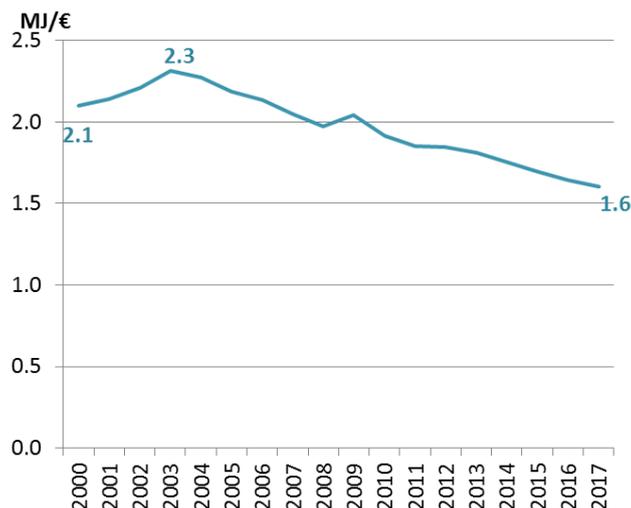
- The economy energy intensity (ratio between the domestic energy use and the GDP at constant prices) increased by 1.0% compared to 2016, but remained one of the lowest in the last 18 years (5.0 MJ/€);

Chart 1 - Evolution of economy energy intensity



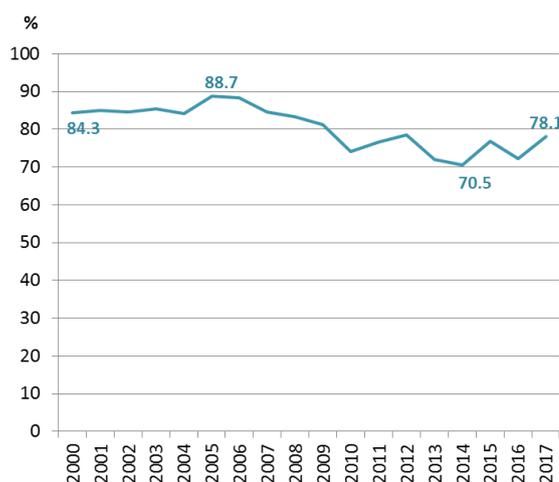
- Households energy intensity (ratio of household net domestic energy use to private consumption at constant prices) decreased by 2.5%, maintaining the downward trend since 2004;

Chart 2 - Evolution of households energy intensity



- Energy dependency (ratio of net energy imports to domestic energy use) increased by 5.9 pp to 78.1% in 2017;

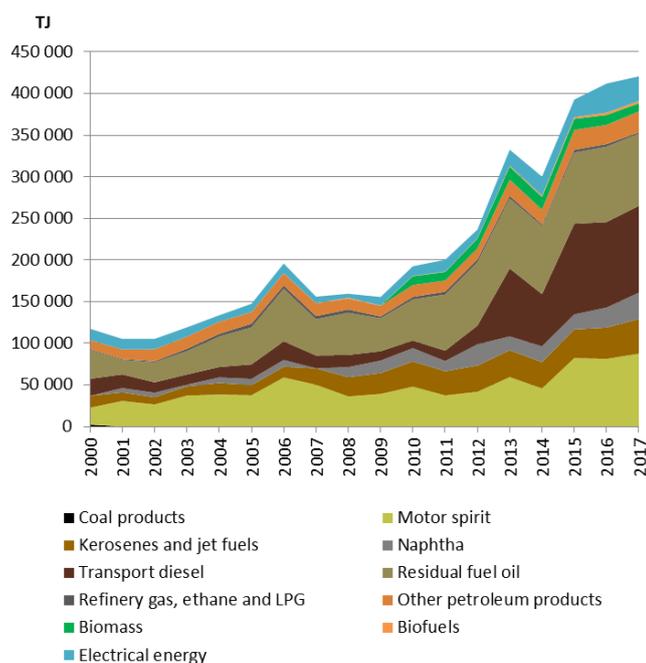
Chart 3 - Evolution of energy dependency



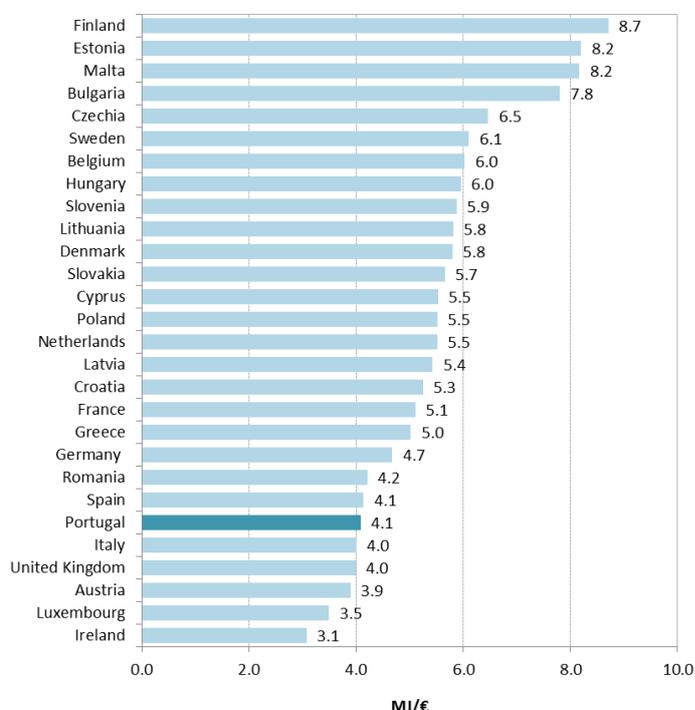
- Energy flow exports increased by 2.1%, reaching the maximum value of the available series. This evolution reflects the increase in petroleum products exports, namely naphtha (31.6%), kerosene and jet fuels

(10.8%) and transport diesel (1.5%). Also noteworthy is the increase in electricity exports in recent years.

**Chart 4 - Energy flow exports evolution**



**Chart 5 - International comparisons of energy intensity in 2016**



Source: Physical energy flow accounts totals bridging to energy balances totals - pilot project data [env\_ac\_pefa05], Eurostat (last update 14.03.2019); Eurostat for GDP in purchasing power parities (ppp) [Purchasing power parities (PPPs), price level indices and real expenditures for ESA 2010 aggregates (prc\_ppp\_ind), (last update 01.08.2019)].

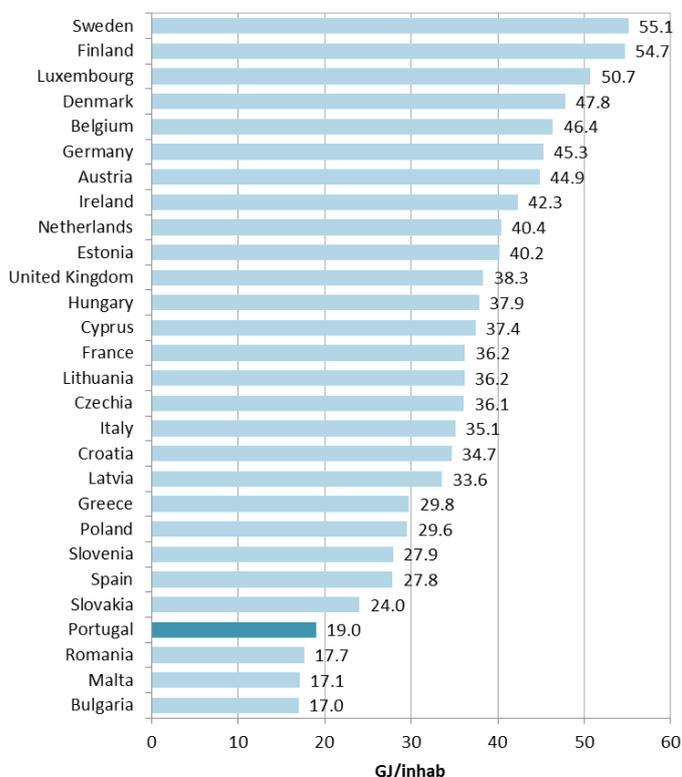
## 2. Comparisons with the European Union (EU)

Energy intensity indicators are related to the productive structure, income and climatic factors of each country.

In 2016 (last year with information available for the EU), Portugal recorded the sixth lowest energy intensity (domestic energy use by GDP in purchasing power parities (ppp)). This relative position is explained, among other factors, by the lower weight of manufacturing and energy industries in the national economy compared to other Member States.

In the same year, Portugal recorded the fourth lowest households energy use *per capita*.

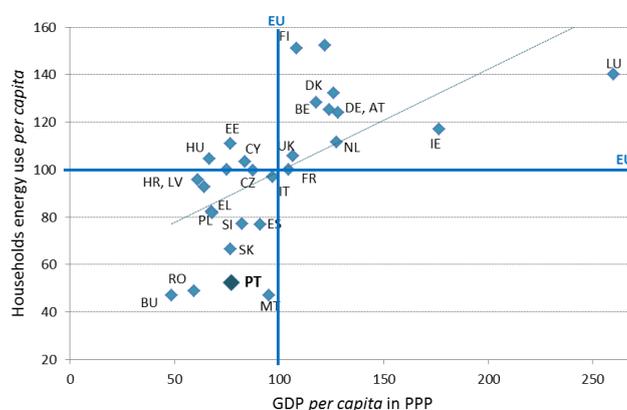
**Chart 6 - International comparisons of households energy use *per capita* in 2016**



Source: Key indicators of physical energy flow accounts by NACE Rev. 2 activity [env\_ac\_pefa04]; Household domestic energy use (residence principle), Eurostat (latest update 14.03.2019); Population and employment [nam\_10\_pe]; Eurostat database for population (latest update 27.09.2019).

with the lowest income are also those with the lowest households energy use (Bulgaria and Romania). Portugal and Malta, despite having higher income levels, also have low household energy use, reflecting the climate factor in energy consumption.

**Chart 7 - Ratio of GDP *per capita* in ppp to households energy use *per capita* in EU countries in 2016 (EU = 100)**



Source: Physical energy flow accounts, Eurostat (latest update 14.03.2019); Eurostat for GDP in purchasing power parities (ppp); Purchasing power adjusted GDP per capita [sdg\_10\_10], Eurostat (last update 01.08.2019; last extraction 24.10.2019).

Comparing households energy use *per capita* with GDP *per capita* in ppp, it can be observed that the countries