

Physical Energy Flow Accounts

2000-2016

The energy intensity of the Portuguese economy declined by 1.2% between 2015 and 2016

Between 2015 and 2016 domestic energy use increased by 0.7%, while economic activity (as measured by Gross Domestic Product - GDP) increased by 1.9% in real terms. As a result, energy intensity of GDP decreased by 1.2%, reaching 5.4 MJ / €, one of the lowest values since 2000. The energy intensity of households fell by 1.0%, reaching 1.7 MJ / €, the lowest value of the last 17 years. The share of renewable resources in electricity generation increased from 30.6% in 2015 to 35.7% in 2016. National energy dependency decreased by 4.0 p.p. to 72.1%.

In 2015 (last year with information available to the EU), Portugal recorded the fourth lowest energy intensity and the fifth lowest *per capita* energy use by households from EU Member States.

Statistics Portugal releases the Physical Energy Flows Accounts (PEFA) results, for the year 2016, and also revises the retrospective series from 2000 to 2015, 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 (section of the Satellite Accounts).

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

the environment and the economy (industries, households² 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 sector of activity, 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.

¹ 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).

² 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. The

combination of physical energy variables with socioeconomic variables also yields indicators on the relationship between energy, economy and environment, presented in Table 2.

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

Unidade: TJ	2000	2015	2016	rate of change 2016/2000	rate of change 2016/2015
Extraction of natural energy inputs by economic activities	122,560	168,614	192,888	57.4%	14.4%
Domestic production of energy products	819,245	1,034,479	1,057,739	29.1%	2.2%
Intermediate consumption of energy products	1,477,578	1,550,905	1,549,839	4.9%	-0.1%
Household consumption of energy products	231,199	192,866	195,700	-15.4%	1.5%
Use of waste for energetic purposes	38,482	54,839	59,603	54.9%	8.7%
Net domestic energy use	1,062,021	945,907	952,517	-10.3%	0.7%
Total energy input / output	1,910,105	2,029,182	2,063,907	8.1%	1.7%

Table 2 Evolution of indicators on the relationship between energy, economy and environment

Theme	Sub-theme	Indicator	Ratio or value	Unit	2000	2015	2016	rate of change 2016/2000	rate of change 2016/2015
Use and production patterns	Energy supply Efficiency	Efficiency of energy conversion and distribution	Energy losses in transformation systems (including losses in electricity generation, transmission and distribution)	TJ	954,090	885,328	899,900	-5.7%	6.7%
	Energy end use	Energy intensity	Domestic energy use / GDP at constant 2011 prices	MJ/€	6.4	5.5	5.4	-14.6%	-1.2%
		Energy intensity of the households	Households energy use / Private consumption at constant 2011 prices	MJ/€	2.2	1.8	1.7	-21.0%	-1.0%
		Households energy use <i>per capita</i>	Households energy use / Population	GJ / nhabitant	22.4	18.6	19.0	-15.2%	1.8%
Security of supply	Diversification (Fuel mix))	Renewable energy share in electricity	Sum of renewable energy supply (hydro, wind, solar, biomass and others) / Total supply of energy flows for electricity generation	%	17.2	30.6	35.7	18.4 p.p.	5.0 p.p.
	Imports	Energy dependency	Net energy imports / Net domestic energy use	%	84.3	76.1	72.1	-12.3 p.p.	-4.0 p.p.
Exports	Exports	Exports	Energy use from the rest of the world (energy exports and residues send)	TJ	117,416	392,160	406,727	246.4%	3.7%

Between 2015 and 2016 the majority of the **energy, economy and environment indicators** shows positive evolutions:

- energy intensity of the economy decreased 1.2%, reaching 5.4 MJ/€, one of the lowest values of the last 17 years;
- energy intensity of the households decreased 1.0%, reaching the lowest value since 2000, 1.7 MJ/€;
- the share of renewable resources in electricity generation increased by 5.1 percentage points (p.p.), from 30.6% in 2015 (very dry year) to 35.7% in 2016 (average year);
- energy dependency decreased by 4.0 p.p. (ratio of net energy imports to domestic energy use), reaching 72.1% in 2016;
- energy exports increased by 3.7%, especially in petroleum products.

Chart 1 - **Evolution of energy intensity of the economy**

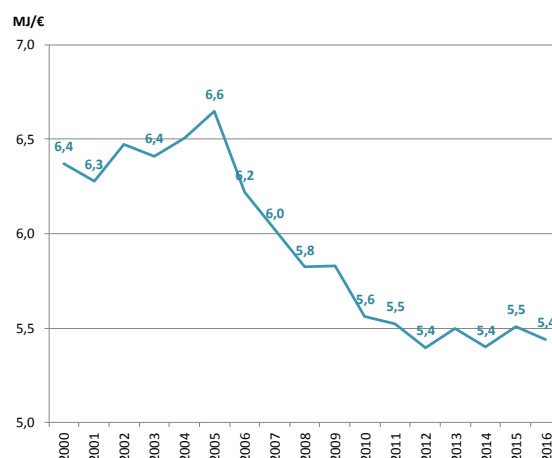


Chart 2 - **Evolution of energy intensity of the households**

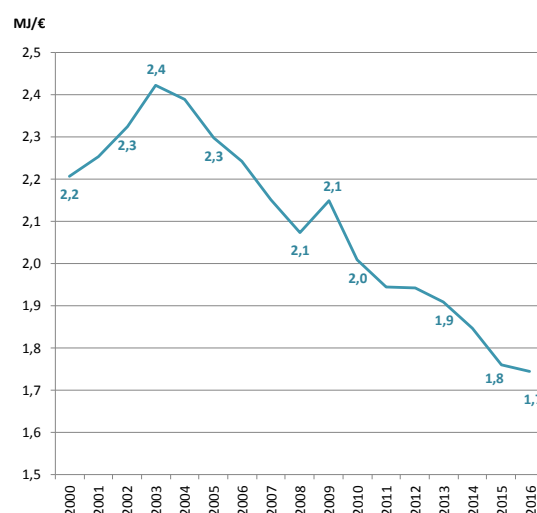
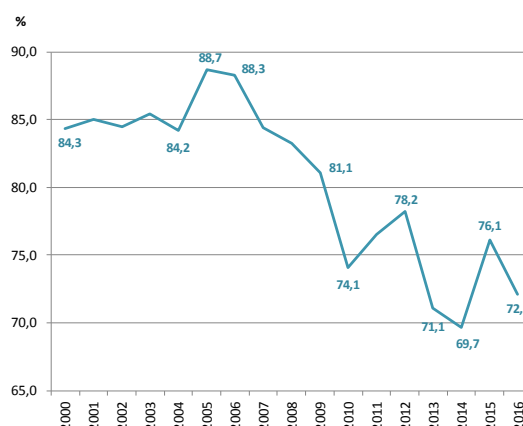


Chart 3 - **Evolution of energy dependency**

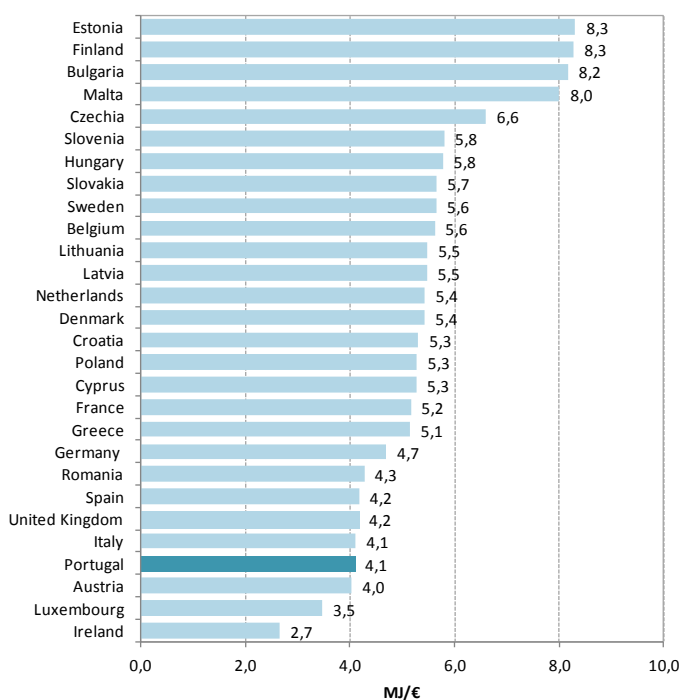


2. Comparisons with the European Union (EU)

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

In 2015 (last year with available information for the EU), Portugal registered the fourth lowest energy intensity (Domestic energy use by GDP in purchasing power parities (ppp)), relative position explained by, among other factors, the lower weight manufacturing and energy sectors in the national economy compared to other Member States.

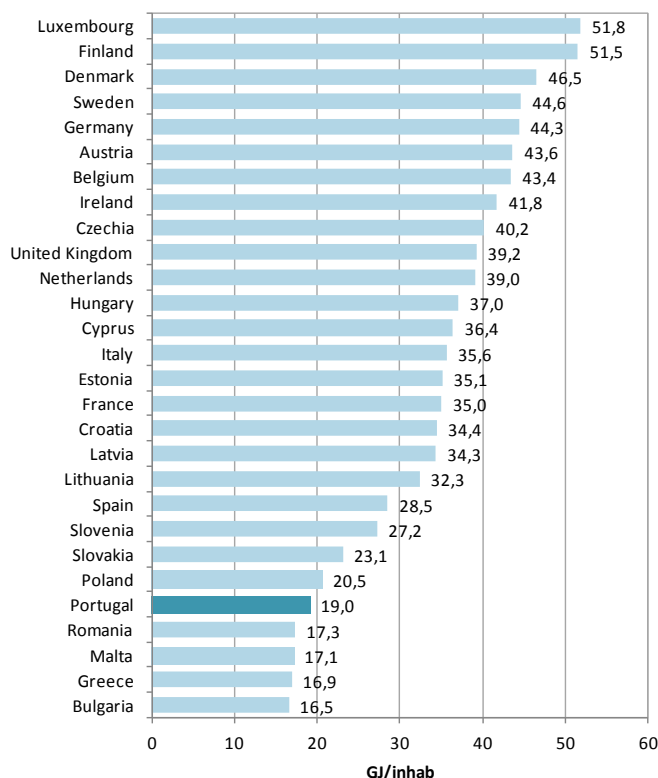
Chart 4 - **International comparisons of energy intensity in 2015**



Source: *Physical energy flow accounts totals bridging to energy balances totals - pilot project data* [env_ac_pefa05], Eurostat (last update 26.04.2018); PEFA data for Portugal in 2014; 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)]

In the same year, Portugal registered the fifth lowest energy use *per capita*.

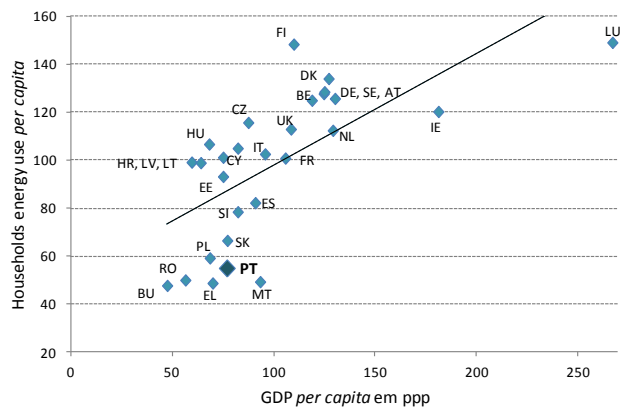
Chart 5 - **International comparisons of households energy use *per capita* in 2015**



Source: *Key indicators of physical energy flow accounts by NACE Rev. 2 activity* [env_ac_pefa04]; Household energy use (residence principle), Eurostat (latest update 30.03.2018); *Population and employment* [namq_10_pe]; Eurostat *database* for population (latest update 12.10.2018).

Comparing households energy use *per capita* with *per capita* GDP in ppp, it can be observed that countries with the lowest levels of income, located in the South of Europe, ie with a milder climate, are the ones with the lowest energy use (which illustrates the relevance of climate factors to energy consumption, as well as economic development).

Chart 6 -Ratio of per capita GDP to household energy use by households per capita in EU countries in 2015 (EU = 100)



Source: *Physical energy flow accounts totals bridging to energy balances totals* [env_ac_pefa04], Eurostat (last update 24.04.2018); Eurostat database for GDP in purchasing power parities (PPP)