



13 October 2021

Economic-environmental Indicators – Air emissions accounts
1995-2019

GLOBAL WARMING POTENTIAL KEPT DECREASING IN 2019, DESPITE THE ECONOMIC GROWTH

In 2019, the Global Warming Potential and Acidification Potential decreased 4.7 and 1.8%, respectively. The Tropospheric Ozone Formation Potential increased 0.2%.

As in the previous year, there was a decrease in Global Warming Potential and a growth in economic activity (in 2019 the Gross Value Added grew, in real terms, by 2.6%). This decoupling reflected simultaneously the reduction of the energy intensity of GDP and of the ratio between GWP emissions and energy demand.

Statistics Portugal publishes Air Emission Accounts data for 2019, and also presents revised data for the period 1995 to 2018. On Statistics Portugal website, in the National Accounts release area, can be found tables with [more detailed information](#).

Table 1. Evolution of Global Warming (GWP), Acidification (ACID) and Tropospheric Ozone Formation (TOFP) Potentials

Indicators	Years		Change (%)			Annual average change (%)		
	2018	2019	2019/2018	2019/2010	2019/1995	1995-2019	2010-2019	2015-2019
GWP (10 ³ t equiv. CO ₂)	69 525	66 229	-4.7	-7.3	-4.9	-0.2	-0.8	-1.5
ACID (t equiv. SO ₂)	282 964	277 757	-1.8	-17.2	-58.9	-3.6	-2.1	-1.1
TOFP (t equiv. COVNM)	403 155	403 798	0.2	-17.2	-43.1	-2.3	-2.1	-1.1
memorandum item GVA at basic prices (10 ⁶ Euros)	171 838	176 375	2.6	7.3	39.7	1.4	0.8	2.6

Source: Statistics Portugal ([Air Emissions Accounts](#); [National Accounts – Table A.1.4.4.5](#)).

1.1. Global Warming Potential (GWP)

Global Warming Potential (GWP) reached 66.2 million tons of CO₂ eq in 2019, decreasing 4.7% comparing to the previous year. This result was determined by the behavior of Carbon Dioxide (CO₂) emissions, since emissions of the other GWP gases increased.



Table 2. Global Warming Potential, by gas type, 2019

Unit: 10³t CO₂eq

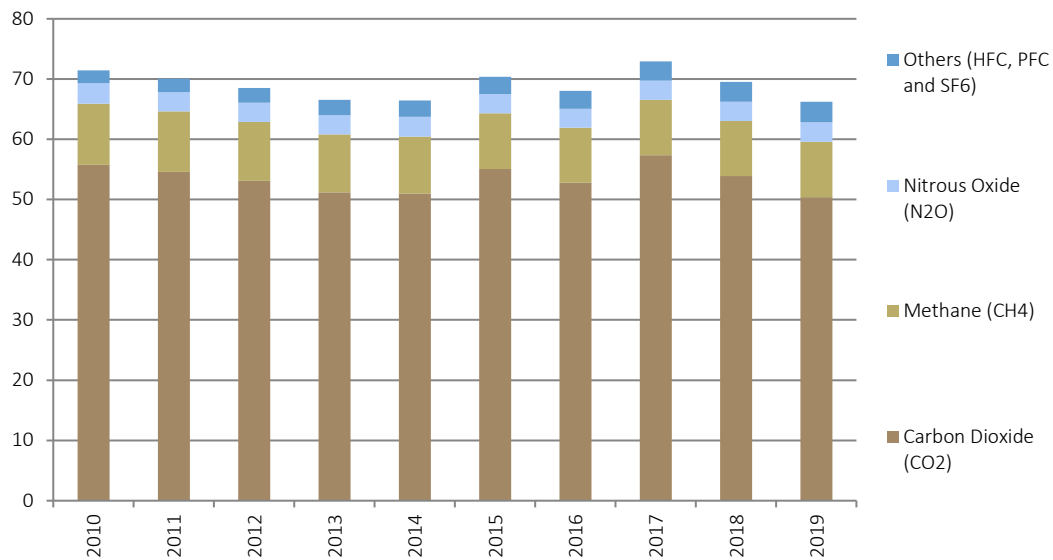
	GWP	% over total	annual variation compared to 2018	
			absolute	%
Carbon Dioxide (CO ₂)	50 401.5	76.1	-3 487.8	-6.5
Methane (CH ₄)	9 172.1	13.8	35.2	0.4
Nitrous Oxide (N ₂ O)	3 236.6	4.9	25.5	0.8
Others	3 418.3	5.2	129.9	4.0
TOTAL	66 228.6	100.0	-3 296.8	-4.7

Source: Statistics Portugal ([Air Emissions Accounts](#)).

With the observed decrease, the GWP has reached in 2019 the lowest value in the series that began in 1995.

Chart 1: Global Warming Potential, by type of gas, 2010 - 2019

Unit: 10³t CO₂eq



Source: Statistics Portugal ([Air Emissions Accounts](#)).



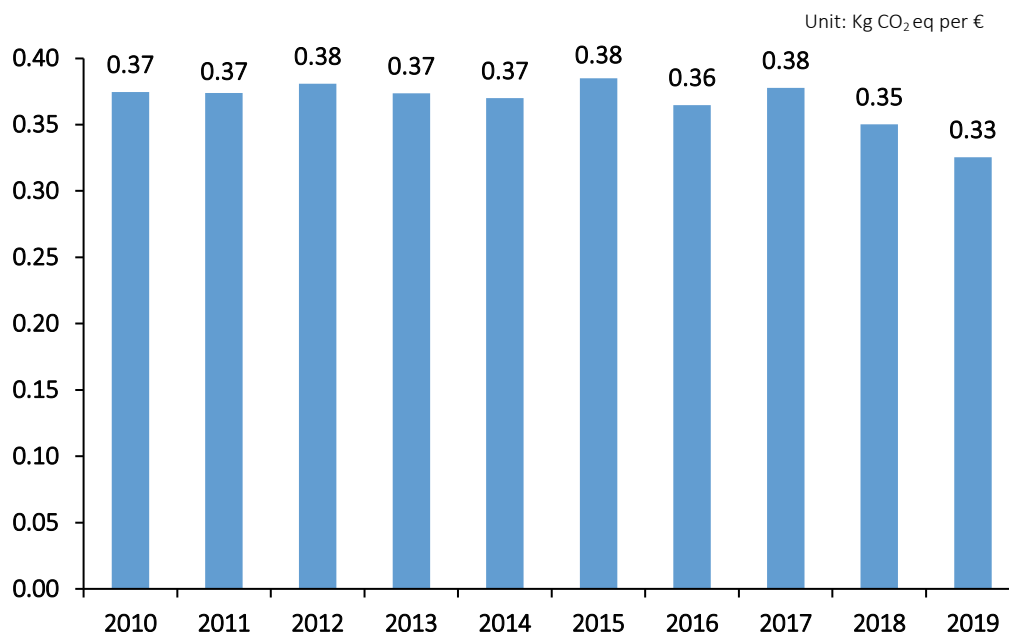
2. Economic-environmental indicators

2.1. Carbon Intensity of the economy

The Carbon Intensity of the economy quantifies the relation between the GWP emissions necessary to obtain all the goods and services produced. The indicator consists of the ratio between the national total of GWP emissions and GDP.

In 2019, the Carbon Intensity of the Portuguese economy was the lowest since 1995, having decreased by 7.1% compared to the previous year. Between 2010 and 2019, it decreased by 13.1%.

Chart 2: Carbon Intensity of the economy (GWP/GDP), 2010 – 2019



Source: Statistics Portugal ([Air Emissions Accounts](#); [National Accounts – Table A.1.1.6](#)).

2.2. Decoupling

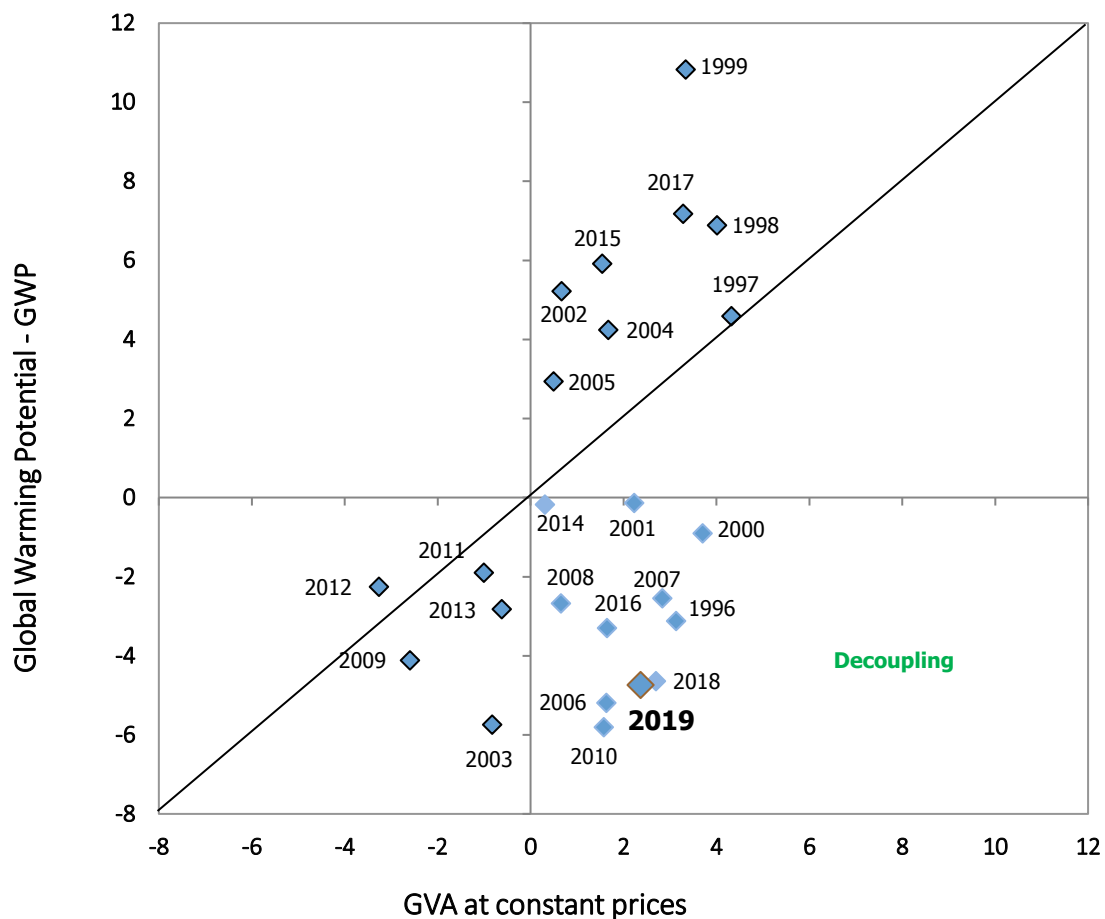
Despite the gradual increase in the weight of solar photovoltaic and wind energy production since 2005, hydropower continued to present a significant weight in the production of electric energy from renewable sources. Considering this characteristic of the national electricity generation system, the "decoupling" between GWP and GVA variations, is generally observed in years when normal or higher levels of rainfall are observed, thus allowing for more abundant resources for the electricity production.



However, despite 2019 being a warm and dry year, in which the average value of total annual precipitation was 755.6 mm, corresponding to about 86% of the normal value, a decoupling between GWP and GVA was again recorded, a situation also observed in 2010, 2014, 2016 and 2018.

Despite the sharp reduction in the production of hydro energy (-24.1%) due to weather conditions, the decoupling reflected the sharp reduction of coal consumption¹, which decreased 48.1% compared to the previous year, at the same time that the production of wind, geothermal and photovoltaic energy, as a whole, increased by 9.5%.

Chart 3: Dissociation between GWP and GVA - annual change rate, 1996 – 2019



Source: Statistics Portugal ([Air Emissions Accounts](#); [National Accounts – Table A.1.4.4.5](#)).

¹ In 2019 there was a sharp decrease in the price of natural gas, which, along with the fact that coal-fired plants are still penalized by the increase in the tax rate on petroleum products and by the cost of carbon dioxide emissions, meant that the change in TJ in electricity generation through coal consumption was -53.9% (112,394.2 in 2018, 51,829.5 in 2019) compared to 2018.