INSTITUTO NACIONAL DE ESTATÍSTICA
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Economic-environmental Indicators – Air emissions accounts
1995-2020

IN 2020, GLOBAL WARMING POTENTIAL DECREASED MORE INTENSELY THAN ECONOMIC ACTIVITY

In 2020, the year of the start of the COVID-19 pandemic in Portugal, in the area of atmospheric emissions, the main environmental stress indicators showed decreases: the Global Warming Potential (-10.0%), the Acidification Potential (-10.9%) and the Tropospheric Ozone Formation Potential (-9.3%), in a context in which economic activity (measured by Gross Value Added) suffered severe contraction (-7.8% in real terms).

The activity sectors that contributed to the decrease in the Global Warming Potential (GWP) were Transport, information and communication (-38.2%), Energy, water supply and sewerage (-16.3%) and Trade and food service activities (-10.9%), which were also the most affected by the pandemic, with significant restrictions on activity.

In 2020, the Carbon Intensity indicator of the Portuguese economy reached its lowest value since 1995, having decreased by 1.8% compared to the previous year, as a result of a reduction in GWP emissions (-10.0%) more intense than the reduction in GDP (-6.5%).

Statistics Portugal publishes Air Emissions Accounts data for 2020, and also presents revised data for the period 1995 to 2019. More detailed information is available on the Statistics Portugal's website.

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

Indicators	Years		Change (%)			Annual average change (%)		
	2019	2020	2020/2019	2020/2011	2020/1996	1995-2020	2011-2020	2016-2020
GWP (10^3 t equiv. CO_2)	66 021	59 437	-10.0	-14.9	-13.9	-0.6	-1.8	-3.2
ACID (t equiv. SO_2)	302 014	269 164	-10.9	-18.8	-60.8	-3.7	-2.3	-2.7
TOFP (t equiv. COVNM)	422 609	383 230	-9.3	-18.8	-47.3	-2.5	-2.3	-2.5
memorandum item								
GVA at basic prices (10^6 Euros)	176 375	162 645	-7.8	-0.1	28.8	1.0	0.0	0.1

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

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1.1. Global Warming Potential (GWP)

In 2020, the year of the start of the COVID-19 pandemic, the Global Warming Potential (GWP) reached 59.4 million tonnes of CO2 equivalent, decreasing by 10.0% compared to the previous year. This result was determined especially by the behaviour of Carbon Dioxide (CO2) emissions, which decreased by 12.7%.

Table 2. **Global Warming Potential, by gas type, 2020**

Unit: 10^3t CO_2eq

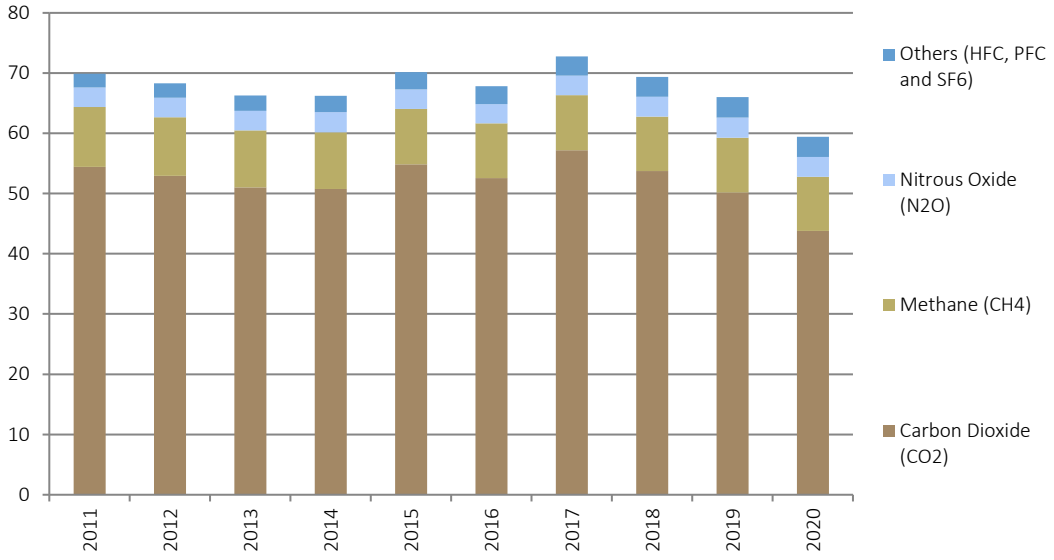
	GWP	% over total	annual variation compared to 2019	
			absolute	%
Carbon Dioxide (CO_2)	43 782.5	73.7	-6 374.6	-12.7
Methane (CH_4)	8 968.2	15.1	-143.0	-1.6
Nitrous Oxide (N_2O)	3 306.0	5.6	-26.0	-0.8
Others	3 380.5	5.7	-40.6	-1.2
TOTAL	**59 437.4**	**100.0**	**-6 583.4**	**-10.0**

Source: Statistics Portugal (Air Emissions Accounts).

With the decrease observed, in 2020 the GWP reached the lowest value of the series that began in 1995.

Chart 1: **Global Warming Potential, by type of gas, 2011 - 2020**

Unit: 10^3t CO_2eq



Source: Statistics Portugal (Air Emissions Accounts).

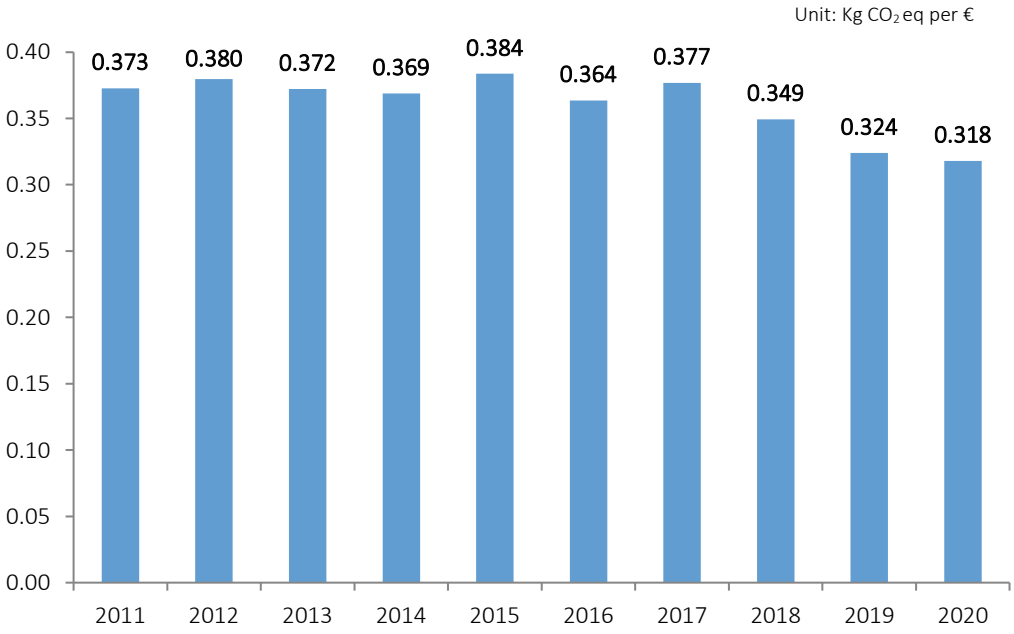
2. Economic-environmental indicators

2.1. Carbon Intensity of the economy

The Carbon Intensity of the economy quantifies the ratio of GWP emissions required to obtain all goods and services produced. The indicator is the ratio between total national GWP emissions and Gross Domestic Product (GDP).

In 2020, the Carbon Intensity of the Portuguese economy was the lowest since 1995, having decreased by 1.8% compared to the previous year, as a result of the decrease in GWP emissions (-10.0%) having been more intense than the reduction in GDP (-6.5%). Between 2011 and 2020, the carbon intensity of the Portuguese economy decreased by 14.7%.

Chart 2: **Carbon Intensity of the economy (GWP/GDP), 2011 – 2020**



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

2.2. Decoupling

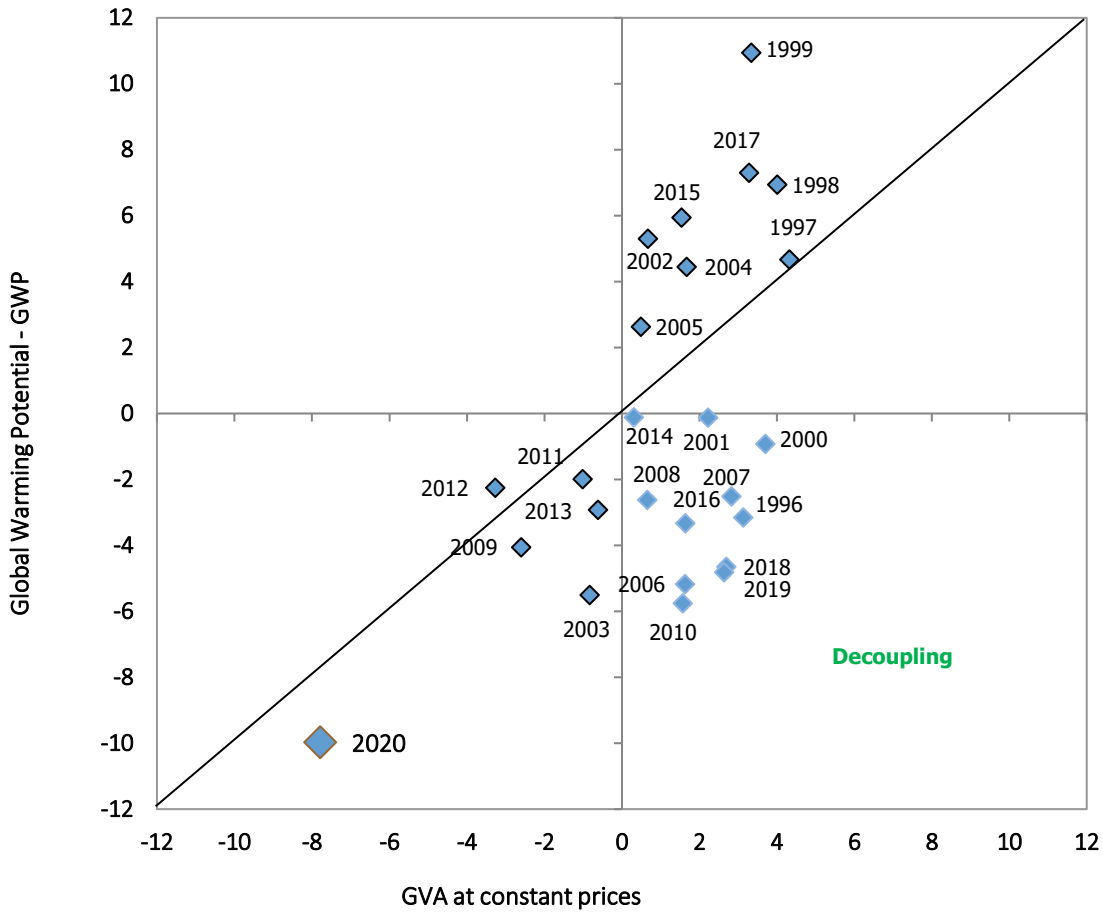
Taking into account the characteristic of the national electricity generating system, in which the hydropower source has a significant weight in the production of electricity from renewable sources, the dissociation between the variation of the GWP and the variation of the GVA is generally observed in years with normal or higher levels of rainfall, thus allowing more abundant resources for electricity generation.

However, as in 2019, the year 2020 was hot and dry, in which the average value of total annual precipitation was 746.8 mm, corresponding to approximately 85% of the normal value (in 2019 it had been 755.6 mm,

corresponding to 86%). Electricity generation from renewable sources in 2020 accounted for 59.6% (54.2% in 2019) of total gross electricity generation, and the overall contribution of energy from renewable sources in gross final energy consumption was 33.9% (30.6% in 2019) (according to the methodology of the Renewables Directive 2009/28/EC).

But the year 2020 was also distinctly influenced by the COVID-19 pandemic, which caused significant behavioural changes in Portuguese society, particularly in energy consumption (primary energy consumption decreased by 7.5% compared to 2019 and returned to the value of 1996), allowing the reduction observed in GWP. However, conversely to the two previous years where a decoupling between GVA and GWP was recorded with both indicators evolving in opposite directions (as shown in the following chart), in 2020 the variation of these two indicators was negative, although the reduction of GWP was greater than that of GVA, thus continuing the trend away.

Chart 3: Dissociation between GWP and GVA - annual change rate, 1996 – 2020



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