

December 30, 2015

Economic-environmental Indicators – Air emissions accounts

1995-2013

Global Warming Potential diminished 2.8% in 2013, more intensively than the economic activity

According to Air Emissions Accounts, the Global Warming Potential decreased without interruption since 2006, diminishing 2.8% in 2013, year with normal rainfall values. However, 2013 registered the maximum percentage of renewal energy, influencing the indicator evolution. This reduction on GWP was mainly caused by the decrease on the carbon dioxide (CO₂) emissions in the Electricity, gas, steam and air conditioning supply industry. In 2013, the GWP decreased more intensively than GVA (-0.8%). Portugal had the third lowest GWP *per capita* in EU28 in 2012.

Statistics Portugal publishes Air Emission Accounts data for 2013 and revised data for the period 1995 to 2012. This revision was essentially motivated by the incorporation of the revisions of the National System of Emissions and Environmental Pollutants Removal Inventory (NSEEPRI) made by the Portuguese Environmental Agency. This revision extent is more significant this year, since several methodological changes were made to the inventory on this submission.

On the Statistics Portugal website, in the National Accounts release area (section of Satellite Accounts¹) tables with more detailed information are available.

Air Emissions Accounts allow for an analysis of the environmental implications of the country production standards, since their results, which are consistent with the National Accounts, enable the development of an integrated environmental-economic analysis.

1. ENVIRONMENTAL INDICATORS

For the assessment of environmental effects of various gases emitted by economic activity and households there are three important indicators: Global Warming Potential (GWP), Acidification Potential (ACID) and Troposphere Ozone Formation (TOFP).

¹ http://www.ine.pt/xportal/xmain?xpid=INE&xpgid=ine_cnacionais2010&contexto=cs&selfTab=tab3&perfil=220674570&INST=220617355&xlang=en

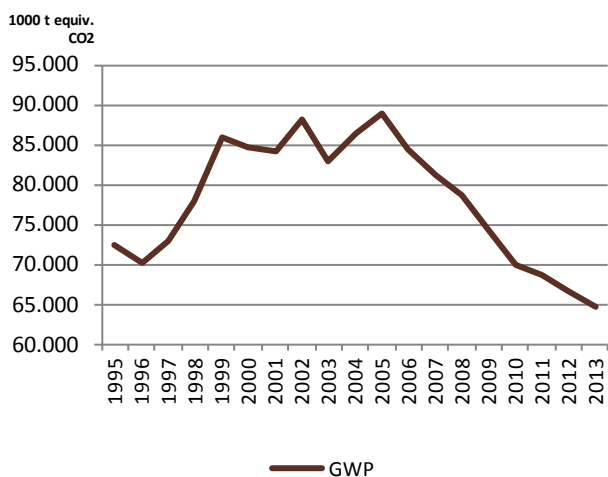
Chart 1 presents the evolution of these three environmental indicators for the period 1995-2013. In 2013, the **GWP** diminished 2.8% in relation to 2012 and registered a new minimum for the series started in 1995. 2013 was a normal year in terms of the annual average amount of rainfall (in relation to the period 1971-2000). This reduction was mainly caused by the decrease on the carbon dioxide (CO₂) emissions and on the methane (CH₄) emissions, in a lesser degree, which kept on their downwards trends, while the nitrous oxide (N₂O) emissions increased, inverting the previous downwards trend. GWP increased significantly from 1997 to 1999, after presenting an irregular behaviour in the period 2000-2005 (reference to the peaks of 2002 and 2005, justified by the low level of water in reservoirs, with consequent change in the mode of electricity production, using more polluting energy sources than water). After this period, the indicator has recorded successive decreases, largely explained by the introduction of natural gas (diminishing the consumption needs of coal and fuel oil), by efficiency improvements in industrial production processes and by the increase in installed capacity of electricity production from wind power.

ACID presents a sharp downwards trend (the average rate of change in the period 1995-2013 was -4.5%). In 2013, ACID diminished 1.6%, mainly due to the reductions of the sulfur oxides (SO_x) emissions, since the ammonia (NH₃) emissions were relatively stable and the oxides of nitrogen (NO_x) emissions increased, discontinuing their downwards trend. The sulfur oxides (SO_x) emissions result mainly from the burning of coal and fuel oil by industry and energy, water and sanitation industries. The decrease of these emissions in recent years is explained by the replacement of these fuels by natural gas and by the technological adaptations, following the entry into force, in 2000, of legislation that limits the sulphur emissions from certain types of liquid fuels derived from petroleum. The oxides of nitrogen (NO_x), the component with higher relative weight and that has as major emission sources the Industry and Transport industries, discontinued their significant descendent trend presented since 2006, registering a small increase in 2013. This interruption is explained, mainly, by the increase in fuels consumption in 2013. The sharp downwards trend was largely explained by technical developments in engines, which made them less polluting, in compliance with existing European legislation in this field.

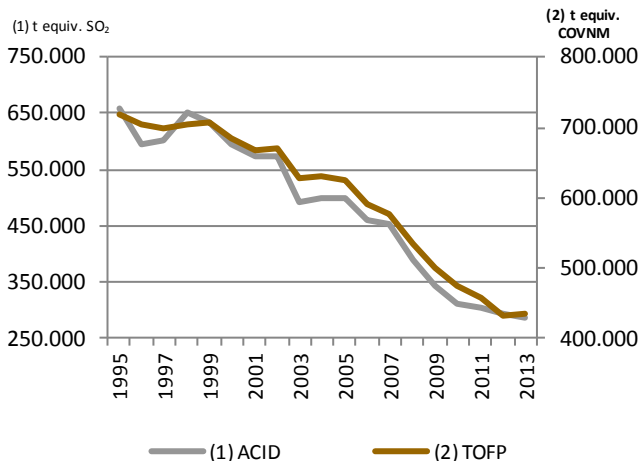
TOFP discontinued the downwards trend presented since 2005, registering a small increase in 2013 (0.5%). The behaviour of this indicator was determined by the emissions of nitrogen oxides (NO_x) and of non-methane volatile organic compounds (NMVOC), which also discontinued their descendent trends, since the carbon monoxide (CO) and the methane (CH₄), with a smaller weight on the indicator, continued to diminish in 2013.

Chart 1. Evolution of environmental indicators

Global Warming Potential

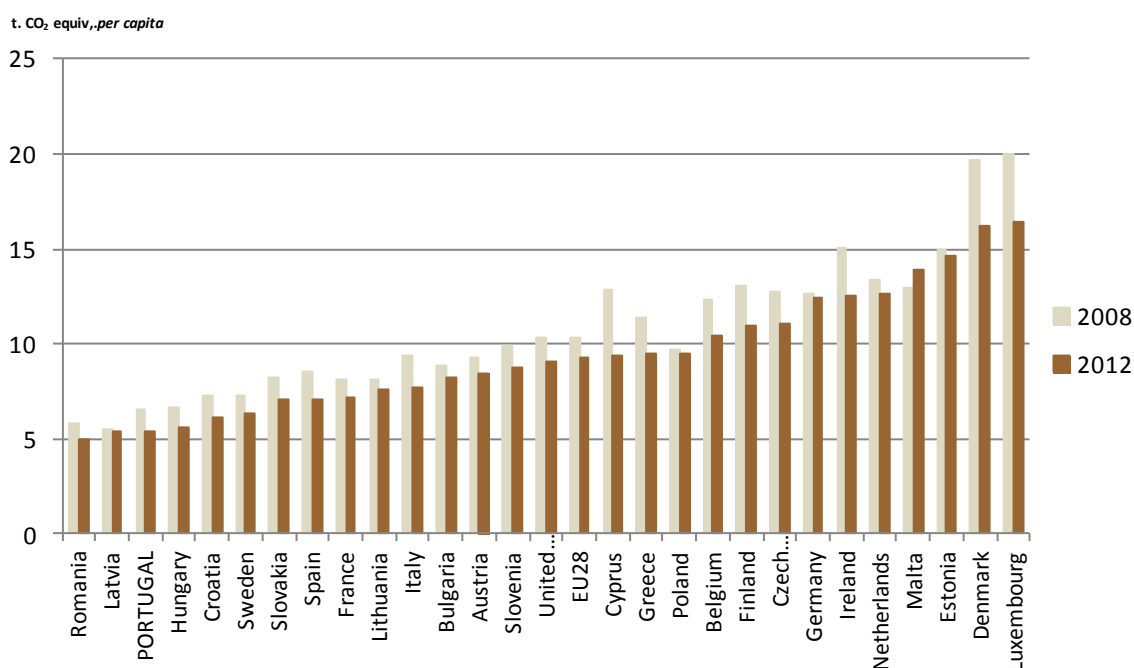


Acidification Potential and Troposphere Ozone Formation



The ranking of the country at the European level can only be analysed for 2008-2012, the period for which comparable data exists at European level. Hence, the indicator "GWP *per capita*" for Portugal showed lower values comparing to most countries in the EU28, presenting the third lowest value in 2008 and 2012. In 2012, the EU28 average was 9.27 tonnes of CO₂ equivalent *per capita* and in Portugal was 5.44 tonnes of CO₂ equivalent *per capita*, i.e. 58.7 % of the EU28 average.

Chart 2. GWP per capita in EU28, in 2008 and 2012

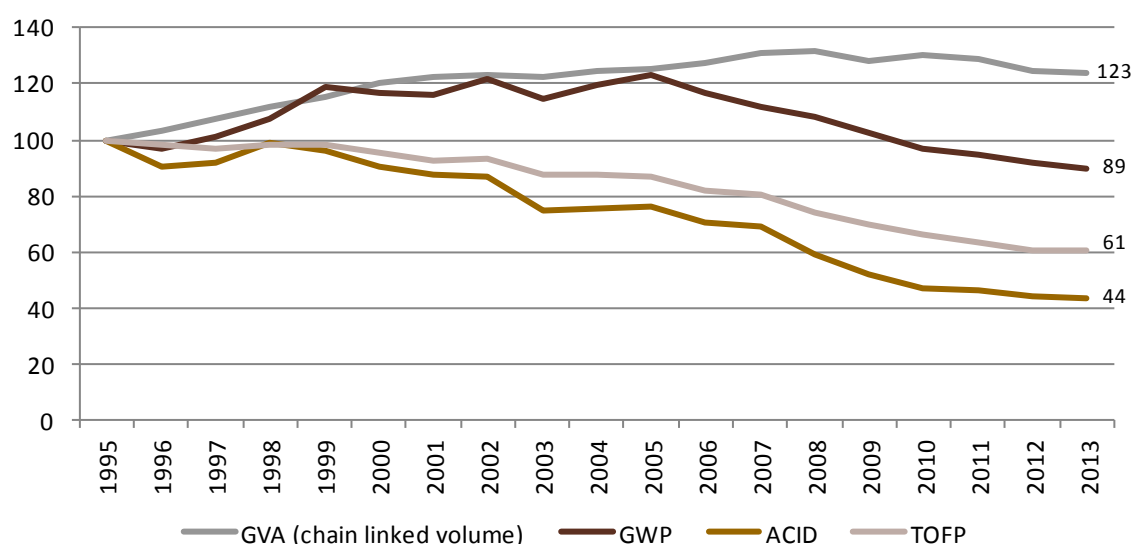


2. ENVIRONMENTAL-ECONOMIC INDICATORS

In this section physical environmental data and economic data are compared, using the same classification and rules of the National Accounts, in order to evaluate the environmental efficiency of the economy in the specific field of atmospheric emissions.

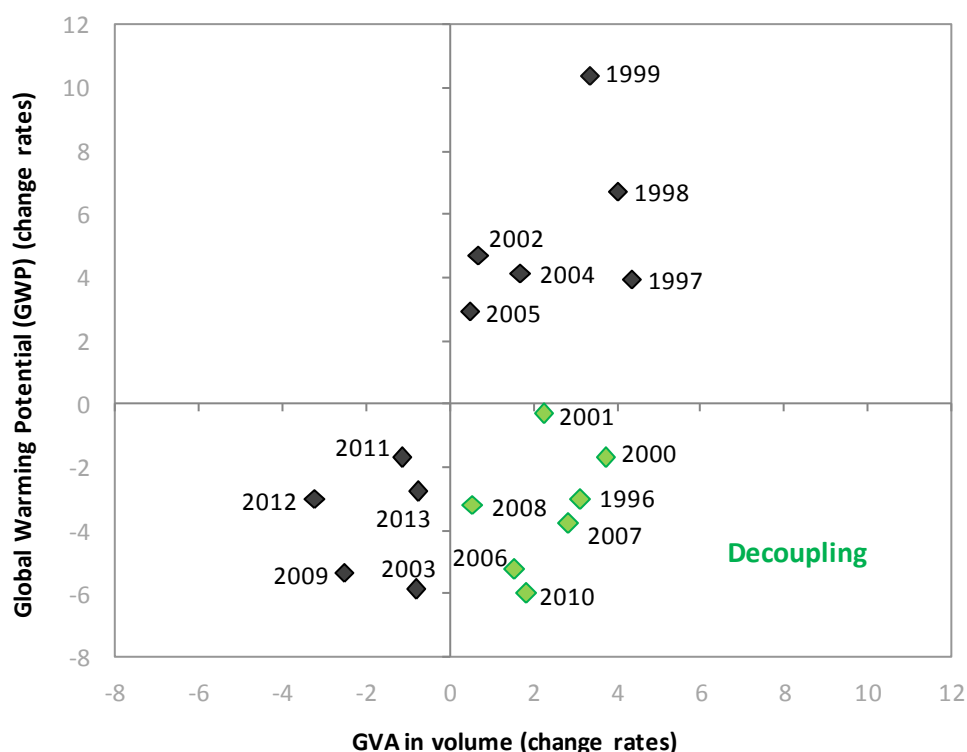
Chart 3 allows comparing the evolution of the Gross Value Added (GVA) in volume with the three above mentioned environmental indicators. In accumulated terms, it can be observed that all environmental indicators showed a significant decrease between 1995 and 2013, differing from the GVA behaviour, which registered an increase of 23%.

Chart 3 – Evolution of GVA, in volume, and of the environmental indicators (1995 = 100)



The GWP showed an upwards trend until 2005, following the evolution of GVA, although presenting, in most years, a higher average annual rate. In the period between 2006 and 2013 there were continuous and significant reductions of GWP, while the GVA showed increases in 2006, 2007, 2008 and 2010 and reductions in 2009, 2011 and 2013, less intense than the GWP.

Chart 4 – Decoupling between GWP and GVA (volume change rates)



The emissions level is highly dependent on the types of energy used by the Energy, water and sanitation, since it is the industry with the highest relative weight, representing, on average, about 30% of total emissions of the GWP series. The water source has a significant weight in this industry, which is, in turn, significantly conditioned by the rainfall levels recorded every year. However, this conditioning has been attenuated since 2005, with the gradual increase in the share of wind energy production in total electricity production. In 2013 the weight of wind energy production was 23.3% (water source weight was 28.8%), and it was superior to the water weight in 2012. 2013 registered the maximum percentage of renewable energy in the total electricity production (59.2%) on the series under analysis.

The ACID and the TOFP showed downwards trends since 1995 (the beginning of the series) in dissociation with economic activity, most of the years. However, TOFP discontinued this trend in 2013, registering a small increase, while the GVA decreased. The increase of TOFP was due to the raise of the emissions of nitrogen oxides (NO_x) in Land transport and transport via pipelines and of non-methane volatile organic compounds (NMVOC) in Manufacture of coke and refined petroleum products.