

18 February 2019

Environmental Goods and Services Sector Accounts and Environmental Protection Expenditure Accounts (2016)

In 2016 the environmental goods and services sector generated 3.0% of the national GVA

In 2016, the environmental goods and services sector accounted for 3.0% of gross value added (GVA), 3.5% of exports and 2.4% of employment. Compared to the previous year, there were higher growth rates in this sector than the economy in the main economic variables analyzed, with a GVA increase of 10.8% (3.4% for the economy as a whole) and Exports (6.4%, compared to 2.7% for the total). The environmental domains that contributed most to the GVA growth were the *management of energy resources* (+16.2%), *waste management* (+13.6%) and *water management* (+10.6%).

In 2015 the relative weight of the environmental goods and services sector GVA in the national GVA was 2.8%, higher than the EU28 average (2.3%).

In 2016, the National Expenditure on Environmental Protection (NEEP) totaled 2,289.3 M€ (1.2% of GDP), having decreased by 6.3% over the previous year, reflecting the reduction in investment and the increase in transfers received from the Rest of the World.

This press release summarizes the main results of the Environmental Goods and Services Sector Accounts (EGSS) by environmental domain and by economic activity, and Environmental Protection Expenditure Accounts (EPEA) for 2016. At the end, methodological notes on both projects are presented.

Additional tables with more detailed information are available at Statistics Portugal website, in the area of dissemination of the National Accounts (Satellite Accounts section).

1. Environmental Goods and Services Sector Accounts (EGSS)

The environmental goods and services sector comprises goods and services produced for the purpose of environmental protection and resource management.

Environmental protection includes all activities and actions whose main purpose is prevention, reduction and elimination of pollution, as well as any other degradation of the environment. Resource management includes the preservation, maintenance and enhancement of existing natural resources and therefore seeks to prevent their decline and depletion (see table A.1 of the methodological notes).

1.1. Main results

In 2016 the environmental goods and services sector:

- Produced 12,474 M€ (3.8% of national output);
- Generated 4,848 M€ of Gross Value Added - GVA (3.0% of the national economy);
- Exported € 2,589 M€ (3.5% of national exports);
- Employed 105,463 Full Time Equivalents - FTE (2.4% of national employment);

- Registered higher growth rates than the national economy in all observed variables.

Table 1: Main results of Environmental Goods and Services Sector Accounts

		2014	2015	2016	Change rate 2015/2016 (%)
Environmental Goods and Services Sector output	10 ⁶ euros	10,930	11,495	12,474	8.5
<i>Economy output</i>		310,198	318,313	325,639	2.3
Weight in the national economy		3.5%	3.6%	3.8%	
Environmental Goods and Services Sector GVA	10 ⁶ euros	4,149	4,377	4,848	10.8
<i>Economy GVA</i>		151,365	156,839	162,226	3.4
Weight in the national economy		2.7%	2.8%	3.0%	
Environmental Goods and Services Sector exports	10 ⁶ euros	2,151	2,433	2,589	6.4
<i>Economy exports</i>		69,360	72,648	74,619	2.7
Weight in the national economy		3.1%	3.3%	3.5%	
Environmental Goods and Services Sector employment	FTE	91,812	99,564	105,463	5.9
<i>Economy employment</i>		4,246,668	4,327,478	4,419,870	2.1
Weight in the national economy		2.2%	2.3%	2.4%	

Total employment measured in Full-time Equivalent (FTE)

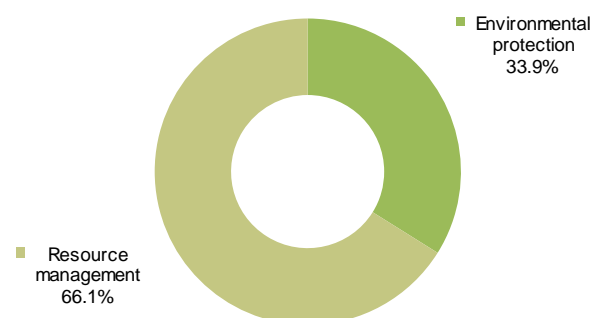
1.2. Results by environmental domain

Environmental goods and services are grouped into two classifications:

- Environmental protection (CEPA) - technologies, goods and services that reduce or prevent the amounts of harmful materials for the environment;
- Resource management (CReMA) - technologies, goods and services that manage and conserve natural resources.

In 2016, the output of environmental protection goods and services amounted 4,227 M€ and the resource management totalized € 8,247 M€.

Chart 1: Output by environmental group (2016)



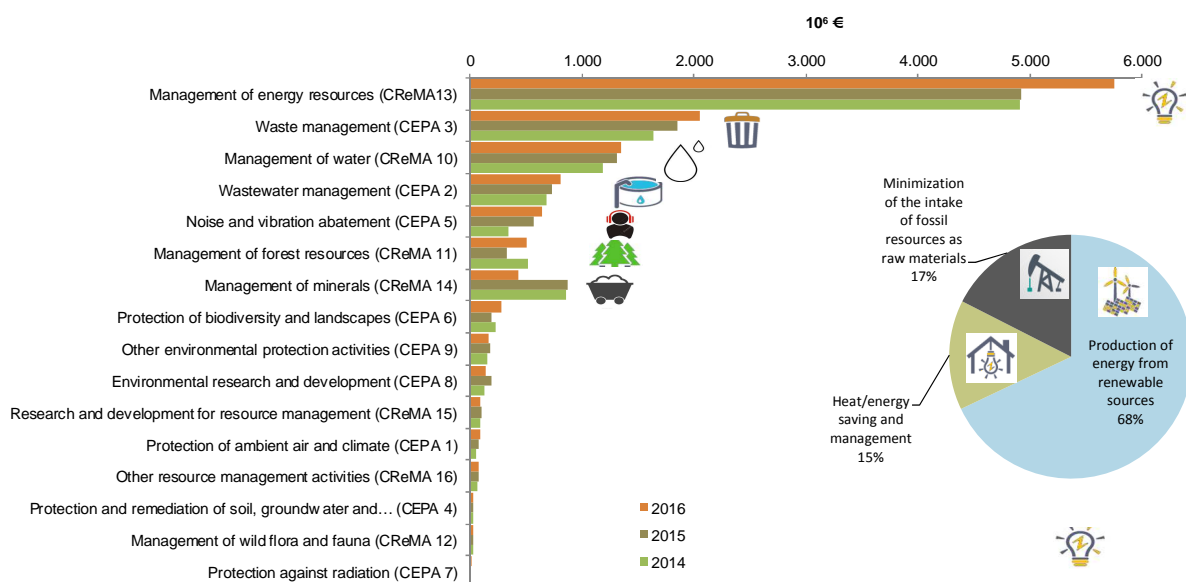
The *management of energy resources* remained the most important area, accounting for 46.1% of the total production of environmental goods and services. It should be noted that this area comprises the production of energy from renewable sources (68.0% of the total), energy and heat saving and management (14.5%) and the minimization of the intake of fossil resources as raw

material (17.5%). *Waste management* was the second most important area (16.5% of the production of environmental goods and services), followed by *water management* (10.8%).

Between 2015 and 2016, the output of the *resource management* group increased by 7.7%, mainly due to a strong growth in the *management of energy resources*

(16.8%, affected by the favorable hydrological year and by an increase of equipment manufacturing for renewable energies and energy efficiency). The output of *environmental protection* increased by 10.2%, mainly as a result of the growth in *waste management* (11.1%) and *noise and vibration abatement* (13.9%), driven by exports of automobile silencers.

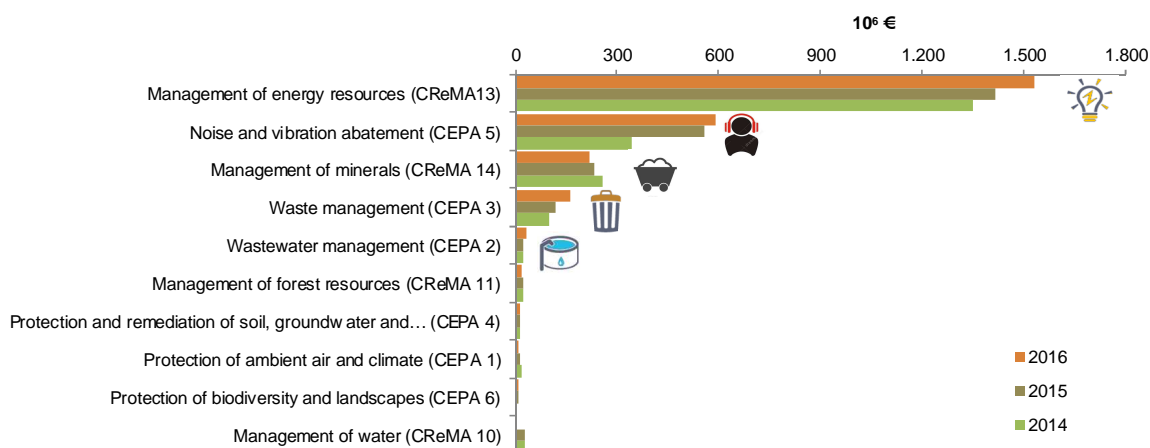
Chart 2: Output by environmental domains (2014 – 2016)



In 2016, 19.5% of the output of environmental goods and services was directed to exports (in 2015 it was 21.2%). The *management of energy resources* accounted for 62.9% of these exports, up to 8.0% over

the previous year (namely wind tower, photovoltaic and biodiesel equipment). Also outstanding are *noise and vibration abatement* (relative weight of 24.2% and an increase of 6.1%).

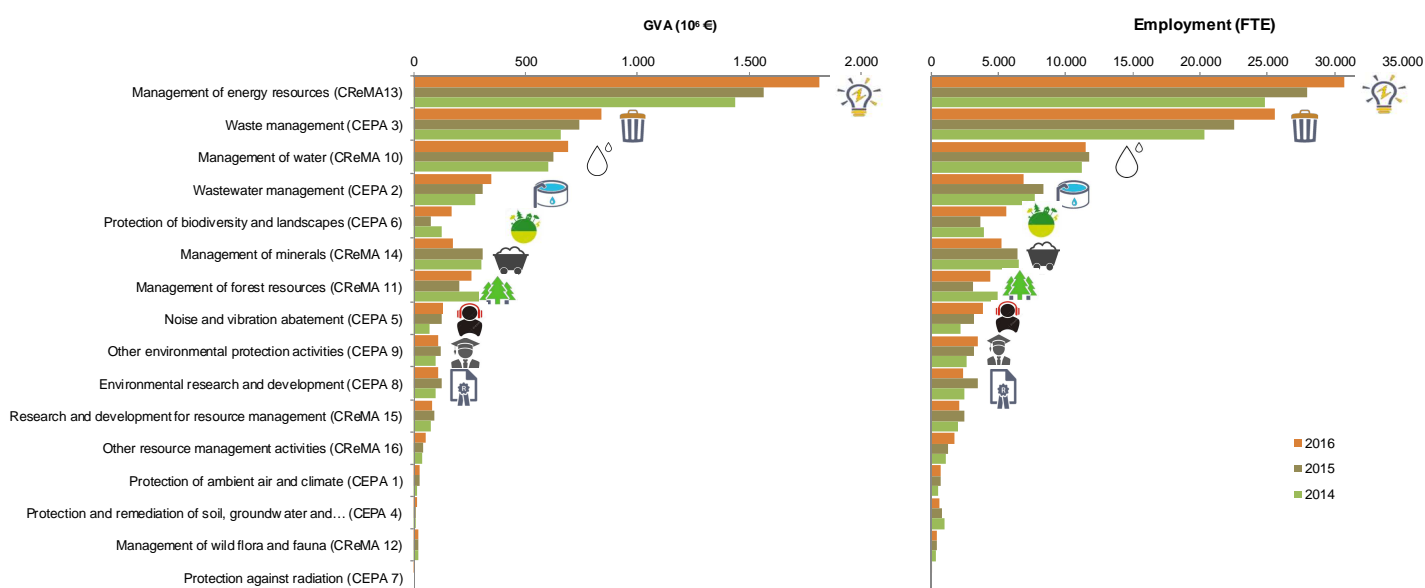
Chart 3: Exports by environmental domains (2014 – 2016)



The environmental domains that contributed most to the GVA were the *management of energy resources* (37.5%), *waste management* (17.3%) and *water management* (14.3%). The hierarchy of activities in

terms of employment was similar: *management of energy resources* (29.1%) was the most relevant, although not as distant from *waste management* (24.3%), followed by *water management* (10.9%).

Chart 4: GVA and Employment by environmental domains (2014 – 2016)



1.3. Results by industry

The GVA in environmental goods and services is generated by multiple branches (by NACE) of economic activity. In 2016, the industry with the greatest relative importance was *Water supply; sewerage, waste management and remediation* (NACE E), responsible for 35.8% of the total GVA of the environmental goods and services sector. *Manufacturing* (NACE C) came in second place (27.6%) and *Electricity, gas, steam and air conditioning supply* (NACE D) in third place (14.4%).

The distribution of employment by activity follows an identical hierarchy, although with different relative weights: *Water supply; sewerage, waste management and remediation* (NACE E) and *Manufacturing* (NACE C) showed very close relative weights (36.2% and 33.1%, respectively). The *Electricity, gas, steam and air conditioning supply* (NACE D) contributed only 1.2% to total employment.

Chart 5: GVA by NACE activity (2016)

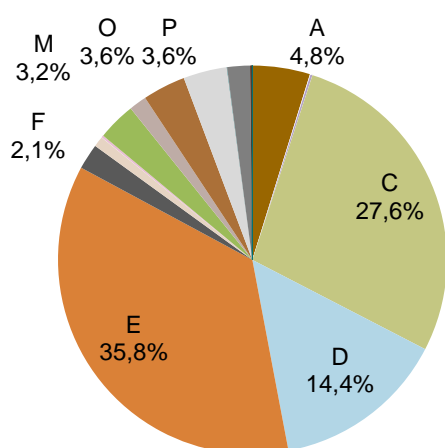
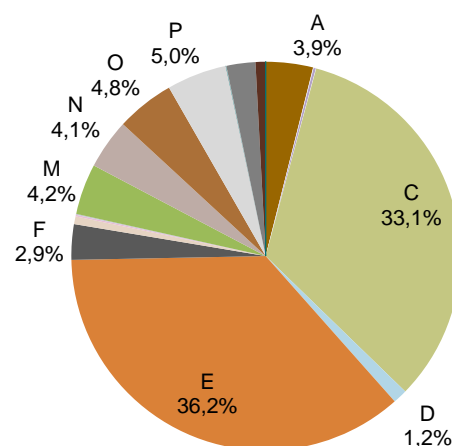


Chart 6: Employment by NACE activity (2016)



Crossing the information of the NACE breakdown and the environmental domains it is possible to conclude that the GVA of the *Water supply; sewerage, waste management and remediation* (NACE E) came mainly from *management of water* (36.9%), *waste management* (36.8%) and *wastewater management* (16.9%).

The GVA of the *manufacturing* (NACE C), under EGSS, was generated mainly by the *management of energy resources* (68.5%), which is subdivided into sub-domains of *production of energy from renewable sources* (46.5%), *heat and energy saving and management* (25.6%) and *minimization of the intake of fossil fuels as raw materials* (27.9%).

The GVA of *Electricity, gas, steam and air conditioning supply* (NACE D) was almost entirely associated with the management of energy resources, more specifically the *production of energy from renewable sources*.

Chart 7: GVA of the three main NACE activities, by domain (2016)

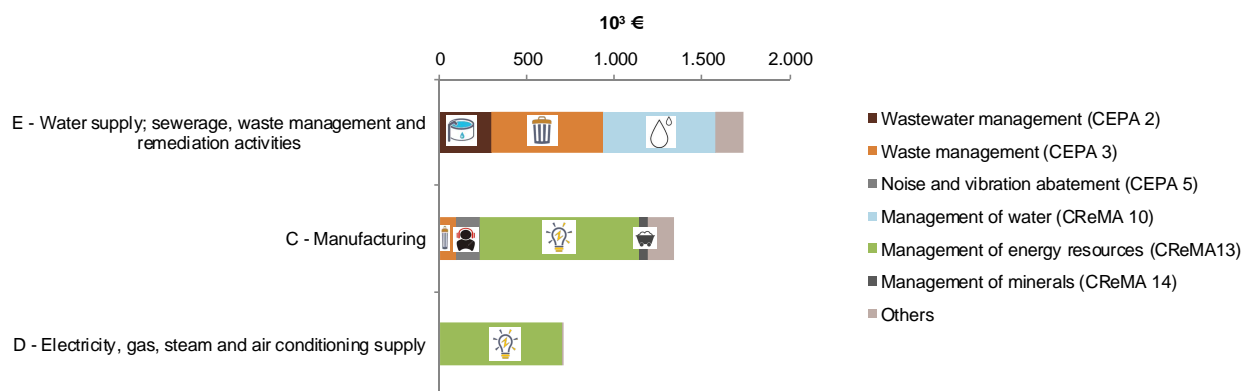
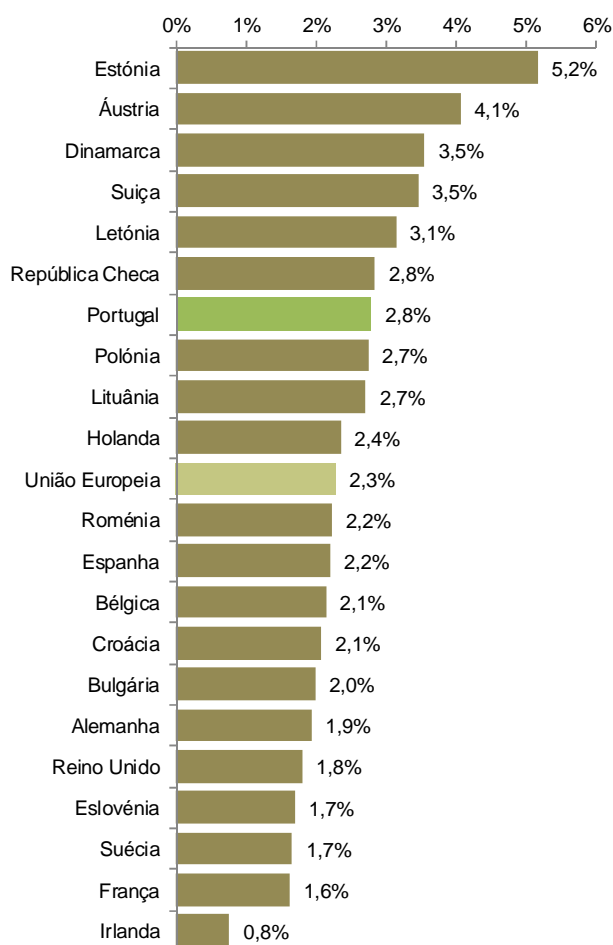


Chart 8: Weight (%) of the GVA of the environmental goods and services sector in Europe (2015)



Source: Eurostat, data extracted on the 12th February 2019.

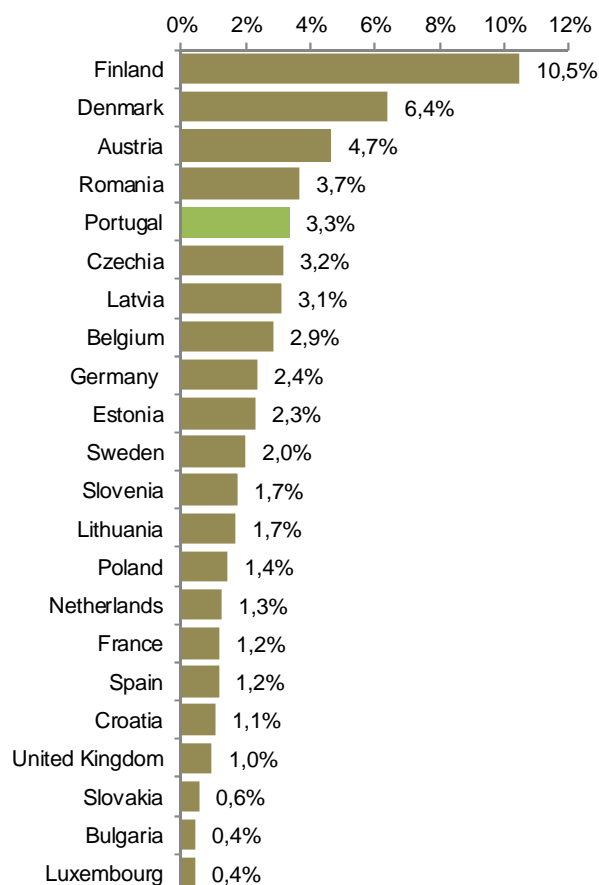
1.4. International comparisons

Having as reference the year 2015, the last year with information available for most European countries, it can be seen that Portugal registered a higher relative weight of GVA for Environmental Goods and Services in the national GVA (2.8%), than that of the EU28 (2.3%).

Comparisons with the results of other countries should be carried out with some caution. Indeed, not all data presented have their origin in Satellite Accounts, based on information from the National Accounts (some values are derived from surveys). Additionally, there is no total harmonization in the type of goods and services and units considered in the perimeter of EGSS.

Portugal presented the fifth highest relative weight of exports of environmental goods and services in total exports (3.3% in 2015). Finland was the country with the highest relative importance of these exports (10.5%).

Chart 9: Weight (%) of exports of the environmental goods and services sector in European countries (2015)



Source: Eurostat, data extracted on the 12th February 2019.

2. Environmental Protection Expenditure Accounts (EPEA)

EPEA predominantly focuses on specific environmental protection services, called **EP services**, most of which are represented by *waste management* and *wastewater management*.

Compared with EGSS, EPEA limit the areas of observation to *environmental protection* (CEPA), not covering *resource management* (CReMA) (see methodological notes).

National expenditure on environmental protection (NEEP) is the main variable of these accounts, corresponding to economic resources related to environmental protection. It is calculated through the following:

NEEP =

final consumption expenditure

+ intermediate consumption (IC)¹

+ investment (GFCF + NP)²

- current and capital transfers received from the Rest of the World

+ current and capital transfers paid to Rest of the World

2.1. Main results

In 2016, the following results were observed for **environmental protection services** (EP services):

¹ Intermediate consumption (IC), excluding the IC of EP services by specialized producers in environmental protection (producers whose main activity is the production of EP services).

² Sum of gross fixed capital formation (GFCF) and acquisitions net disposals of non-produced assets (NP).

- Final consumption expenditure of 958.4 M€ (0.6% of final consumption expenditure of the economy);
- Intermediate consumption of EP services of 1,331.7 M€ (0.8% of national intermediate consumption);
- Investment (for the production of EP services) of 511.3 M€ (1.8% of the total investment of the economy);
- Transfers for EP services received from the Rest of the world (RoW) of 513.8 M€;
- NEEP of 2,289.3 M€ (1.2% of national GDP). This value had underlying an output of EP services of 3,065.4 M€ (0.9% of national output).

Between 2015 and 2016, there was a decrease of 6.3% in NEEP, determined by a reduction in investment and by an increase in transfers received from the Rest of the World (RoW), which more than compensated the increases in final consumption expenditure and

intermediate consumption. In detail, it was observed:

- An increase in final consumption expenditure by 11.4%, higher than the 3.2% registered in the national economy;
- Intermediate consumption growth of 9.9%, while that of the national economy grew by 1.2%. The waste management domain in General government (GG) was decisive for this evolution;
- A 25.3% decrease in the investment for the production of EP services, as opposed to a 3.5% of increase in the national economy. For this evolution, contributed a decrease of around 30% in GG (responsible for almost 50% of the total investment) and 20% in Corporations;
- An increase in EP transfers received from the RoW of 61.5%.

Table 2: Main results of the Environmental protection Expenditure Accounts (2014 – 2016)

		2014	2015	2016	Change rate 2015/2016 (%)
National expenditure on EP (NEEP)	10 ⁶ euros	2,482.0	2,442.7	2,289.3	-6.3
Final consumption expenditure of EP services	10 ⁶ euros	857.2	860.6	958.4	11.4
<i>Final consumption expenditure in national economy</i>		146,265.6	150,310.6	155,085.8	3.2
Weight of final consumption expenditure of EP services in the national economy		0.6%	0.6%	0.6%	
Intermediate consumption (IC) of EP services¹	10 ⁶ euros	1,179.7	1,211.5	1,331.7	9.9
<i>Intermediate consumption in national economy</i>		158,833.3	161,474.6	163,413.0	1.2
Weight of intermediate consumption of EP services in the national economy		0.7%	0.8%	0.8%	
Investment (GFCF+NP) for the production of EP services	10 ⁶ euros	610.0	684.4	511.3	-25.3
<i>Investment, in the national economy</i>		25,993.1	27,843.9	28,829.6	3.5
Weight of investment for the production of EP services in the national economy		2.3%	2.5%	1.8%	
Current and capital EP transfers received from the Rest of the world	10 ⁶ euros	168.5	318.2	513.8	61.5
<i>Total current and capital transfers received from the Rest of the world</i>		9,544.1	9,697.2	9,635.7	-0.6
Weight of EP transfers received, in total transfers received from the Rest of the world		1.8%	3.3%	5.3%	

¹ - excluding the IC of EP services by specialized producers in environmental protection

by memory:

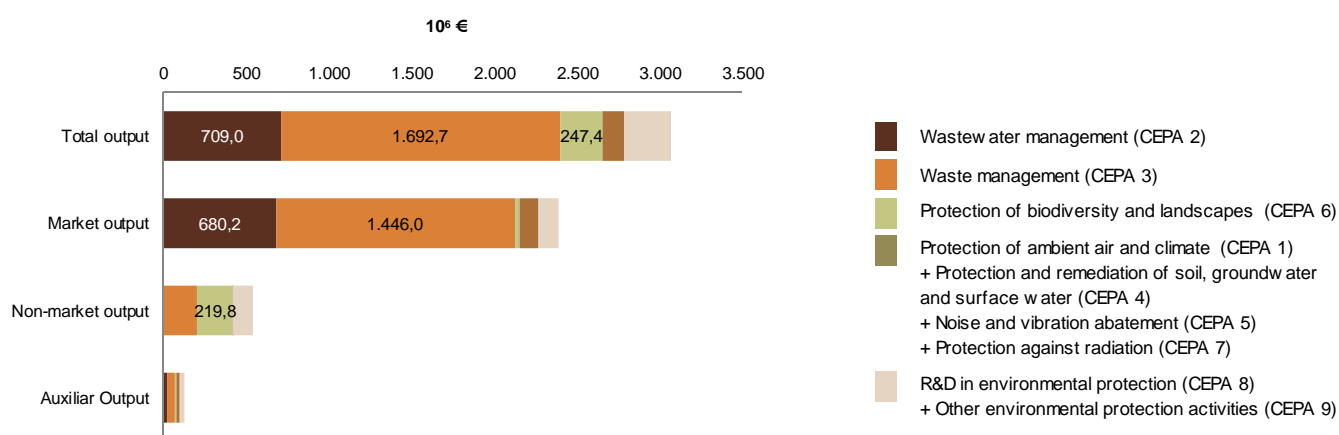
GDP	10 ⁶ euros	173,079.1	179,809.1	186,480.5	3.7
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For output of EP services by environmental domain, we highlight:

- *Waste management* was the most relevant domain (55.2%), followed by *wastewater management* (23.1%);

- *Waste management* was dominant in all types of production except for non-market output, where the *protection of biodiversity and landscape*, with 219.8 M €, was the main domain (40.4% of the total).

Chart 10: Main variables of Environmental Protection Expenditure Accounts



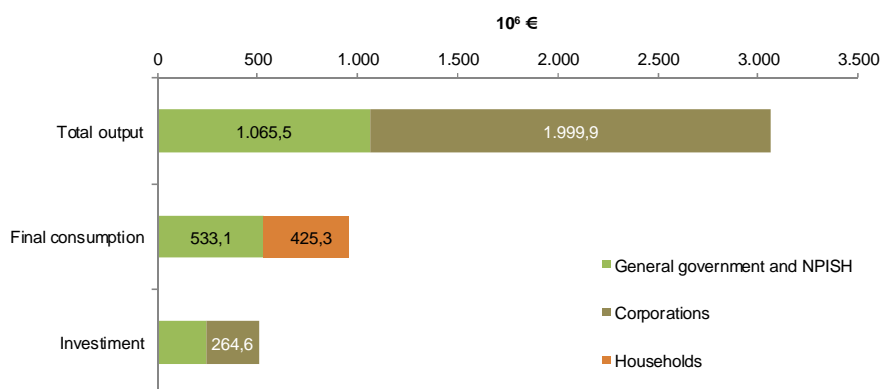
In terms of institutional sectors, in 2016:

- The Corporations accounted for 65.2% of the total output and the nonprofit institutions (NPISH) for the remaining (34.8%);
- The final consumption expenditure in EP services of the GG and NPISH represented 55.6% of the total,

with the remaining 44.4% for Households;

- The Corporations accounted for 51.8% of the investment for the production of environmental protection services and the GG and NPISH were responsible for the other 48.2%.

Graph 11: Main variables of the Environmental Protection Expenditure Accounts, by institutional sector (2016)



Methodological Notes:

The Environmental Goods and Services Sector Accounts (EGSS) and the Environmental Protection Expenditure Accounts (EPEA) are part of the System of European Economic Environmental Accounts (SEEA) and are two of the new mandatory transmission modules, from 2017 onwards, to comply with Regulation (EU) No. 538/2014. Accordingly, Member States are required to report these accounts to Eurostat from December 2017. For each transmission of data to the Commission, Member States provide annual data for years $n-2$, $n-1$ and n , where n is the reference year.

The environmental accounts were developed in interconnection with the System of National Accounts (SNA). They are a satellite account system that presents environmental information in a format compatible with the National Accounts information, enabling an integrated analysis.

A.1 Environmental Goods and Services Sector Accounts (EGSS)

In addition to the Regulation, EGSS's main methodological reference documents are the Eurostat handbooks: *Environmental goods and services sector accounts Handbook* and *Environmental goods and services sector accounts Practical guide*. In addition, since EGSS is a project consistent with the SNA, the use of its concepts, nomenclatures and methodological references is essential, namely the United Nations System of National Accounts (SNA2008) and the European System of Accounts (ESA2010).

Statistics on environmental goods and services record and present data on production activities of national economies that generate environmental products in a manner consistent with the data transmitted under ESA2010. Environmental products (environmental goods and services) have as their main objective environmental protection or resource management. The selection and classification of the products and economic activities covered by this project comply with the requirements of the *Environmental goods and services sector accounts Practical guide*.

EGSS results are not directly comparable with the results of the Environmental Goods and Services Sector Survey, because: EGSS are a derived statistic, i.e. cross several sources of information (namely this survey); EGSS is a satellite account of the National Accounts. Therefore, it uses identical sources, methodologies and principles, namely exhaustiveness.

Main data sources

- Statistics Portugal:
 - Portuguese National Accounts (Base 2011);
 - General File of Statistical Units;
 - Environmental Goods and Services Sector Survey (ISBSA);
 - Municipal Environmental Protection Survey (IMPA);
 - Business Survey on Management and Protection of the Environment (IEGPA);
 - Survey of Fire Brigade Entities (IEDCB);
 - Survey on Urban Waste Management Entities (IEGRU);
 - Survey on Non-Governmental Environmental Organizations (IONGA).
- Other sources:
 - Detailed analytical balance sheets of General Government entities (including the General State Account);
 - Simplified Business Information (SBI);
 - National Scientific and Technological Potential Survey (IPCTN).
 - Electronic pages of units of economic activity;
 - Reports and Accounts.

EGSS data is broken down according to the following nomenclature of environmental activities and products:

Table A.1: Classification of the domains of the environmental goods and services sector

Classification of environmental goods and services sector domains		
Environmental protection activities		Examples
CEPA 1	Protection of ambient air and climate	Equipment for the reduction of atmospheric emissions.
CEPA 2	Wastewater management	Collection and treatment of wastewater including monitoring and regulation activities.
CEPA 3	Waste management	Collection and treatment of waste, including monitoring and regulation activities. Recycling and composting, street cleaning and the collection of public litter.
CEPA 4	Protection and remediation of soil, groundwater and surface water	Monitoring and control of soil and groundwater pollution.
CEPA 5	Noise and vibration abatement	Reduction of noise in places frequented by the public (swimming pools, discos, etc.), production of car automotive silencers, etc.
CEPA 6	Protection of biodiversity and landscapes	Maintaining or establishing certain landscape types, biotopes, eco-zones, etc. having a clear link to biodiversity preservation.
CEPA 7	Protection against radiation	Handling, transportation and treatment of high level radioactive waste that requires shielding during normal handling and transportation.
CEPA 8	Research and development in environmental protection (R&D)	R&D activities oriented towards environmental protection (identification and analysis of sources of pollution, their effects on human beings, the species and the biosphere); R&D for the prevention and elimination of pollution.
CEPA 9	Other environmental protection activities	Training or teaching activities specifically oriented towards environmental protection and consulting activities in non-discriminated environmental protection areas.
Resource management activities		
CRema 10	Management of waters	Minimisation of inland waters intake through the reduction of water losses and leaks or water reuse and savings. (1)
CRema 11	Management of forest resources	
CRema 11A	Management of forest areas	Measuring, controlling and monitoring forest areas and timber stocks; education, training and general administration activities linked to the management of forests.
CRema 11B	Minimisation of the intake of forest resources	Reducing the input of forest-related products (wood and non-wood); recovery, reuse or savings of forest products and byproducts. Non wood forest products include cork.
CRema 12	Management of wild flora and fauna	Restoration activities (replenishment of wild flora and fauna stocks); education, training and general administration activities linked to the management of wild flora and fauna.
CRema 13	Management of energy resources	
CRema 13A	Production of energy from renewable sources	Production of energy from renewable sources (wind, solar, geothermal, hydrothermal and ocean energy, hydropower, biomass, landfill gas, sewage treatment plant gas and biogases).
CRema 13B	Heat/Energy saving and management	Energy savings, thermal insulation activities and energy recovery (e.g. cogeneration, reduction of energy transport and distribution losses, energy efficiency improvements).
CRema 13C	Minimisation of the intake of fossil resources as raw material	Minimization of fossil resources through changes in the manufacturing process, recovery of materials based on non-energy fossil resources and production of petroleum product substitutes.
CRema 14	Management of minerals	Saving of mineral resources through recovery of mineral-based materials (waste and scrap processing of metallic and non-metallic mineral materials and other articles).
CRema 15	Research and development (R&D) for resource management	R&D activities for new applications in the field of natural resource management and savings: R&D for renewable energy, for energy and minerals savings, for timber and other biological resources savings, etc.
CRema 16	Other resource management activities	Education and training activities that relate to natural resources, as well as other kinds of consulting activities leading to indivisible output.

(1) The abstraction, treatment and distribution of water should, in principle, be excluded. However, the Environmental goods and services sector accounts, Practical Guide refers that if the available data sources do not allow their separation, they can be included in CRema 10 (this is the national case).

Source: based on the *Environmental goods and services sector accounts, Practical Guide*

A.2 Environmental Protection Expenditure Accounts (EPEA)

EPEA provide data on expenditure in the areas of environmental protection, i.e. the economic resources allocated by resident units to environmental protection. These accounts allow the compilation of National expenditure on environmental protection (NEEP). The algorithm provided by the reporting system to Eurostat is calculated directly through the set of remaining variables reported:

$$\text{EPEA} = \text{final consumption expenditure} + \text{intermediate consumption} + \text{investment (GFCF + NP)} - \text{current and capital transfers received from the Rest of the World} + \text{current and capital transfers paid to the Rest of the World}$$

Like EGSS, in addition to the Regulation and methodological references of the National Accounts, EPEA have other specific methodological reference documents, namely Eurostat's *Environmental protection expenditure accounts Handbook 2017 edition*. The list of products and economic activities covered by this project also complies with the requirements of the manual *Environmental goods and services sector accounts Practical guide*.

The results of EPEA are not directly comparable with the results of the environmental surveys because: 1) EPEA focus only on environmental protection services and do not cover other environmental protection products or resource management; 2) EPEA is a derived statistic, that is, they cross several sources of information; 3) EPEA is a satellite account of the National Accounts and therefore use identical sources, methodologies and principles, including completeness.

The main **sources of information** used in the EPEA are the same as those of the EGSS.

These accounts relate to EGSS, but:

- Restrict the domains of observation to environmental protection (CEPA classification), i.e. they do not cover Resource Management (CReMA classification);
- Focus predominantly on the share of specific environmental products that correspond to specific environmental protection services, abbreviated to PA services. Environmental protection products, which encompass goods and services, can be categorized by purpose (primary or secondary) to protect the environment. Products whose primary purpose is environmental protection are designated in the methodological manual by Specific Products EP. The portion of the specific EP products corresponding to services are the EP services;
- Do not detail activities by NACE;
- Extend the number of estimated variables;
- Detail most of the variables by institutional sector.

The total EP services output comprises:

- Market output – output that is disposed, or intended to be disposed on the market;
- Output produced for own final use – consists of services retained for own final consumption; the EPEA questionnaire foresees the addition of this output to the market output and the inclusion in that operation;
- Non-market output – output provided to other units for free, or at prices that are not economically significant;
- Ancillary output - it comes from ancillary activities, such as waste treatment activities that do not constitute the productive activity of the entities, and can be estimated by the sum of the costs.

Note on the international trade of EP services:

International trade in EP services, within the scope of wastewater management (CEPA 2) or waste management (CEPA 3), includes operations for commissioning (without transfer of ownership) between two countries. In these cases, the export of these services corresponds to the value of the service rendered by Portugal abroad, and the importation appears in the opposite case, when Portugal resorts to another country to treat its waste.

Final considerations and revisions:

Although these accounts are already covered by a EU regulation, these projects are still under conceptual discussion at Eurostat, notably on environmental boundaries and classification of included products.

EPEA consist of a set of economic information, with mandatory variables and other voluntary calculations. Variables of these two types contribute to NEEP. Statistics Portugal calculates a significant number of variables in addition to those required by regulation, namely all the variables underlying the NEEP.

The results presented here implied revisions for 2014 and 2015 compared to the previous publication released in February 2018, due to updates of the information and improvement of the calculation of some NEEP variables, namely:

- International trade, which now considers only the import and export of EP services, failing to account for the portion of goods included in the product 38 – waste collection, treatment and disposal services; materials valuation services - from the product nomenclature of the Portuguese National Accounts - NPCN;
- The information on Gross Fixed Capital Formation (GFCF) underlying the production of EP services, which is now in line with public expenditure by function - COFOG (Classification of Functions of Public Administrations) has been updated.

As a result, with the release of the data relating to environmental protection accounts for 2016, EPEA results for 2014 and 2015 were revised, with the impact shown in the following table:

Table A.2: NEEP revision, in percentage

	2014	2015
NEEP	-4.7%	-2.7%