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ENVIRONMENTAL GOODS AND SERVICES SECTOR ACCOUNTS – FIRST STATISTICS

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ABSTRCT: The 1990s saw the first efforts to make the national accounts "greener," i.e. to introduce into the System of National Accounts (SNA) of satellite accounts reflecting the relationships (flows) between the economy and the environment. They were supposed to ensure the provision of better information to assess progress in implementing the principles of sustainable development. As a result of this process European environmental economic accounts were phased in. The first modules were introduced by the regulations of 2011 (the first three modules) and of 2014 (three more modules).
The article surveys the most important issues related to economic environmental accounts and shows the first statistical data collected by Eurostat. The aim of this article is thus to analyse the main difficulties of the calculation of environmental costs in the context of the environmental goods and services sector accounts, i.e. the subsequent environmental accounts modules being implemented.

KEY WORDS: European environmental economic accounts, Environmental goods and services sector accounts, environmental costs

JEL: Q560, M480

Introduction

The 1990s saw the first efforts to make the national accounts "greener," i.e. to introduce into the System of National Accounts (SNA) of satellite accounts reflecting the relationships (flows) between the economy and the environment. They were supposed to ensure the provision of better information to assess progress in implementing the principles of sustainable development together with the elaboration of the concept, the emphasis on the separation of economic growth from increased consumption of natural resources (EUROPA 2020, 2010; Progress on "GDP and beyond", 2013) and the transition towards the circular economy (An EU action plan for the Circular Economy, 2015).

European environmental economic accounts were introduced by the regulations of 2011 (the first three modules) (Regulation EU 691/2011, 2011) and of 2014 (three more modules), (Regulation EU 538/2014, 2014, p. 20), including environmental goods and services sector accounts. In general, goods and services related to environmental protection include those specifically generated with a view to protecting the environment (e.g. those aimed at reducing the negative impact on the environment) and related to resource management (conservation and reduction of natural resource depletion) (EGSS – Statistics Explained).

The article surveys the most important issues related to environmental accounts and shows the first statistical data collected by Eurostat. The aim of this article is thus to analyse the main difficulties of the calculation of environmental costs in the context of the environmental goods and services sector accounts, i.e. the subsequent environmental accounts modules being implemented.

Environmental economic accounts

At the outset, let us briefly recapitulate the essence and extent of the reporting requirements of individual countries in the area of environmental economic accounts. The environmental economic accounts constitute a module of the national accounts. They serve to combine information on the relationships between society and the environment. The environmental economic accounts have been devised with a view to better reflect both the contribution of the environment to the economy and the impact of the economy on the environment. Their important feature is the fact that they are based on international SEEA guidelines (under the auspices of the United Nations, the European Commission and Eurostat), the Food and Agriculture Organisation of the United Nations, the Organisation for Economic Coopera-

tion and Development, the International Monetary Fund, and the World Bank Group) and thus enable the collection of consistent data. The first guidelines concerning environmental and economic accounts were promulgated in 1993, (Integrated Environmental and Economic Accounting, 1993), but work was continued and ten years later another edition of the guidelines was published (SEEA–2003, 2003). 2012 saw the publication of general guidelines, although it should be noted that the official version of the document was not published until 2014 (SEEA CF–2012, 2012). The European guidelines must, of course, be consistent. These issues are governed by two regulations.

The first one, Regulation No 691/2011 of 6 July 2011 on European environmental economic accounts, provides a legal basis for the development of the environmental accounts, and defines three modules:

I. Air emissions accounts (AEA),
II. Environmentally related taxes by economic activity (TAXES),
III. Economy-wide material flow accounts (MFA).

The second one, Regulation No 538/2014 of 16 April 2014 amending Regulation EU No 691/2011 on European environmental economic accounts, added three further modules:

IV. Environmental protection expenditure accounts (EPEA),
V. Environmental goods and services sector accounts (EGSS),
VI. Physical energy flow accounts (PEFA).

For the sake of clarity, the relationships amongst the conceptual regulations and legal solutions are highlighted in figure 1.

From the point of view of the issues raised in this paper, it is extremely important to mention the Commission Implementing Regulation EU 2015/2174 on the indicative compendium of goods and services related to environmental protection, the format for data transmission for European environmental economic accounts and modalities, structure and periodicity of the quality reports (Regulation EU 2015/2174, 2015), which clarifies the provisions of Annex V, including, among others, the definition of the environmental goods and services sector (in fact, the Annex is contained in Regulation 538/2014). The definitions shall be considered in more detail further in the survey.

It is worth noting that in 2011 the UN Committee of Experts on Environmental–Economic Accounting adopted the *International Recommendations for Energy Statistics* (implemented as SEEA-energy), and in 2010, the *International Recommendations for Water Statistics* (implemented as SEEA-water). These guidelines are designed to streamline and standardise the processes of water and energy data collection, transmission, and publication. The recommendations constitute the basis for the implementation of changes in the national accounts. At the end of 2015, further guidelines on agriculture,

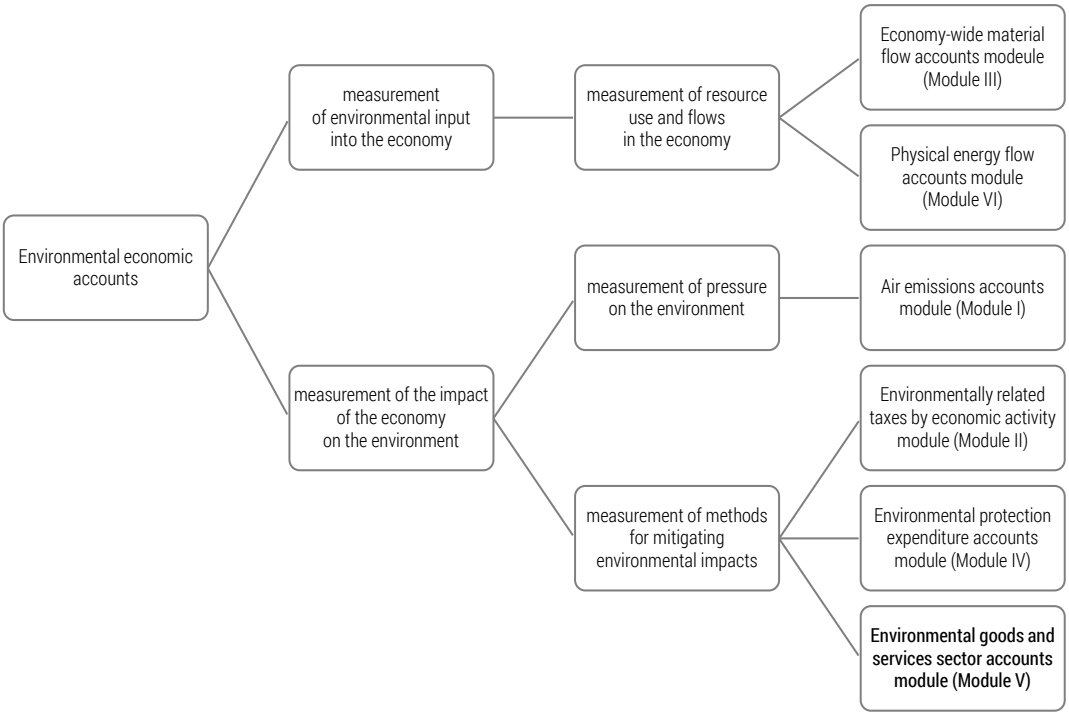

Figure 1. Environmental costs and EU regulations

Source: Own study based on: Regulation EU 691/2011, 2011; Regulation EU 538/2014, 2014, p. 20.

forestry and fisheries *SEEA Agriculture, Forestry and Fisheries* (SEEA AFF) were put under consultation. The next subsystem, *SEEA Experimental Ecosystem Accounting*, is being developed; as such, it represents an enormous challenge.

This brief outline covers the most important acts and actions in the field of European environmental economic accounts and demonstrates the huge emphasis in recent decades on their development understood as the creation and improvement of methodologies meant to ensure consistency and timeliness of data. These are supported by relevant legal and practical actions undertaken by the European Union, including through Eurostat. They fit in naturally with the international, jointly developed standards.

It should be underscored that the environmental economic accounts should be based on the existing data sources, but in practice, a number of elements require clarification – from the definitions to the detailed methodologies for calculating individual items. In the absence of reliable sources or if the available data is inaccurate, they must be produced, even though the idea behind the accounts was to use the already existing inputs (Małecki,

2015, p. 140). This, in turn, increases the costs of implementing subsequent modules of environmental economic accounts. The most important challenge is to ensure high quality and consistency of the data supplied by individual countries. It should also be remembered that different countries have different information needs (e.g. southern European countries are more interested in Water Accounts), while on a global scale, the differences are even greater than those in Europe (Cf Rosiek, 2015).

Environmental goods and services sector accounts

The reports of the European Commission clearly indicate that the introduction of additional statistical modules for the European environmental economic accounts poses an ever greater challenge (COM/2016/0663 final, 2016), including the environmental goods and services sector accounts. Eurostat's first guidelines in this regard were published in 2009 and were updated in 2016 as *Environmental goods and services sector accounts – Handbook 2016 edition* (EGSSA-Handook, 2016).

As per the guidelines, environmental goods and services are those produced for the purpose of environmental protection, i.e. preventing, reducing and eliminating pollution and any other degradation of the environment as well as resource management, i.e. preserving and maintaining the stock of natural resources and hence safeguarding against depletion (Regulation EU 538/2014, 2014 annex V, section 2). The environmental goods and services sector has the same system boundaries as ESA (ESA 2010 Eurostat, 2013). According to ESA, production means "the activity carried out under the control and responsibility of an institutional unit that uses inputs of labour, capital, and goods and services to produce goods and services." (Regulation EU No. 538/2014, Annex V, Section 2)

Goods and services related to environmental protection fall within the following categories (Broniewicz, Domańska, 2016, p. 18):

- environmental specific services – typical for environmental protection and resource management, e.g. sewage treatment, waste management, organic farming, energy production from renewable resources, monitoring and measuring the state of the environment and ecological education;
- environmental sole purpose products (connected products) – products used directly and exclusively to protect the environment and manage resources, or other services;
- adapted goods – more environmentally friendly alternatives to traditional goods generating less pollution and more resource-efficient;
- environmental technologies – divided into 'end-of-pipe' and integrated technologies.

The purpose of these data is to facilitate, inter alia, the reporting of changes towards a green economy, hence apart from production and added value, the basic data include employment levels in these 'sectors' in order to better monitor the economic targets. The above-mentioned accounts include all the entities whose activities lead to the production of environmental protection and resource management goods as well as related services regardless of whether or not they specialise in such production, whether or not it is their primary activity, and may also provide those products or services for individual use. The challenge then becomes how to define the boundaries of the environmental goods and services sector, and hence the range of data collected. This range should be consistent with the existing data structures (CEPA), and, at the same time, flexible enough to take into account the specificity of each country. In fact, the first question is related to what constitutes the sector in question: whether one should focus on manufacturers producing environmental goods, the manufacturing process or the products themselves (goods and services). Manufacturers of environmental goods (primary activity) may also produce other goods. The EU guidelines indicate the need to focus on environment-related activities and products (EGSS-Handbook 2016, p. 12-14).

The analysis of accessible data from Eurostat

Officially, the first transmission of data to Eurostat is expected to take place in 2017, hence reports are currently being prepared. Eurostat has already published first data on the environmental goods and services sector. Please note, however, that they are not complete, since they are supplied on the basis of a 'gentlemen's agreement.' Most countries submit estimates and preliminary data for selected years, but a number of them has yet to provide such data. In such a situation, Eurostat uses 'alternative data estimation techniques.' (COM/2016/0663 final, p. 13)

The first data on production and employment in this sector appear to indicate a fairly dynamic growth in 2004–2013 ranging from 1.5 to more than 2-fold. (tables 2 and 3, figure 2). Equally impressive was employment growth in all sectors: mining, quarrying and production (by 38%), agriculture, forestry and fisheries (by 49%), electricity, gas, steam and air conditioning supply; water supply; sewerage, waste management and remediation activities (by 25%), services (by 18%). The data apply to activities that result in the delivery of environmental protection and resource management goods as well as related services.

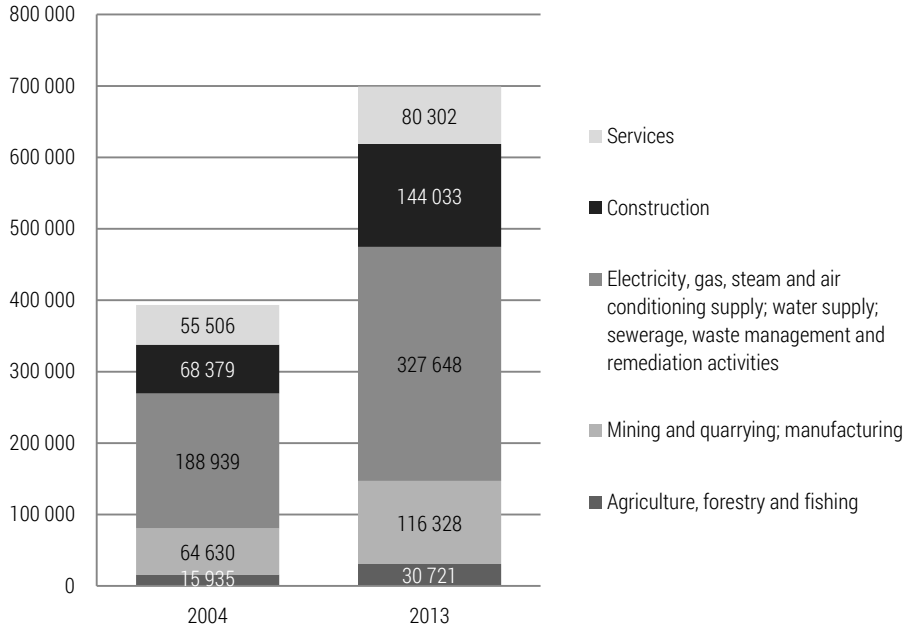

Figure 2. Production value of environmental goods and services sector in the European Union (28 countries) in 2004-2013 [million EUR]

Source: Eurostat, Production, value added and employment by industry groups in the environmental goods and services sector, [env_ac_egss3], [07-11-2016].

When analysing this data, it should be remembered that they are incomplete and approximate, since the first mandatory data transmission will occur in 2017. This fact is best illustrated by table 4, which include selected countries with the most data submitted and Poland (transmissions in 2007–2014). To date (2016), quite a few countries have not submitted any reports (e.g. Spain, Italy, Turkey), whereas others have transmitted only selected categories or only single data units. The table contains data from 2005-2014, but they apply to different years. An attempt was made to include data from subsequent years closest to 2005 or closest to 2014, respectively. Hence, the column for 2005 contains data from 2005-2009, and if no data for the period were available, it means that they were not reported in 2005 or in subsequent years until 2010. The 2014 column contains data for 2010-2014, and if no data for the period were available, it means that they were not reported. As was pointed out above, even though the tabulation comprises selected countries with the most complete data inventories, a number of entries are blank. Additionally, the table reflects only the production of goods and ser-

vices related to environmental protection. Other rubrics concerning added value, imports and exports are often left completely blank.

Even table 1, which summarizes the value of production of goods and services related to the environment, shows that the data are incomplete, especially in the earlier reporting periods. However, it is difficult to say to what extent the increase in the value of production in this section (e.g. in the case of Germany) can be attributed to changes in the market or to more detailed reporting. Certain hints can be extracted from the data concerning France, Belgium, and Austria, which implemented continuous reporting and have posted visible growth since 2008. In their case, the sector in question grew 23% in France, 33% in Belgium, and 17% in Austria in 2008–2014. To further highlight the importance of this area, the value of production in the sector under consideration can be compared with the GDP (at current prices). For example, in 2013 the approximate index totalled 4% in France, 8% in Belgium and 11% in Austria. These figures are significant. By way of comparison, the index in Poland in 2014 was approximately 5%.

When analysing the data, one must be aware of the fact that they are incomplete. Despite the efforts by Eurostat aimed at maintaining their consistency, individual countries face a number of difficulties in estimating the required data, moreover, it is impossible to reliably estimate certain items on the basis of the reports already submitted.

Examples can be found in the reports concerning data collection in Poland (Broniewicz, Domańska, 2016, p. 30):

- no information about the value of ancillary production areas related to resource management (outside CReMA 10);
- no basis for determining the share of EGSS production in global production as regards certain environmental goods and services; e.g. the share of the value of landfill equipment production in the production of machinery for mining, quarrying and construction;
- no possibility of tracing the source data on the value of environmental goods and services, e.g. value/number of noise barriers actually built or the value of trash collection and snow removal services.

Similar problems certainly affect other countries, but to differing extents. Fortunately, they have been defined now, hence it will be easier to eliminate them in the future.

Table 1. Selected data of production value in the environmental goods and services sector by the EU Countries in years 2005–2014 (Total – all NACE activities) [mln EUR]

	2005-2009	2010-2014
Belgium	17 031	30 981
Bulgaria	:	1 590
Czech Republic	:	7 114
Denmark	:	23 629
Germany	28 288	145 948
Ireland	:	2 829
Spain	:	:
France	69 890	86 113
Croatia	:	2 408
Italy	:	:
Latvia	1 521	2 101
Lithuania	:	2 098
Luxembourg	1 724	1 722
Netherlands	:	32 791
Austria	31 048	36 437
Poland	18 608	19 973
Portugal	:	:
Romania	8 449	9 150
Slovenia	:	1 736
Finland	:	:
Sweden	:	19 345
Turkey	:	:

Source: own study based on: Production, value added and exports in the environmental goods and services sector by Countries, Total – all NACE activities [env_ac_egss2], [07-11-2016].

Table 2. Production Value of environmental goods and services sector in European Union (28 countries) between 2004-2013 [mln EUR]

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Total – all NACE activities*	393388	428602	478523	520516	570451	552394	615756	679004	689262	699033
Agriculture, forestry and fishing	15935	15725	16883	19113	21104	20753	24287	27878	30169	30721
Mining and quarrying; manufacturing	64630	69723	82381	90030	108657	96125	118038	126173	120535	116328
Electricity, gas, water supply; sewerage, waste management**	188939	204617	224058	242323	260151	250828	278097	297505	314513	327648
Construction	68379	79714	91086	100645	109181	113888	121672	148493	144234	144033
Services	55506	58823	64114	68406	71357	70800	73662	78955	79811	80302

* NACE – The Statistical classification of economic activities in the European Community, Glossary: Statistical classification of economic activities in the European Community (NACE)

** Electricity, gas, steam and air conditioning supply; water supply; sewerage, waste management and remediation activities

Source: own study based on the same source as figure 2.

Table 3. Dynamic of Production in environmental goods and services sector in European Union (28 countries) between 2004-2013 (2004=100)

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Total – all NACE activities	100	109,0	121,6	132,3	145,0	140,4	156,5	172,6	175,2	177,7
Agriculture, forestry and fishing	100	98,7	105,9	119,9	132,4	130,2	152,4	174,9	189,3	192,8
Mining and quarrying; manufacturing	100	107,9	127,5	139,3	168,1	148,7	182,6	195,2	186,5	180,0
Electricity, gas, water supply; sewerage, waste management*	100	108,3	118,6	128,3	137,7	132,8	147,2	157,5	166,5	173,4
Construction	100	116,6	133,2	147,2	159,7	166,6	177,9	217,2	210,9	210,6
Services	100	106,0	115,5	123,2	128,6	127,6	132,7	142,2	143,8	144,7

* Electricity, gas, steam and air conditioning supply; water supply; sewerage, waste management and remediation activities
Source: own study based on the same source as figure 2.

Table 4. Dynamic of Employment in environmental goods and services sector in European Union (28 countries) between 2004-2013 (2004=100)

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Total – all NACE activities	100	109,0	121,6	132,3	145,0	140,4	156,5	172,6	175,2	177,7
Agriculture, forestry and fishing	100	98,7	105,9	119,9	132,4	130,2	152,4	174,9	189,3	192,8
Mining and quarrying; manufacturing	100	107,9	127,5	139,3	168,1	148,7	182,6	195,2	186,5	180,0
Electricity, gas, water supply; sewerage, waste management*	100	108,3	118,6	128,3	137,7	132,8	147,2	157,5	166,5	173,4
Construction	100	116,6	133,2	147,2	159,7	166,6	177,9	217,2	210,9	210,6
Services	100	106,0	115,5	123,2	128,6	127,6	132,7	142,2	143,8	144,7

* Electricity, gas, steam and air conditioning supply; water supply; sewerage, waste management and remediation activities
Source: own study based on the same source as figure 2.

Table 5. Selected data of production value in the environmental goods and services sector by types of activities by the EU Countries in years 2005-2014 (Total – all NACE activities) [mln EUR]

Category	Ancillary activities		Market activities		Market activities:												Non-market activities	
Country	total		total		environmental specific and connected services		connected goods		adapted goods		end-of-pipe technologies		integrated technologies		cleaner and resource efficient products		total	
	2005a	2014b	2005a	2014b	2005a	2014b	2005a	2014b	2005a	2014b	2005a	2014b	2005a	2014b	2005a	2014b	2005a	2014b
Belgium	344	205	16448	29211	10787	17110	:	:	:	:	:	:	:	:	4897	10033	239	1566
Germany	:	:	44616	109006	:	:	:	:	:	:	:	:	:	:	:	:	:	:
France	2794	2962	55022	68335	24150	26682	:	:	:	:	:	:	:	:	16604	28555	12074	14816
Poland	:	1 074	:	18351	:	7064	:	:	:	:	:	:	:	:	:	11287		510
Romania	1224	891	4679	7718	1425	1434	4983	858	2810	5132	55	90	45	114	:	5861	301	541

a – in 2005-2009; b – in 2010-2014

Source: own study based on the same source as figure 1.

Conclusions

The extension of national accounts to include the environmental economic modules is a challenging task, but by all means a desirable one. Individual countries report collected data to Eurostat to varying extents. Some countries have submitted regular reports for years, whereas others, such as Poland, have developed a methodology and made pilot data transfers. Still others have yet to transfer such information to Eurostat.

What are, then, the conclusions that can be drawn from the current situation in Europe in the area studied? They refer primarily to data and to their collection procedures. With regard to the data presented, one must be aware of their incompleteness, especially given the fact that the Eurostat website contains ready-made tables and charts (Eurostat, EGSS – Statistics Explained). Thus, the charts in the present study should be interpreted with a degree of caution. Certainly, the share of environmental goods and services expressed as production value increases, but knowing that a substantial portion of the data results from estimations suggests that they should also be approached with caution. On the other hand, the data for individual countries, especially relative ones, permit more valid generalisations, e.g. concerning the share of the sector's output in GDP. Unfortunately, in order to draw more reliable conclusions we must wait for more complete information that will come in next year (the actual waiting period is two years, whereas the data spanning several years will likely not be available until 2020). One may also presume that certain countries find the collection of such data problematic, hence their submissions even in recent years have been incomplete. This signals the often raised issue of the dynamics of work on the environmental economic accounts: which is more important – the consistency of the data or their accuracy? Is it better to introduce 9 types of accounts and leave some of them incomplete or to focus on making the existing one more specific?

One should also answer the most important question: is it worth attempting to develop such complex accounts? The answer is yes, although it is not so obvious. Whether or not it makes sense to collate such information and incur the attendant costs is determined by two factors. On the one hand, the quality of collected and published data is important, which can be achieved in the case of environmental economic accounts within 5 years. On the other hand, the use of such information is also important. The author's modest experience in this area in Poland suggests that the awareness of the existence of such accounts among politicians and people responsible for the shape of the economy is limited, not to mention the practical application of such a tool. So far, it appears that only a narrow circle of specialists deals with this subject. On a more positive note, at the level of the European Union the data

generated by the environmental economic accounts system are indeed utilised and indirectly affect activities undertaken in Poland. For this reason, it is worth making the effort to further specify the scope of reporting and ensure accuracy of the data contained in these accounts.

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