

# Statistics on environmental goods and services sector in Finland

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**Abstract.** The UN Statistical Commission adopted the core accounts of the System of Environmental-Economic Accounts (SEEA) as an international statistical standard at its 43<sup>rd</sup> session in 2012. One element of the SEEA framework are statistics on the environmental goods and services sector (EGSS) that comprises the production, design and manufacturing of products for purposes of environmental protection and resource management. In Finland, data from enterprises producing environmental goods and services are collected by means of a direct questionnaire whereas in most EU countries the production of EGSS statistics is based on register data. Both methods have problems to overcome. In the survey-based method, the problems relate mostly to the sampling and survey design, whereas in the register-based method problems arise as there are no well-defined guidelines on what is considered EGSS production and on how to measure the share of the EGSS of those product categories that are considered to only partly come under the EGSS. However, a combination of these two methods might be an answer to being able to produce reliable statistics. In addition, there is a need to clarify the concept of the EGSS and its relation to “green economy”, especially in public debate, otherwise statistical institutes may be expected to respond to demand for data that have not been defined.

## 1. Introduction

The UN Statistical Commission adopted the core accounts of the System of Environmental-Economic Accounts (SEEA) as an international statistical standard at its 43<sup>rd</sup> session in 2012. Even earlier, the EU had passed statistical regulations on the first three modules of the European environmental-economic accounts, which concern air emissions, economy-wide material flow accounts and environmental taxes. The EU work continues, aiming at the adoption of the next three modules of the environmental-economic accounts, comprising energy accounts, environmental goods and services sector (EGSS) and environmental protection.

This paper discusses Statistics Finland’s experiences in developing statistics on the environmental goods and services sector. The development work started already five years ago with the help of small extra budget funding. It proved, however, the interest of the Finnish government in the development of these important statistics. The current government programme also emphasizes the economic importance of cleantech business and, consequently, the demand for reliable statistics has increased.

Chapter 2 of this paper provides explanations to some basic concepts. Chapter 3 describes the compilation of EGSS statistics in Finland. Some problems relating to the practical work are described in Chapter 4. A summary and conclusions based on the experiences gained so far are presented in the last Chapter.

## **2. Some basic concepts**

### *2.1 Environmental activities*

According to the SEEA, environmental activities mean economic activities whose primary purpose is to reduce or eliminate pressures on the environment or to make more efficient use of natural resources (Paragraph 4.11 of SEEA). In SEEA 2012, environmental production activities are defined in Paragraph 4.12 and resource management activities in Paragraph 4.13.

There are two different sets of statistical information concerning environmental activity. The first set concerns the recording of expenditure and related national accounts flows for environmental activities. Accounts of this type have been developed in relation to environmental protection. These Environmental Protection Expenditure Accounts (EPEA) supporting statistics on environmental protection expenditure are widely available. Similar accounts and statistics are not this well developed for resource management activities but can be compiled following the same concepts and definitions as for the EPEA. As already mentioned, one of the new modules of the EU regulation on environmental accounts will concern EPEA.

The second set of statistical information focuses on the supply of environmental goods and services and describes the Environmental Goods and Services Sector (EGSS). These statistics contain information on the production of the range of environmental goods and services. Unlike the EPEA, statistics on the EGSS are not compiled in a full accounting format but the statistics that are produced are defined and measured in a manner consistent with national accounting principles.

### *2.2 Environmental Goods and Services Sector*

By definition, all products that are produced, designed and manufactured for purposes of environmental protection and resource management come under the scope of the Environmental Goods and Services Sector (EGSS). Thus, the definition looks at environmental activities from the supply perspective.

Statistics on the EGSS provide detailed information on the production of environmental goods and services. The main variables included are output, value added, employment, exports, and gross fixed capital formation related to the production entities of environmental goods and services.

In public debate, environmental goods and services (EGS) are generally referred to as cleantech. From the point of statistics the diversity of the terminology and concepts is challenging in both data collection and in the communication of results.

### *2.3 Types of environmental goods and services*

The types of environmental goods and services (EGS) used in the EGSS are defined as environmental specific services, environmental sole-purpose products, adapted goods, and environmental technologies.

*Environmental specific services* comprise environmental protection and resource management products that are “characteristic” or typical of those activities. Examples of environmental specific services are waste and wastewater management and treatment services for sale or own-use.

*Environmental sole-purpose products* are by the SEEA definition goods or services whose use directly serves an environmental protection or resource management purpose, and which have no use except for environmental protection or resource management.

*Adapted goods* are goods that have been specifically modified to be more “environmentally friendly” or “cleaner” and whose use is therefore beneficial for environmental protection and resource management.

Adapted goods differ from environmentally specific services and sole-purpose products because, while they serve an environmental protection or resource management purpose, these are not the primary reason for their production.

Compared to the definition of adapted goods in the EPEA, the scope of adapted goods in the EGSS is broader due to the inclusion of goods beneficial for resource management and, also because the full value of adapted goods is included instead of the mere extra cost compared to the equivalent normal goods. Consequently, the number and value of adapted goods is much higher within the scope of the EGSS than in the EPEA.

*Environmental technologies* are technical processes, installations and equipment (goods), and methods or knowledge (services) whose technical nature or purpose is environmental protection or

resource management. Environmental technologies can be either *end-of-pipe* (pollution treatment) technologies or *integrated* (pollution treatment) technologies.

### **3. Compilation of statistics on the EGSS at Statistics Finland**

Statistics Finland started the compilation of statistics on the EGSS in 2007 by establishing a project to define the scope and methods for these statistics. The main users outside Statistics Finland were participating in this work. As a result, it was decided that the basic information would be collected from enterprises by means of a direct questionnaire. Later on, the information system was developed further allowing e.g. web-based data collecting from enterprises.

In accordance with Eurostat's recommendation, the principal activities producing environmental goods and services in Finland comprise sewerage, waste management, materials recovery and remediation activities. In the European Classification of Economic Activities (NACE) these are classes 37 – 39. In addition, the production of electricity with hydropower and wind power is included in this category. In principle, the entire production of the enterprises classified under these economic activities is regarded as environmental activity and the enterprises are called main principal producers of EGS. Registers can be relied on as the main source of data on these principal producers.

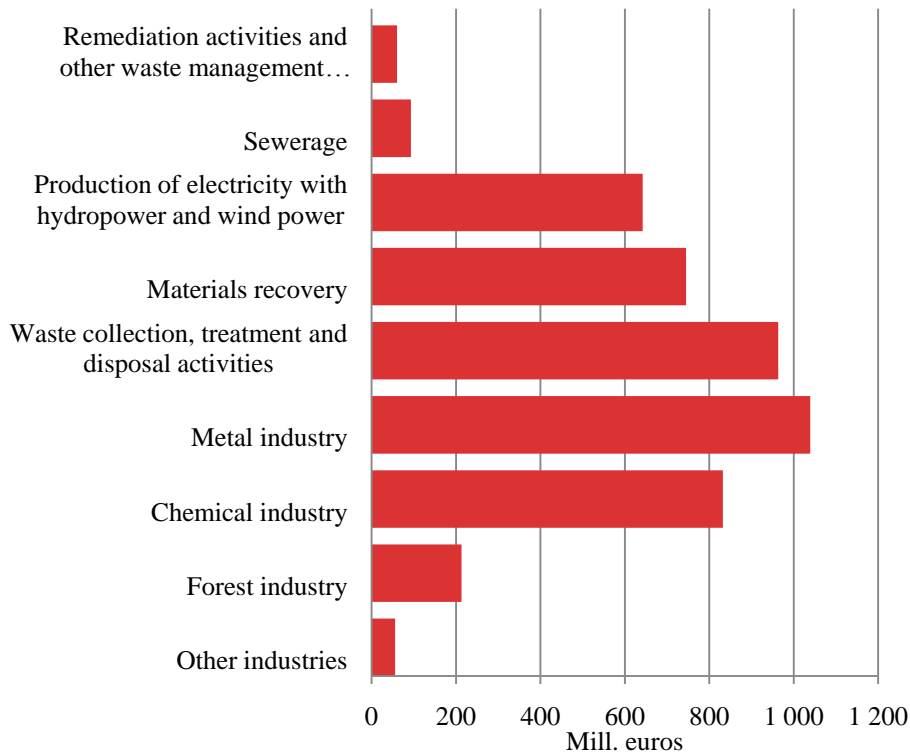
In addition to the principal producers, enterprises from other fields of activities can also produce environmental goods and services. These are called secondary producers of EGS. In Finland, data of secondary producers refer only to manufacturing enterprises (NACE 05–33).

Data from both principal and secondary producers of EGS are mainly collected with specific inquiries. Register data, especially data from the Register of Enterprises and Establishments, are also widely exploited for data on the principal producers. Most EU countries producing statistics on the EGSS also utilise data from their registers of enterprises and establishments. In addition, data on certain goods and services derived from statistics on industrial output and foreign trade are also widely used in the production of EGSS statistics in the EU countries.

In 2010, the turnover of the economic activities representing the principal EGSS producers was EUR 2.4 billion. At the same time, the value of the production of the secondary EGSS producers was EUR 2.1 billion. In manufacturing, the most important activity of the secondary EGSS producers was the metal industry where the value of EGSS production was good EUR 1 billion. The total turnover of the EGSS in main industries and manufacturing was EUR 4.5 billion in 2010, accounting for 2.5 per cent of GDP.

The first five activities in the graph below represent production by principal producers and the last five production by secondary producers in the EGSS.

### Turnover from the EGSS in main industries and manufacturing in 2010



The employment provision capacity of the EGSS understandably attracts both national and international interest. Ascertaining it for the principal producers of EGS is relatively easy, as all employees of these producers can be presumed to be employed by the EGSS. The situation with secondary producers is problematic, for it may be almost impossible for a respondent enterprise to specify the precise number of hours worked that relates to the EGSS. The share of persons employed by the EGSS is not necessarily the same as the share of the EGSS of the enterprise's turnover either, so the use of a simple model like this could produce misleading results.

## 4. Some problems relating to the practical work

### 4.1 Registers and classifications

All NSIs want to make their production processes of statistics into as automated as possible without compromising quality. In the case of production of EGSS statistics, there are some difficulties that must be overcome before the efficiency and quality, including international comparability, can be

raised to the level of advanced statistical systems. The main challenges in register-based production of EGSS statistics relate to classifications and especially to the registers using these classifications.

The guidelines of Eurostat define the environmental goods and services sector by 16 product categories of environmental technologies and products. These are divided into Environmental Protection Activities (CEPA) and Resource Management Activities (CReMa). Among the EU countries these activities are widely derived from the European Classification of Products by Activity (CPA) and foreign trade statistics. However, defining the CEPA and CReMA with the help of the CPA is more conceptual and theoretic by nature. In practice, many problems arise especially with cases where only some of the production of a certain CPA category is classified as production of environmental goods and services.

According to Eurostat's guidelines, only 22 CPA categories are classified purely into the environmental goods and services sector, whereas 279 CPA categories partially represent environmental products. The remaining 4,927 CPA categories do not contain environmental goods and services at all. This list is not exhaustive but it is recommended to use it for comparability purposes.

From the practical point of view, the group of 279 CPA categories is the most problematic. Out of these 279 CPA categories that partially represent environmental goods and services, a total of 175 represent agricultural products, some of which are organic agricultural products. Many countries compile statistics on organic agricultural production. This may help to define the share of environmental products as regards these 175 CPA categories. The rest of the 279 CPA categories, i.e. more than 100 categories, consist of a very heterogeneous group of products and it is very difficult to find any common method or relevant data to define the share of environmental production, technologies or services for these CPA categories. National circumstances vary a lot which may make it difficult to define any detailed European guidelines. On the other hand, national definitions may hamper the comparability of EGSS statistics. Then again, double-glazing may save energy costs and be an environmental product in central Europe but in the north we need at least triple glazing.

As already pointed out, it is very difficult to define the share of environmental production in cases where the CPA categories are split into products partially representing EGS and partially non-EGS. In addition to this problem, statistics on services are still produced at a very aggregate level and the CPA classification is much more aggregated for services than for material production. Many countries, like Finland, do not produce statistics on the production of services by the CPA. This

means that the CPA cannot be used as the reference as regards the production of environmental services.

A register of enterprises and establishments is often exploited for data relating to the enterprises that are principal EGSS producers. However, many enterprises classified as principal producers of the EGSS may have establishments with activity that has nothing to do with the production of EGS. On the other hand, many industrial enterprises have establishments which produce environmental goods or services even though their parent company does not belong to the producers of the EGSS. This phenomenon causes a lot of extra work and makes the compilation of EGSS statistics rather burdensome, and time and resource consuming. Without an automated statistics production process, a lot of manual work is still needed even if registers are utilised.

#### *4.2 Surveys*

The biggest challenges in surveys relate to the definition of the sample. In the first Finnish survey, the sample was drawn from the enterprises that were registered in a specific register of cleantech enterprises. When the results of the survey were analyzed, it became clear that many of the enterprises in the cleantech register did not in practice produce any environmental goods or services.

In the next round, the survey design was improved by utilising Eurostat's guidelines to define the environmental goods and services sector. With the help of the CPA, we identified all the industrial enterprises producing environmental goods and services and used this group of enterprises as the sample frame. Because the production of service enterprises is not disaggregated in the CPA, this method could not be used to define the sample of service enterprises. To be able to restrict the sample size in some meaningful way, we should find relevant criteria for limiting the number of service enterprises included in the survey.

In addition to the problems with sampling, there are also problems relating to the practical survey process. The phenomenon of environmental production is rather new to many enterprises and knowledge about the concepts and terminology is often weak. Therefore, statisticians must draw a lot of attention to the questionnaire instructions and spend time on the consulting of respondents. Statistics Finland received a lot of invaluable support from the Confederation of Finnish Industries that helped us in communication with and motivation of the respondent enterprises. Thanks to this, the response rates of recent surveys have been quite good and in 2011, for instance, the rate was 76 per cent.

In the first years of the survey, the checking and editing of the answers demanded a lot of resources. The answers were checked by using e.g. the web sites of the respondents. We realized that many enterprises that presented information about their environmental activities on their websites did not report any of it to us. On the other hand, in some cases the enterprises might exaggerate their environmental activity by interpreting all their activities as environmental activities without any evidence. The quality of the results can be improved by accumulating experience, which in turn will also help to improve the questionnaire instructions and the consulting of the respondents. We have also invested in pre-testing of the survey questionnaires.

In order to minimize the response burden we had to simplify the questionnaire. At the moment, we are no longer asking for information about ancillary activities, i.e. EGSS production for own use even though it should be included according to the recommendations. It turned out to be impossible to estimate the prices of these internal transactions. The production of environmental goods and services for own use is currently included in the statistics only if the producer is an establishment specialized in such production.

## **5. Concluding remarks**

There is much demand for statistics on the EGSS. "Green economy" and "green growth" are politically hot topics. Statistical institutes are expected to respond to demand for data that have not been defined. Political decision-makers lay great expectations on "green economy" although it is unclear what the concept exactly means in various contexts. The environmental goods and services sector (EGSS) is one of the key issues in green economy. For its part it would be best to adhere to the definitions given for it in statistical recommendations. What else green economy comprises can be analysed with the help of other parts of environmental accounts.

The concepts of the EGSS have been defined in the new SEEA Central Framework, and Eurostat's guidelines also exist for their implementation. The EGSS will most likely be covered by the regulation on environmental accounts in the very near future.

Both register-based and inquiry-based statistics can be compiled on the EGSS. Indisputable advantages of the register-based method are low cost, avoidance of response burden and good coverage of activities. On the other hand, secondary activities and environmental technology can be measured better with a well-organised inquiry.

Those exploiting registers should compare the data in the registers with inquiry results. This way, at least the quality of inquiry results could be improved and inquiries could perhaps partly be even



abandoned. There are altogether around one hundred CPA categories in which the share of the EGSS varies. International harmonisation of statistics on the EGSS requires guidelines on the use of CPA categories. Their application is always subject to national consideration.

Even in the SEEA, the set of EGSS concepts is not fully consistent with the concepts of the EPEA. It would be good if the supply of the EGSS could be compared direct in the form of a balance sheet to the demand of environmental protection that the EPEA describes. We could then unambiguously ascertain whether we are nationally importers or exporters of environmental protection. This cannot be established from the present accounting.

The most common question relating to statistics on the EGSS that statistical experts are expected to answer is how much employment the EGSS provides. Answering this specific question is exceptionally difficult with the present statistics. It is difficult for both inquiry respondents and makers of register surveys to estimate reliably the proportion of employment that is expressly provided by the share of environmental protection.

## 6. Sources

System of Environmental-Economic Accounting. Central Framework. 2012

Environmental Goods and Services Sector web page at Statistics Finland:  
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The Environmental Goods and Services Sector - A Data Collection Handbook. European Communities 2009.

## 7. Acronyms and Abbreviations

CEPA	Classification of Environmental Protection Activities
CPA	European Classification of Products by Activity
CReMA	Classification of Resource Management Activities
EGS	Environmental goods and services
EGSS	Environmental Goods and Services Sector
EPEA	Environmental Protection Expenditure Accounts
NACE	European Classification of Economic Activities

SEEA

System of Environmental-Economic Accounts