

# System of Environmental Economic Accounting

# SEEA Technical Note: Environmental Goods and Services Sector Accounts

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## SEEA Technical Notes

This note is a part of a series of Technical Notes prepared to support the development of data based on the System of Environmental Economic Accounts (SEEA) Central Framework, the first international standard in environmental economic accounting. Since SEEA is not a single account but a series of modules, the accounts in each of the various modules can be developed separately in accordance with the priorities and the resource availability in each country.

The series of Technical Notes is comprised of one note addressing general issues that cut across domains focusing on processes and operational aspects that encourage efficient implementation of the standard and associated data compilation exercises and a number of notes on specific topics. It is recommended that those wishing to develop data related to any of these specific topics should read the general process note in conjunction with the note on the specific topic to be developed.

These notes summarize the data requirements and other operational considerations designed to provide sufficient guidance to initiate the development of the accounts. The notes also provide reference information for additional publications that will support the full development of the accounts and provide information on extensions and linkages that can be exploited once the accounts and tables are in place.

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## I. Introduction

1. The general purpose of SEEA Technical Notes is to summarize the key features for a given topic to support countries in the implementation of the SEEA and provide initial guidance to countries wanting to implement the specific SEEA module. This technical note provides an overview of the Environmental goods and services sector accounts (EGSS) based on the System of Environmental Economic Accounting 2012 Central Framework (SEEA CF) which was adopted by the United Nations Statistical Commission in 2012 as the international statistical standard for environmental-economic accounts. Furthermore, the UN Committee of Experts on Environmental-Economic Accounting (UNCEEA) approved in its 2018 meeting an integrated framework for economic environmental accounts as state of the art of functional accounts (SEEA CF, chapter IV).<sup>1</sup> This technical note follows the integrated framework.
2. Environmental goods and services sector (EGSS) accounts quantify the supply of environmental goods and services and the economic activities of the environmental producers. This concerns the gross value added, output, exports, employment, etc. in environmental goods and services. The environmental goods and services sector is a sub-set of the whole economy. It is the group of economic units engaged in producing environmental goods and services, otherwise said, the producers engaged in environmental activities. The environmental goods and services sector is sometimes called ‘green economy’, ‘eco-industries’ or ‘environmental industry’.
3. Some users are not interested on the employment in *all* environmental activities but in certain environmental activities, e.g. employment in management of biodiversity or employment in waste management. EGSS also provides this information, based on the classification of environmental activities.
4. The EGSS account is one of the SEEA environmental activity accounts. Environmental activity accounts record the transactions in monetary terms between economic units that may be considered environmental (SEEA CF, chapter IV). The EGSS account has strong links with other SEEA environmental activity accounts, in particular with the environmental protection expenditure accounts (EPEA) and the environmental subsidies and similar transfers accounts.
5. The EGSS account is an elaboration of the System of National Accounts (SNA) in the sense that the environmental activities are already part of the SNA but are not separately identified. For this reason, many terms, concepts and definitions in EGSS are those from the SNA, for instance: output, gross value added, etc. The statistical units and industries in EGSS are also those of the SNA. Using the same accounting conventions that apply to the SNA allows to easily relate environmental protection to other transactions and aggregates from SNA, and thus derive indicators, shares, ratios, etc. Some concepts which exist in SNA are more important in EGSS, such as output. Some methodological elements in the EGSS account do not exist in SNA, such as the functional classification of environmental protection activities (CEPA). The EGSS account estimates are

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<sup>1</sup> Cover document ([https://seea.un.org/sites/seea.un.org/files/briefing\\_note\\_for\\_unceea\\_-\\_integrated\\_framework\\_sv\\_002.pdf](https://seea.un.org/sites/seea.un.org/files/briefing_note_for_unceea_-_integrated_framework_sv_002.pdf)) and detailed document ([https://seea.un.org/sites/seea.un.org/files/seea\\_paper\\_integrated\\_framework\\_estat\\_v5.pdf](https://seea.un.org/sites/seea.un.org/files/seea_paper_integrated_framework_estat_v5.pdf))

consistent with the estimates found in the SNA with the exception of the treatment of ancillary activities which are explicitly included in the EGSS for completeness of coverage.

6. This Technical Note describes the main features of the SEEA EGSS account, and presents a set of core accounts which comprise an adapted version of the accounts as presented for the EGSS in the SEEA Central Framework, and the integrated framework, to focus and guide initial compilation. Section II is a brief presentation of the main conceptual elements and features of EGSS. Section III describes the EGSS Core account and main aggregates. The Core account represents a minimum set of information which countries should aim to compile and report, explicitly identifying the most important data items for the module at hand. Countries may often wish to extend the minimum level of detail in areas deemed particularly policy relevant. Section IV provides highlights of such possible extensions and also EGSS links with other SEEA environmental activity accounts. Section V presents a combined presentation for EGSS with other SEEA and SNA accounts. This combined presentation provides countries with a template to present and disseminate an aggregated set of key information relevant to the module at hand from a range of sources (including the SEEA and SNA). The information included in the combined presentations are data items which are of key relevance to policy makers and which, often in combination, are used to calculate particularly important indicators (including the Sustainable Development Goals (SDG) indicators). Section VI provides an overview of the data sets required to produce the core tables including the data sources and compilation methods. Section VII provides references and links to supporting material.

## II. SEEA CF accounts for environmental goods and services sector

### Scope

7. The environmental goods and services sector is a sub-set of the whole economy. It is necessary to determine its scope. There are three possible approaches: establishing which economic activities are within scope (i.e. which ones are environmental activities), or which products are environmental, or which producers are environmental. Whereas environmental producers, activities and products are quite closely related, there is no perfect 1:1 relation between them as environmental producers may also be engaged in non-environmental activities (as secondary activities), and environmental activities may also produce non-environmental products. This means, for instance, that the exports of units engaged in environmental activities may not be identical to the exports of environmental products. The figures are different and it may be costly or impossible to reconcile them.
8. SEEA CF defines *environmental activities* as those economic activities whose primary purpose is to reduce or eliminate pressures on the environment or to make more efficient use of natural resources. These various activities are grouped into two broad types of environmental activity: environmental protection and resource management.
9. *Environmental protection activities* are those activities whose primary purpose is the prevention, reduction and elimination of pollution and other forms of degradation of the environment. An example is manufacture of exhaust pipes for motor vehicles. Environmental protection activities and actions also include all measures taken in order to restore the environment after it has been degraded. An example is rehabilitation of mining sites. Activities which, while beneficial to the environment, primarily satisfy the technical needs or the internal requirements for hygiene or safety and security

of an enterprise or other institution are excluded from this definition. An example is manufacture of rubber gloves.

10. *Resource management activities* are those activities whose primary purpose is preserving and maintaining the stock of natural resources and hence safeguarding against depletion. These activities include, but are not limited to, reducing the withdrawals of natural resources; restoring natural resource stocks; the general management of natural resources; and the production of goods and services used to manage or conserve natural resources.
11. These definitions are based on the primary purpose principle. On paper, several approaches are possible to discern if the primary purpose of an economic activity is environmental or not. For instance: presumed effect, motivation, intention stated in legislation, real effect, etc. For SEEA, the best approach to establish the primary purpose is the technical nature of the economic activity, i.e. inputs, a production process and outputs characterizing a given activity.
12. The technical nature criterion helps to identify if the primary environmental purpose of an activity or a product is environmental or not. However, in practice, compilers of EGSS accounts need more operational basis to identify which activities, producers and producers fall within the scope of EGSS. For instance, to identify which economic units belong in the EGSS out of a list of producers or in the business register, or to identify in a database of imports and exports flows which ones concern environmental products. This identification requires expert analysis and judgement, case by case. Given the complexity and the impracticality, many countries use operational lists of environmental activities and products. These lists must be discussed and established by experts, using the environmental purpose as guiding principle.
13. *Environmental products* may be goods or services. Environmental services are more frequent, but this document will refer to environmental products to keep explanations general. Environmental products are produced, designed and manufactured for purposes of environmental protection and resource management. An example of environmental service is engineering for renewable energy projects. An example of environmental good is a pump for use in wastewater treatment. Products whose only purpose or primary purpose is environmental can be called primary purpose environmental products, or *specific environmental products* for short. An example of environmental product whose primary purpose is environmental is the wildlife preservation.
14. There can also be some environmental products for which the primary purpose is not environmental but which may serve a secondary environmental purpose. For instance, an energy-efficient vehicle has transportation as primary purpose, but it has a secondary environmental purpose insofar it saves energy. *Cleaner products* are those non-specific environmental products which serve a secondary environmental purpose because they prevent pollution or environmental degradation because they are less polluting at the time of their consumption and/or scrapping, compared with equivalent 'normal' products (otherwise said: their secondary purpose is environmental protection). Examples of cleaner products include mercury-free batteries and cars or buses with lower air pollutants and greenhouse gas emissions. *Resource-efficient products* are those non-specific environmental products which serve a secondary environmental purpose because they help to prevent natural resource depletion because they contain fewer natural resources in the production stage and/or require less natural resources during the use stage, compared with equivalent 'normal' products (otherwise said: their secondary purpose is resource management). Examples of resource-efficient

products are recycled paper, renewable energy, heat from heat pumps and solar panels, resource-efficient appliances and water-saving devices such as tap filters.

15. *Environmental producers* are those economic units performing environmental activities. This may be, e.g. perform an environmental service or manufacture an environmental good. An example of environmental producer is an enterprise installing photovoltaic panels, as the installation is an environmental service. Environmental producers may also engage in non-environmental activities. For instance, a construction company building energy efficient buildings may also build conventional buildings. Accordingly, environmental activities can be principal or secondary or ancillary activities of the corresponding production unit (see SNA § 5.8-5.10). EGSS only records environmental activities and environmental products, any non-environmental activity and product must be excluded from the estimates. If a producer is engaged in both environmental production and non-environmental production, the latter must be taken out from EGSS estimates. Failing to do so leads to different estimates based on an environmental activity approach and an environmental product approach.
16. The national boundaries of the EGSS account are the same as in SNA and the Balance of Payments: EGSS accounts are compiled for resident environmental producers. A producer is resident in a country when it engages or intends to engage in economic activities in that country for at least one year.

#### Variables

17. The main variables in EGSS accounts are: output, gross value added, employment and imports. The definitions of these EGSS variables are consistent with SNA, and they are as follows:
18. **Output** of environmental producers is the result of their economic production. Production is an activity, carried out under the responsibility, control and management of an institutional unit, that uses inputs of labour, capital, and goods and services to produce outputs of goods and services. EGSS scope is limited to the output of environmental activities or to environmental products, as seen above. As stated above, most or all the output of environmental producers are environmental products (goods and/or services), but there may also be non-environmental products. Output is valued at basic prices, which is the same valuation as in SNA (see SNA § 3.146). Cleaner products and resource-efficient products are valued in EGSS at their full value, contrarily to other SEEA accounts which value them at extra costs compared to equivalent products with no secondary environmental purpose.
19. **Gross value added (GVA)** of environmental producers is the value of their output less the value of their intermediate consumption. Intermediate consumption are the goods and services used up when producing output, this is also a concept from SNA. It is to be noted that whereas all or most of output of environmental producers are environmental products, their intermediate consumption may consist of any product whether environmental or not. For instance, the producers manufacturing energy-efficient vehicles may use as intermediate consumption all types of materials and energy, no matter environmental or not. GVA is a cornerstone concept in national accounts, even more important than output, because aggregating the output of all producers in the country would lead to double-counting, instead aggregating the GVA of all producers delivers the correct total output (this is

because some output is further used as intermediate consumption to produce other output). However, when considering a sub-set of the whole economy, such as EGSS, the concept output becomes more relevant, because the goal is not to measure the whole economy of the country. It is noted that, by construction, the difference between EGSS gross value added and output is the intermediate consumption of the environmental producers. This variable is relevant in other SEEA accounts, such as EPEA. Synergies between EGSS and EPEA are further explored in section IV 'Extensions and links'.

20. **Employment** is defined as all persons, both employees and self-employed persons, engaged in some environmental activity. Employment can in principle be measured in persons (employed), hours worked (by those persons) or full-time equivalents (i.e. full-time equivalent jobs). The full-time equivalent is defined as total hours worked divided by average annual hours worked in full-time jobs. The reason for EGSS to report employment in full-time equivalents is that many environmental activities may be performed on a part-time basis, in the sense that jobholders may be engaged indistinctively in environmental and non-environmental activities in the same job. In those circumstances, reporting employment measured in number of persons risks to provide a biased picture (underreporting or overreporting depending on the circumstances). If an EGSS producer is also engaged in non-environmental activities only the share of employment relating to the environmental production is to be recorded in EGSS.
21. **Imports** of environmental goods and services consist of transactions in (environmental) products (sales, barter, and gifts) from non-residents in the country to residents. In SNA, imports occur when the economic ownership of the good changes between non-resident units and resident units or when a service is rendered by a non-resident to a resident. EGSS records the imports of environmental products. In general, the imports of environmental products are not the same as the imports of environmental producers. For instance, electric cars, which are an environmental good, can be imported by anybody, not only environmental producers..
22. All the EGSS variables, except employment, are measured in currency units rather in physical terms, unlike a number of other accounts in SEEA.
23. EGSS can also record other variables besides those listed above. Exports is one clear case as it is useful to measure exports alongside imports. Other possible EGSS variables are, for instance: intermediate consumption of environmental producers, taxes and subsidies on environmental production, compensation of employees of environmental producers. Some of these variables can be relevant for EPEA.

#### Classifications

24. The EGSS variables use the following breakdowns:
  - Economic activity of the environmental producers, according to the ISIC classification. An example is the gross value added of the (environmental) construction.
  - Environmental function of the environmental producers, according to the classification of environmental activities. An example is the manufacture of instruments and machinery for protection of air and climate vs manufacture of instruments and machinery for wastewater

management.

- Type of economic output: market, non-market, ancillary, own final use. An example is the waste management services by the government (the government is a non-market producer) vs waste management services by businesses-for-profit (which are market producers).
  - Type of environmental product: specific product, cleaner product and resource-efficient product (see paragraphs 13 and 14).
25. Economic activities can be classified according to the International Standard Industrial Classification (ISIC). This is the standard statistical classification of productive activities. ISIC has 88 categories at division (2-digit) level, which is probably too exigent for EGSS compilers. For this reason aggregating divisions is frequent practice.
26. Environmental producers can also be grouped by their main economic activity according to ISIC. EGSS gross value added and employment can be classified by ISIC. For instance the GVA of the organic farmers, the employment of the manufacturers of energy-efficient buildings, etc.
27. Whereas ISIC is a classification of activities, it is sometimes used for products. When EGSS output is classified by ISIC, is used to group the output of environmental producers in the same industry (i.e. engaged in the same principal activity). *Stricto sensu*, imports and exports should not be classified by ISIC because they are flows of products and ISIC is a classification of activities. A different classification would be needed, such as the Harmonised System (HS). However, in practice, EGSS imports and exports could be classified by ISIC too, under the understanding that it means the ISIC of the producers involved in exports and imports. This proxy can be extended to government units too, insofar they are engaged in exports and imports, which is rare. However, imports of environmental products by households cannot be classified by ISIC because households are only consumers; this is minor flaw insofar households rarely purchase imported environmental products.
28. The transactions in environmental protection products can be disaggregated by their functional purpose using the Classification of Environmental Activities (CEA) as presented in Table 1. (NB: this classification is currently under review, as part of the SEEA CF research agenda)

**Table 1 Classification of Environmental Activities: overview of groups and classes**

29. The part of the CEA about environmental protection is also known as Classification of Environmental Protection Activities (CEPA); the part about resource management is also known as Classification of Resource Management Activities (CReMA). CEPA and CReMA are mutually exclusive so that an environmental activity should fit into one and only one of their classes. Table 1 shows CReMA as stated in the SEEA CF. Some countries, notably in Europe, use a more recent version of CReMA. Finalisation of the CEA classification is in the SEEA CF research agenda.
30. EGSS breakdowns by CEA (and CEPA & CReMA) are important because they enable the identification of sub-sectors of the environmental economy, such as: climate-change activities, biodiversity activities, renewable energy activities, etc. Frequently policy makers request data about such specific sub-sectors rather than for the whole EGSS.

31. Environmental products can be market output or non-market output or output for own final use or ancillary output. These are concepts from national accounts (see SNA § § 6.95ss). Market output is intended for sale at economically significant prices; this is the normal situation in a market economy. An example of market output is the management of water resources by a for-profit organization. Non-market output is output undertaken by general government in the absence of economically significant prices, e.g. public waste management. Output for own final use consists of products retained by the producer for his own use as final consumption or capital formation, e.g. if a producer of solar panels keeps some of its panels to produce its own energy to run its manufacture. Ancillary output supports production activities undertaken within an enterprise in order to create the conditions within which the principal or secondary activities can be carried out, e.g. in-house treatment of waste water by businesses. Output for own final use and ancillary output are similar but different concepts in SNA: ancillary output is only use as intermediate consumption, i.e. as part of running production, whereas output for own final use can only be used as final consumption (by government or households) or as capital formation. Ancillary environmental output are recorded in EGSS more explicitly than in SNA in order to provide a more complete picture of the environmental sector (see SNA § § 5.39ss).

This classification (in market, non-market, for final use or ancillary) is meant for output. It can also be used for gross value added and for employment. It is not normally used for imports nor exports.

### III. Core accounts and aggregates for the EGSS

32. The EGSS core account is a set of tables, in its most basic form one table for each variable, broken down by the 4 main breakdowns.
33. Alternative presentations of the Core account are possible, in particular with alternative breakdowns. Furthermore, it is possible to present the variables cross-classified by two or more breakdowns simultaneously. This adds relevance for analysis. It also helps to produce more robust estimates because it forces EGSS to take more decisions to reconcile data sources. However, it can significantly increase the number of cells to be estimated and the pressure on the EGSS compilers to produce reliable estimates. This pressure can be relieved by grouping (i.e. reducing the number of) the classification categories. Which breakdowns are cross-classify and at which level of detail is an important design decision for EGSS compilers. Factors in that decision are: data sources available, user data needs, integration with compilation of other SEEA accounts. Two alternative presentations of the Core account are shown as examples.
34. The Core account presented here represents a minimum for compilation. National compilers may consider additional breakdowns and extensions.

Core account: Environmental goods and services sector

**1. EGSS by economic activity**

	<b>Output</b> <b>(million USD)</b>	<b>GVA</b> <b>(million USD)</b>	<b>Employment</b> <b>(000's FTE)</b>	<b>Exports</b> <b>(million USD)</b>	<b>Imports</b> <b>(million USD)</b>
ISIC A	100	50	0.9	50	40
ISIC B	1,600	1,050	9.9	1,060	800
ISIC C	4,000	3,550	37.1	2,400	2,240
ISIC D-E	11,600	5,200	97.6	40	60
ISIC F	4,000	3,400	28.1	50	130
ISIC G-U	450	200	26.7	300	130
<b>TOTAL</b>	<b>21,750</b>	<b>13,450</b>	<b>200.5</b>	<b>3,900</b>	<b>3,400</b>

**2. EGSS by environmental function**

	<b>Output</b>	<b>GVA</b>	<b>Employment</b>	<b>Exports</b>	<b>Imports</b>
CEPA 2	5,200	3,200	28.6	80	130
CEPA 3	12,400	7,700	65.6	1,700	1,700
other CEPAs	4,150	2,550	24.5	20	70
<b>TOTAL</b>	<b>21,750</b>	<b>13,450</b>	<b>118.7</b>	<b>1,800</b>	<b>1,900</b>
<b>env protection</b>					
CReMA 13A	7,000	5,400	32.9	100	600
CReMA 13B	6,100	2,900	28.4	650	500
Other CReMAs	4,400	3,100	20.6	1,350	400
<b>TOTAL</b>	<b>17,500</b>	<b>11,400</b>	<b>81.8</b>	<b>2,100</b>	<b>1,500</b>
<b>res management</b>					
<b>TOTAL</b>	<b>39,250</b>	<b>24,850</b>	<b>200.5</b>	<b>3,900</b>	<b>3,400</b>

**3. EGSS by environmental products**

	<b>Output</b>	<b>GVA</b>	<b>Employment</b>	<b>Exports</b>	<b>Imports</b>
Specific prods	19,830	10,110	114.7	2,880	2,750
Cleaner prods	9,320	7,770	40.6	220	350
Resource-efficient prods	10,100	6,970	45.2	800	300
<b>TOTAL</b>	<b>39,250</b>	<b>24,850</b>	<b>200.5</b>	<b>3,900</b>	<b>3,400</b>

**4. EGSS by type of output**

	<b>Output</b>	<b>GVA</b>	<b>Employment</b>	<b>Exports</b>	<b>Imports</b>
Market activities	27,025	18,297	127.5	-	-
Non-market acts	7,343	3,430	48.4	-	-
Ancillary acts	2,915	1,812	15.0	-	-
Activities for own final use	1,968	1,311	9.6	-	-
<b>TOTAL</b>	<b>39,250</b>	<b>24,850</b>	<b>200.5</b>	<b>3,900</b>	<b>3,400</b>

Core account (alternative 1): Environmental goods and services sector

	Output at basic prices						Total output	Gross value added at basic prices						Total GVA	Employment						Total employment	Imports	Exports
	ISIC A	ISIC B	ISIC C	ISIC D-E	ISIC F	ISIC G-U		ISIC A	ISIC B	ISIC C	ISIC D-E	ISIC F	ISIC G-U		ISIC A	ISIC B	ISIC C	ISIC D-E	ISIC F	ISIC G-U			
<b>CEPA 2</b>		500	900	2,900	900		5,200	300	800	1,400	700		3,200	1.9	3.4	19.9	3.4		28.6	130	80		
<i>Specific products</i>		500	200	2,500	130		3,330	300	150	1,150	80		1,680	1.9	0.8	17.2	0.5		20.3	100	80		
<i>Cleaner products</i>			700	400	770		1,870		650	250	620		1,520		2.6	2.8	2.9		8.3	30			
<b>CEPA 3</b>		800	2,800	6,100	2,700		12,400	600	2,600	2,000	2,500		7,700	3.0	10.5	41.9	10.1		65.6	1,700	1,700		
<i>Specific products</i>		400	400	5,500	300		6,600	200	200	1,800	150		2,350	1.5	1.5	37.8	1.1		41.9	1,400	1,500		
<i>Cleaner products</i>		400	2,400	600	2,400		5,800	400	2,400	200	2,350		5,350	1.5	9.0	4.1	9.0		23.6	300	200		
<b>other CEPAs</b>	100	300	300	2,600	400	450	4,150	50	150	150	1,800	200	200	2,550	0.4	1.1	1.1	17.9	1.5	2.5	24.5	70	20
<i>Specific products</i>	100	100	100	2,000	100	100	2,500	50	50	50	1,400	50	50	1,650	0.4	0.4	0.4	13.8	0.4	0.6	15.8	50	
<i>Cleaner products</i>		200	200	600	300	350	1,650		100	100	400	150	150	900	0.0	0.8	0.8	4.1	1.1	2.0	8.7	20	20
<b>TOTAL environmental protection</b>	100	1,600	4,000	11,600	4,000	450	21,750	50	1,050	3,550	5,200	3,400	200	13,450	0.4	6.0	15.0	79.8	15.0	2.5	118.7	1,900	1,800
<b>CReMA 13A</b>	50	250	2200	1400	1900	1200	7,000	30	120	2050	600	1800	800	5,400	0.2	0.9	8.3	9.6	7.1	6.8	32.9	600	100
<i>Specific products</i>	50	150	700	800	300	1200	3,200	30	20	550	200	200	800	1,800	0.2	0.6	2.6	5.5	1.1	6.8	16.8	500	100
<i>Resource-efficient products</i>		100	1500	600	1600		3,800		100	1500	400	1600		3,600	0.0	0.4	5.6	4.1	6.0	0.0	16.1	100	
<b>CReMA 13B</b>		200	2300	500	1000	2100	6,100		150	1250	150	400	950	2,900	0.0	0.8	8.6	3.4	3.8	11.8	28.4	500	650
<i>Specific products</i>		50	300	100	200	500	1,150		40	50	20	140	150	400	0.0	0.2	1.1	0.7	0.8	2.8	5.6	400	300
<i>Resource-efficient products</i>		150	2000	400	800	1600	4,950		110	1200	130	260	800	2,500	0.0	0.6	7.5	2.8	3.0	9.0	22.8	100	350
<b>Other CReMAs</b>	100	600	1400	700	600	1000	4,400	50	450	1150	350	450	650	3,100	0.4	2.3	5.3	4.8	2.3	5.6	20.6	400	1,350
<i>Specific products</i>	50	400	1000	500	400	700	3,050	30	300	850	300	300	450	2,230	0.2	1.5	3.8	3.4	1.5	3.9	14.3	300	900
<i>Resource-efficient products</i>	50	200	400	200	200	300	1,350	20	150	300	50	150	200	870	0.2	0.8	1.5	1.4	0.8	1.7	6.3	100	450
<b>TOTAL resource management</b>	150	1050	5900	2600	3500	4300	17,500	80	720	4450	1100	2650	2400	11,400	0.6	3.9	22.1	17.9	13.1	24.2	81.8	1,500	2,100
<b>TOTAL</b>	250	2650	9900	14200	7500	4750	39,250	130	1770	8000	6300	6050	2600	24,850	0.9	9.9	37.1	97.6	28.1	26.7	200.5	3,400	3,900

Core account (alternative 2): Environmental goods and services sector

Output	Employment									TOTAL	Employment									TOTAL
	CEPA 2	CEPA 3	Other CEPAs	TOTAL EP	CReMA 13A	CReMA 13B	Other CReMAs	TOTAL RM	TOTAL		CEPA 2	CEPA 3	Other CEPAs	TOTAL EP	CReMA 13A	CReMA 13B	Other CReMAs	TOTAL RM	TOTAL	
<b>ISIC A</b>			100	100	50		100	150	250	<b>ISIC A</b>			0.4	0.4	0.2		0.4	0.6	0.9	
Market			100	100	50		100	150	250	Market			0.4	0.4	0.2		0.4	0.6	0.9	
Non-market										Non-market										
Ancillary										Ancillary										
Own final use										Own final use										
<b>ISIC B</b>	500	800	300	1,600	250	200	600	1,050	2,650	<b>ISIC B</b>	1.9	3.0	1.1	6.0	0.9	0.8	2.3	3.9	9.9	
Market	425	680	255	1,360	213	170	510	893	2,253	Market	1.6	2.6	0.9	5.1	0.8	0.7	2.0	3.3	8.4	
Non-market										Non-market										
Ancillary	50	80	30	160	25	20	60	105	265	Ancillary	0.2	0.3	0.1	0.6	0.1	0.1	0.2	0.4	1.0	
Own final use	25	40	15	80	13	10	30	53	133	Own final use	0.1	0.2	0.1	0.3	0.0	0.0	0.1	0.2	0.5	
<b>ISIC C</b>	900	2,800	300	4,000	2,200	2,300	1,400	5,900	9,900	<b>ISIC C</b>	3.4	10.5	1.1	15.0	8.3	8.6	5.3	22.1	37.1	
Market	810	2,520	270	3,600	1,980	2,070	1,260	5,310	8,910	Market	3.1	9.5	1.0	13.5	7.5	7.7	4.8	19.9	33.4	
Non-market										Non-market										
Ancillary	90	280	30	400	220	230	140	590	990	Ancillary	0.3	1.1	0.1	1.5	0.8	0.9	0.5	2.2	3.7	
Own final use										Own final use										
<b>ISIC D-E</b>	2,900	6,100	2,600	11,600	1,400	500	700	2,600	14,200	<b>ISIC D-E</b>	19.9	41.9	17.9	79.7	9.6	3.4	4.8	17.9	97.6	
Market	1,450	3,050	1,300	5,800	700	250	350	1,300	7,100	Market	10.0	21.0	9.0	39.9	4.8	1.7	2.4	9.0	48.8	
Non-market	1,160	2,440	1,040	4,640	560	200	280	1,040	5,680	Non-market	8.0	16.8	7.2	31.9	3.8	1.4	1.9	7.2	39.0	
Ancillary	145	305	130	580	70	25	35	130	710	Ancillary	1.0	2.1	0.9	4.0	0.5	0.2	0.2	0.9	4.9	
Own final use	145	305	130	580	70	25	35	130	710	Own final use	1.0	2.1	0.9	4.0	0.5	0.2	0.2	0.9	4.9	
<b>ISIC F</b>	900	2,700	400	4,000	1,900	1,000	600	3,500	7,500	<b>ISIC F</b>	3.4	10.1	1.5	15.0	7.1	3.8	2.3	13.1	28.1	
Market	765	2,295	340	3,400	1,615	850	510	2,975	6,375	Market	2.9	8.6	1.3	12.8	6.0	3.2	2.0	11.1	23.9	
Non-market										Non-market										
Ancillary										Ancillary										
Own final use	135	405	60	600	285	150	90	525	1,125	Own final use	0.5	1.5	0.2	2.3	1.1	0.6	0.3	2.0	4.2	
<b>ISIC G-U</b>			450	450	1,200	2,100	1,000	4,300	4,750	<b>ISIC G-U</b>			2.5	2.5	6.8	11.8	5.6	24.2	26.7	
Market			203	203	540	945	450	1,935	2,138	Market			1.1	1.1	3.1	5.3	2.5	10.9	12.0	
Non-market			158	158	420	735	350	1,505	1,663	Non-market			0.9	0.9	2.4	4.1	2.0	8.5	9.3	
Ancillary			90	90	240	420	200	860	950	Ancillary			0.5	0.5	1.4	2.4	1.1	4.8	5.3	
Own final use										Own final use										
<b>TOTAL</b>	<b>5,200</b>	<b>12,400</b>	<b>4,150</b>	<b>21,750</b>	<b>7,000</b>	<b>6,100</b>	<b>4,400</b>	<b>17,500</b>	<b>39,250</b>	<b>TOTAL</b>	<b>28.6</b>	<b>65.5</b>	<b>24.5</b>	<b>118.6</b>	<b>32.9</b>	<b>28.4</b>	<b>20.7</b>	<b>81.8</b>	<b>200.5</b>	

35. EGSS provides essential information for a supply table of environmental products, parts of a use table of environmental products and most of a production account.
36. All in all, the Core account provides information on the environmental production and supply of environmental products. It is the basis for the following indicators:
- Growth of the environmental sector, also called ‘environmental growth’ or ‘green growth’. Growth is measured as the year-on-year change of the GVA. To neutralise effects of changes in prices (inflation) EGSS GVA should be measured in volume (see SNA chapter 15).
  - Employment in the environmental sector, also called ‘environmental growth’ or ‘green jobs’.<sup>2</sup>
  - Imports of environmental products.

These figures can be compared to SNA data on value added, employment, imports & exports, etc. for the whole economy or parts of it. It is possible e.g. to calculate shares of the environmental sector in the whole economy, or to compare growth rates.

#### IV. Extensions and links

37. As explained above, the EGSS account is only one of the environmental activity accounts in the SEEA CF. Links with other SEEA environmental activity accounts exist and can be exploited. Moreover a joint compilation system for several accounts can be envisaged, which would deliver economies of scale, efficiency gains and more robust estimates.
38. Links are strongest between the EGSS and the Environmental protection expenditure account (EPEA). Whereas EGSS addresses the output, gross value added, growth, exports and other production-related variables (employment, consumption and investment needed for production), EPEA addresses the expenditure (consumption, investment, financing). There are obvious overlaps and complementarity between EPEA and EGSS.
39. Indeed, there is an SNA accounting relation called product balance, applicable to any product and in particular to environmental protection products, which further cements the links between EGSS and EPEA. In a product balance, the amount of a product available for use within the economy must have been supplied either by domestic production or by imports. The same amount must be used for intermediate consumption, final consumption, capital formation or exports:

$$\text{output} + \text{imports} = \text{intermediate consumption} + \text{final consumption} + \text{capital formation} + \text{exports} \quad (\text{Equation 1})$$

Because of differences in SNA valuation rules in the left and right side of Equation 1, it is necessary to add taxes on products less subsidies on environmental products, and trade and transport margins, to the left-hand side.

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<sup>2</sup> The International Labour Organisation standard definition for Green Jobs is very similar but not identical to EGSS employment as it has an additional requirement that the jobs are decent. [https://www.ilo.org/global/topics/green-jobs/news/WCMS\\_220248/lang--en/index.htm](https://www.ilo.org/global/topics/green-jobs/news/WCMS_220248/lang--en/index.htm)

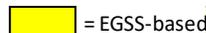
40. This product balance allows e.g. deriving the expenditure variables needed for EPEA from supply variables should they be known, for instance from EGSS.

$$\text{intermediate consumption} + \text{final consumption} + \text{capital formation} = \text{output} + \text{imports} - \text{exports} + \text{items to adjust valuation} \quad (\text{Equation 2})$$

41. Whenever EGSS and EPEA are combined or one is used to derive the other, it is essential to be aware that, while they are fully consistent, there are some differences between them which require adjustments. There are three main differences. First, the scope of EGSS is broader: whereas EGSS covers environmental protection and resource management activities, EPEA covers only environmental protection. Secondly, EGSS and EPEA use different valuation principles, according to SNA, but reconciling them is possible. For instance output is valued at basis prices whereas consumption and gross fixed capital formation are valued at purchasers' prices. Thirdly, EGSS typically estimates cleaner products at their full value whereas EPEA does it at extra costs. Data should be adjusted accordingly.
42. It is also possible to estimate some parts of the economy (say some products or some sectors) using the left-hand side of equation 2 and other parts with the right-hand side part. The best framework to accomplish it is a supply and use table of environmental production products.
43. Another SEEA environmental activity account related to EPEA is the resource management expenditure account (ReMEA). This account is the twin sister of EPEA for resource management. It studies demand and financing of resource management. Most variables, concepts and definitions are the same as EPEA but it uses a classification of resource management (CReMA) instead of environmental protection (CEPA). For historical reasons and availability of data sources, ReMEA is far less advanced than EPEA even if they are conceptually similar.
44. EGSS, together with EPEA and ReMEA, can be used to set up supply and use tables of environmental products. A supply and use table is a set of two tables with similar structure: the supply table shows how environmental products are produced and imported; the use table shows how these products are used by companies, households and government and exported. The tables follow the format of the 'general' monetary supply and use tables of the SNA. The supply and use tables have detail of 'individual' environmental categories (detail by CEPA-CReMA and are more suitable for detail by type of environmental product), which instead the production and expenditure accounts do not have.
45. A supply and use table for environmental products is shown below. For the purpose of illustration, this table includes environmental protection products and resource management products, but EPEA is only concerned with environmental protection. The totals in the supply table and use table are identical for each product or group of products. Colors illustrate which account may be the basis for the table data, but it can be different e.g. if EGSS or EPEA include additional variables.

## Supply table for environmental products

SUPPLY	Output at basic prices						Total output basic prices	Imports	Taxes less subsidies on environmental products	Trade and transport margins	Total supply purchasers' prices	
	ISIC A	ISIC B	ISIC C	ISIC D-E	ISIC F	ISIC G-U						
<b>CEPA 2</b>		500	900	2,900	900		5,200	130	300		5,630	5,630
<i>Specific products</i>		500	200	2,150	130		2,980	100	200		3,280	3,280
<i>Cleaner products</i>			700	400	770		1,870	330	100		2,000	2,350
<b>CEPA 3</b>		800	2,800	6,100	2,700		12,400	1,700	600		14,700	14,700
<i>Specific products</i>		400	400	5,500	300		6,600	1,400	500		8,500	8,500
<i>Cleaner products</i>		400	2,400	600	2,400		5,800	300	100		6,200	6,200
<b>other CEPAs</b>	100	300	300	2,600	400	450	4,150	70	200	50	4,470	4,470
<i>Specific products</i>	100	100	100	2,000	100	100	2,500	50	150		2,700	2,700
<i>Cleaner products</i>		200	200	600	300	350	1,650	20	50	50	1,770	1,770
<b>TOTAL environmental protection</b>	100	1,600	4,000	11,600	4,000	450	21,750	1,900	1,100	50	24,800	24,800
<b>CReMA 13A</b>	50	250	2200	1400	1900	1200	7,000	600	350		7,950	7,950
<i>Specific products</i>	50	150	700	800	300	1200	3,200	500	300		4,000	4,000
<i>Resource-efficient products</i>		100	1500	600	1600		3,800	100	50		3,950	3,950
<b>CReMA 13B</b>		200	2300	500	1000	2100	6,100	500	300		6,900	6,900
<i>Specific products</i>		50	300	100	200	500	1,150	400	250		1,800	1,800
<i>Resource-efficient products</i>		150	2000	400	800	1600	4,950	100	50		5,100	5,100
<b>Other CReMAs</b>	100	600	1400	700	600	1000	4,400	400	200	50	5,050	5,050
<i>Specific products</i>	50	400	1000	500	400	700	3,050	300	150		3,500	3,500
<i>Resource-efficient products</i>	50	200	400	200	200	300	1,350	100	50	50	1,550	1,550
<b>TOTAL resource management</b>	150	1050	5900	2600	3500	4300	17,500	1,500	850	50	19,900	19,900
<b>TOTAL</b>	250	2650	9900	14200	7500	4750	39,250	3,400	1,950	100	44,700	44,700

 = EGSS-based  = based on EGSS or other SEEA account

 = via balancing of supply-use of products

## Use table for environmental products

USE	Intermediate consumption (by corp., government, households) (breakdowns by industry)						Total intermediate consumption	Final consumption		Gross fixed capital formation	Exports	Total use at purchases' prices
	ISIC A	ISIC B	ISIC C	ISIC D-E	ISIC F	ISIC G-U		Government	Households			
	<b>CEPA 2</b>		200	100	1500	200		2 000	150	1 400	2 000	80
<i>Specific products</i>		200	100	1500	200		2 000	150	1 400		80	3 630
<i>Cleaner products</i>										2 000		2 000
<b>CEPA 3</b>		200	200	4100	200		4 700	800	2 000	5 500	1 700	14 700
<i>Specific products</i>		200	200	3700	150		4 250	750	2 000		1 500	8 500
<i>Cleaner products</i>				400	50		450	50		5 500	200	6 200
<b>Other CEPAs</b>	50	150	150	800	200	250	1 600	450	1 300	1 100	20	4 470
<i>Specific products</i>	50	50	50	600	50	50	850	350	750	750		2 700
<i>Cleaner products</i>		100	100	200	150	200	750	100	550	350	20	1 770
<b>TOTAL environmental protection</b>	50	550	450	6400	600	250	8 300	1 400	4 700	8 600	1 800	24 800
<b>CRema 13A</b>	20	130	150	800	100	400	1 600	2 000	100	4 150	100	7 950
<i>Specific products</i>	20	130	150	600	100	400	1 400	1 800	100	600	100	4 000
<i>Resource-efficient products</i>				200			200	200		3 550		3 950
<b>CRema 13B</b>		50	1050	350	600	1150	3 200	1 500	250	1 300	650	6 900
<i>Specific products</i>		10	250	80	60	350	750	600	150		300	1 800
<i>Resource-efficient products</i>		40	800	270	540	800	2 450	900	100	1 300	350	5 100
<b>Other CRemAs</b>	50	150	250	350	150	350	1 300	800	150	1 450	1 350	5 050
<i>Specific products</i>	20	100	150	200	100	250	820	600	100	1 080	900	3 500
<i>Resource-efficient products</i>	30	50	100	150	50	100	480	200	50	370	450	1 550
<b>TOTAL resource management</b>	70	330	1450	1500	850	1900	6 100	4 300	500	6 900	2 100	19 900
<b>TOTAL</b>	120	880	1900	7900	1450	2150	14 400	5 700	5 200	15 500	3 900	44 700

= EPEA-based  = ReMEA-based

## V. Combined Presentation and Aggregates

46. This section presents two accounts that can be produced as combined presentations of the EGSS with other SEEA activity accounts, in particular EPEA and environmental subsidies and similar transfers account (ESST). As will be seen, these accounts are an extension of the Core account presented in section III. These combined presentations can be used to derive indicators and to put in relation with SNA aggregates for the whole economy.
47. The first combined presentation is an environmental protection production account. It presents information on the output of all environmental protection goods and services by the economy and how much of this output is available for domestic uses. The top part of the account is a combined production and generation of income account that is also presented in SEEA CF (table 4.2). The bottom part of the account shows how much environmental output is available for national uses and links directly to the expenditure account.
48. The bottom part of the account (rows 11-20) reports output, imports and exports of environmental protection products, i.e. the information from the right-hand side of equation 2. This information is organised in such a way as to prepare the calculation of the corresponding expenditure for the EPEA and the final calculation of the national expenditure on environmental protection (NEEP; for details refer to the SEEA Technical Note on EPEA). In particular, row 15 explicitly deducts the intermediate consumption of EP products for the production of other environmental protection

products, to avoid a double-counting of those products in the expenditure side, as stated in paragraph **Fehler! Verweisquelle konnte nicht gefunden werden.** Row 22 adjusts the valuation of cleaner products, as output, imports and exports in rows 11-20 value them at full costs whereas for the NEEP they are sought at extra costs.

49. The top part of the account (rows 1-10) reports relevant variables concerning the producers of environmental protection products which were not in the Core account. In particular the sum of intermediate consumption (row 1) and the value added (row 2) equals the total output (row 11). The remaining top part of the account reports how income is generated by the producers of environmental protection and the gross value added is distributed to the production factors as income (note how the sum of rows 6-10 is row 5). All these variables follow the definitions of SNA, and can thus be compared with the corresponding variables from SNA for the whole economy or for each sector. Finally, row 24 reports another variable about the producer of EP products, namely employment. Contrarily to all the other variables in the EPEA, which are measured in currency units, employment is measured in jobs, full-time equivalents or persons employed.

### **Combined presentation of a production account based on EGSS, EPEA and ESST**

	Corporations		non-EP producers	Government	Households	Rest of the world	TOTAL
	EP producers						
	specialist producers	other producers					
1	Intermediate consumption of producers of EP	4 100	1 950		2 950		9 000
5	Value added of producers of EP	9 950	850		5 550		16 350
6	Compensation of employees	3 750	250		2 000		6 000
7	(Other) Taxes on production (+)	450	60		1 700		2 210
8	(Other) Subsidies on production (-)	300	5		1 200		1 505
9	Consumption of fixed capital	1 500	100		400		2 000
10	Net operating surplus	4 550	445		2 650		7 645
11	<b>TOTAL output of producers of EP (basic prices)</b>	<b>14 050</b>	<b>2 800</b>		<b>8 500</b>		<b>25 350</b>
12	market output	13 500	2 300		4 500		20 300
13	non-market output	0	0		4 000		4 000
14	own account output	550	500		0		1 050
15	Intermediate consumption of EP products (-)	1 700	NA		800		2 500
16	VAT and other taxes on EP products (+)	600	100		2 100		2 800
17	Subsidies on EP products (-)	500	90		1 510		2 100
18	Trade and transport margins	30	10		10		50
19	Imports of EP goods and services (+)					1 900	1 900
20	Exports of EP goods and services (-)					1 800	1 800
21	<b>TOTAL environmental output available for uses by resident units (at purchasers' prices)</b>	<b>12 480</b>	<b>2 820</b>		<b>8 300</b>	<b>100</b>	<b>23 700</b>
22	Correction for valuation of cleaner and resource-efficient products at extra costs (-)	400	90		200	10	700
23	<b>TOTAL environmental output available for uses by resident units (at purchasers' prices; cleaner products valued at extra costs)</b>	<b>12 080</b>	<b>2 730</b>		<b>8 100</b>	<b>90</b>	<b>23 000</b>
<b>Supplementary item</b>							
24	Employment of producers of EP (jobs or full-time equivalents)	270 000	30 000		100 000		400 000

■ = EGSS-based

■ = EPEA-based

■ = not applicable

■ = based on EPEA or EGSS or ESST

■ = via balancing of supply-use of products

50. The second combined presentation is an expenditure account. This is an extension of the core account for the EPEA (see SEEA Technical Note on EPEA). The top part of the account (rows 1-10) reports the expenditure on environmental protection products by resident units. The middle part of the expenditure account (rows 11-16) is identical to the Core account for EPEA. The bottom part of the expenditure account (rows 17-20) shows more detail on the financing part of the expenditure than the core account. This additional information is mostly based on ESST, although it may also be based on an extension of EPEA. They are all flows between the sectors of the economy, so that they cancel out in the national total (total of each row is zero) and with the rest of the world. Correspondingly, the national total of rows 16 and 22 are identical, but they distribution by sector differs: NEEP in row 16 reports who spends on environmental protection whereas row 22 reports who finances the expenditure.

### Combined presentation of an expenditure account based on EGSS, EPEA and ESST

	Corporations			Government	Households	Rest of the world	TOTAL
	EP producers		non-EP producers				
	specialist producers	other producers					
1 Intermediate consumption on EP products	2 900	400	1 000	4 000			8 300
2 <i>specific environmental protection products</i>	2 600	300	700	1 100			4 700
3 <i>cleaner products</i>	300	100	300	900			1 600
4 Final consumption on EP products				1 400	4 700		6 100
5 <i>specific environmental protection products</i>				1 250	4 150		5 400
6 <i>cleaner products</i>				150	550		700
7 Gross fixed capital formation on EP products	2 600	2 100	1 000	2 900			8 600
8 <i>specific environmental protection products</i>	1 800	1 400	650	1 900			5 750
9 <i>cleaner products</i>	800	700	350	1 000			2 850
10 <b>TOTAL use of EP products by resident units</b>	5 500	2 500	2 000	8 300	4 700		23 000
11 Gross fixed capital formation (on non-EP products) for EP production	1 900	1 000	500	1 000			4 400
12 Acquisition less disposals of non-financial, non-produced assets for EP production	50	NA	NA	NA			50
13 Transfers not included in the total use of EP products						100	100
14 Transfers to the rest of the world (+)						800	800
15 Transfers from the rest of the world (-)						700	700
16 <b>TOTAL national environmental protection expenditure</b>	7 450	3 500	2 500	9 300	4 700	100	27 550
17 Environmental subsidies on production (D39)	-10	-5	0	15			0
18 Social contributions and benefits (D6)	-400	-40	-20	1 220	-760		0
19 Other current transfers (D7)	50	10	5	5	0	-70	0
20 Capital transfers (D9)	15	5	NA	10	0	-30	0
21 Earmarked taxes (D2)	20	10	0	-30	0		0
22 <b>TOTAL national environmental protection expenditure</b>	7 085	3 460	2 485	10 580	3 940	0	27 550

= EGSS-based     
 = EPEA-based     
 = ESST-based  
 = not applicable     
 = based on EPEA or EGSS or ESST

## VI. Compilation

51. The compilation of SEEA accounts should be founded on the GSBPM as outlined in the first note in this series “Statistical Production Processes for Implementation of the SEEA-Central Framework”.

Overarching Management Functions							
1 Specify Needs	2 Design	3 Build	4 Collect	5 Process	6 Analyze	7 Disseminate	8 Evaluate

Specify Needs, Design & Build

52. It is often the case when building accounts (SEEA or SNA for example) that one of the goals is to use existing data sources as much as possible. In such a case, the Specify Needs, Design and Build phases will often need to be undertaken simultaneously and iteratively, as one evaluates the capacity of existing data sets to meet needs relative to the potential costs of initiating new data development.

53. Since the role of protecting the environment is organized differently across nations, the first step in developing an EGSS account is to document these responsibilities in one's country. The

organizations with these responsibilities will be important in determining the data needs but may also have expertise and existing data sources that can support the development of the accounts.

54. Consult with policy makers, stakeholders and potential data providers on the environmental protection activities of interest for the country. Setting out the specific activities that would be of interest to the information needs of the country should be done at this stage. This will provide a basis to examine the adequacy of the existing data and assess where additional information may be required.
55. It will be important to find the appropriate balance between the detail sought by policy makers and analysts and the capacity of the statistical infrastructure to deliver sufficiently robust estimates particular in the early stages of development. When first setting up an EGSS account, care should be taken to not be overly ambitious. It is advisable to focus on major producers and products in the initial development and then improve the estimates as experience with the account is acquired. For EGSS this may be starting with the environmental producers engaged in market activities. However it is also important to recognize the demands for detailed estimates so that the development of data sources and systems can anticipate eventual improvements in these dimensions.
56. These initial steps may not need to be undertaken for each data cycle but should be revisited periodically in conjunction with longer term planning cycles.
57. Part of the design phase is making the scope of environmental activities operational. The SEEA CF definition of environmental activities, introduced in Section II, emphasizes the purpose of the activities and actions. Experience over the years has shown that several interpretations of the concept of 'environmental' and of the determination of the purpose may exist. Therefore, the national compilers must identify environmental protection activities, products and producers in classifications, lists and business registers. As explained in paragraph 12, many countries use operational lists of environmental activities and products. These lists must be discussed and established by experts, using the environmental purpose as guiding principle. Using lists created for other environmental activity accounts, such as EPEA, is also an option and it reinforces coherence between accounts. This work can also be facilitated and coordinated at international level, as to produce lists that can be shared across countries; however some room for adaptation to national circumstances is normally required. Because there is considerable technological progress in product development in the environmental domain, it is important to update product and activity lists on a regular basis.
58. Setting the scope of cleaner and resource-efficient products may require a dedicated effort. Some approaches are: identify groups of goods and services with the greatest negative environmental impacts during their production, use or scrapping; examine for each group the goods with the relatively best environmental performance levels; estimate the part which is considered as the 'leading green edge' of the market, based on current standards; identify the codes of the standard classifications where the identified goods are currently classified.
59. The next step is identifying potential data sources and assessing their suitability for estimating the desired variables for the full range of environmental activities and products. A separate analysis of activities and products may be necessary. Sources can be e.g. the national accounts or the economic

statistics feeding into the accounts, both the production account, but also government financing are important sources. Consider links to other environmental data initiatives planned or underway that could be potential data sources or provide guidance in classifying or identifying environmental protection expenditures (EPEA for example).

60. Each data source may cover only subsets of the EGSS. The sources may be partly overlapping or have different scopes. A careful integration is therefore needed. A data map may assist in this task. Such data map shows which subsets of EGSS can be compiled from which data sources. Each national compiler will have different sources available and may need its own data map. An example from Eurostat guidance to European Union countries is shown below. Other countries may have different circumstances or data sources.

**Example data map for compilation of EGSS accounts (source: Eurostat EGSS handbook)**

		Market and non-market production of EGS: waste-water, waste and water management services	Market production of EGS other than waste-water, waste and water management services: non-capital goods and services	Market production of EGS: capital goods and services	Non-market production of EGS: other than waste-water, waste and water management services	Ancillary production of EGS
EP	Protection of ambient air and climate		EPE, NA_64, NA_SUT, LFS		EPE, NA_64, LFS	
	Wastewater management	EPEA, NA_64, NA_SUT, LFS	likely to be small			
	Waste management					
	Protection of soil, ground-water and surface water		EPE, NA_64, NA_SUT, LFS, AGRI (for organic farming)	EPE, NA_64, NA_SUT, NA_GFCF, LFS		EPE, NA_64, LFS
	Noise and vibration abatement				EPE, NA_64, LFS	
	Protection of biodiversity and landscape		EPE, NA_64, NA_SUT, LFS			
	Other EP (protection against radiation, env. R&D and other env. Protection)					
RM	Management of forest resources		IEEAF, NA_64, NA_SUT, LFS		IEEAF, NA_64, NA_SUT, LFS	
	Management of waters		likely to be small	NA_64, NA_SUT, NA_GFCF, LFS		
	Production of energy from renewable sources		NA_64, NA_SUT, SBS, LFS, ENSTAT, IEEAF, IEA, FAO/OECD	NA_64, NA_SUT, NA_GFCF, PRODCOM, LFS	likely to be small	
	Heat/energy savings		likely to be small			
	Other RM		as far as material recovery is recorded in national accounts under NACE/CPA E28 it is included in waste management			

Legend  
 = empty cell by definition  
 = suitable data not identified yet by Eurostat

Legend:

NA\_64: National accounts aggregates by industry (64 industries, in Europe)  
 NA\_SUT: National accounts supply and use tables  
 EPE: Environmental protection expenditure account  
 SBS: Business surveys  
 LFS: Labour force survey (employment estimates)  
 IEEAF: forest accounts or statistics  
 IEA: International Energy Agency  
 FAO/OECD: Biofuel prices  
 AGRI: agricultural statistics

61. Typically, there are fewer direct sources to estimate EGSS gross value added and employment than output and exports. If there is no specific survey that collects gross value added and employment related to EGSS, the best option is to estimate first EGSS output and employment, and afterwards use ratios of GVA to output and employment to output and to apply these ratios to the estimated EGSS output. The most practical way of compiling such ratios is to extract data from national accounts: output data, GVA and employment are generally published with an industry breakdown and can be easily aggregated as needed for the EGSS accounts. Business surveys may also provide data to derive such ratios, in particular whenever they are available with higher industry detail than national accounts.

62. An important data source are national accounts, in particular detailed estimates e.g. by industry or supply-use tables. In some cases the detail may not be sufficient to identify environmental activities, in particular for market producers (corporations). One case where detailed data may exist is in government financial data given the growing interest and focus on these activities by many governments.

63. Environmental data sets used for other SEEA activity accounts may provide information on production of Environmental goods and services accounts (see section IV). Also, economic data programs may provide some data of use for the identification of these activities.
64. Business surveys may collect data on output (turnover), gross value added, number of employees, etc. This is useful in particular for market output. There are however conceptual differences between the concepts in business surveys and EGSS, as the latter are aligned to national accounts. Using business surveys as sources requires adjustments to meet the definitions and valuation principles. Typically, general-purpose business surveys provide little indication on the share of environmental output in an industry. Complementary information is necessary. Sector-specific statistics can be used to estimate shares of the EGSS in broader industries, for example organic farming within agriculture and production of renewable energies within electric power generation.
65. External trade statistics provide information on imports and exports. A detailed analysis of product codes is necessary to identify the environmental products.
66. Administrative data on environmental protection activities and regulation may also provide sources for some aspect of environmental protection. Business associations may be a source of producers of environmental services. Increasingly individual businesses and industry associations are highlighting members activities related to environmental activities and these reports may provide ratios such as portions of activities or full-time equivalent activity that can be used to estimate the associated values. Contacting the association may provide access to lists of members or the associations may be prepared to use its own expert knowledge of sector activities to identify major producers and products relevant for the economy. They also often have knowledge of patterns of international trade and also which activities or products are not significant for the particular economy.
67. Finally, adding questions to existing surveys or developing new surveys may be an option. However, care should be taken as the distribution of environmental expenditures may be distributed widely and not well correlated with other activity thus making surveying challenging. This may be particularly true for capital investment where expenditures can be widely dispersed with timing tied to the more general investment decisions of the firm or highly concentrated in response to government initiatives.
68. At this point, if sufficient basic data is not available to produce estimates for one or more important production of environmental goods or services, it may be necessary to initiate a project to establish a new source of data. This may mean that the development of the sector splits into two paths: one that can provide partial coverage with existing data and one where development would have to await the availability of basic data.
69. In some cases where partial data exist but there are some important data gaps, it may be a good idea to construct a preliminary set of estimates based on related flows or modelling to fill the gaps. This could be done to aid in the development of the missing basic data.
70. In the case where basic data must be developed, it is recommended that a separate project be initiated to develop the necessary data. This project should follow the GSBPM steps and generic principle as set out in the first note in this Technical Note series. Depending on the organization of

responsibilities within the statistical infrastructure of the country, this step may involve additional agencies or sectors of the NSI.

## Collect

71. Secure access to data, associated metadata and the rights to disseminate the estimated variables that are derived from that data. Where needed, obtain access to expertise in organizations from which data is being sought to assist with analysis and/or training. The terms of access under current institutional arrangements are key. The terms should support cooperative working arrangements and the release of data with sufficient detail to address the policy issues important for the country. This step can take considerable effort and time in cases where institutional arrangements are not yet established. It will be important for all agencies involved to clearly appreciate the mandate of the other agencies and associated constraints.
72. Given that data may be acquired from a number of institutions or agencies, it may be beneficial to establish standard data transfer protocols in particular for data collected and processed frequently.
73. Databases for the basic data and the associated accounts must be established. As the SEEA links to the SNA, existing database structures and associated processing systems may be a good source for this development. These databases should also allow easy linking with standard data sets for related domains so that verification and confrontation of data is facilitated. It is also important to collect metadata with each period or at least verify that it has not changed so as to be aware of any changes to classification, definitions, etc.
74. Import data and process data including applying concordances that may be required between the classifications used in the imported data and the classifications to be used in the estimates. Identification at the entity level may also allow the use of micro data linking techniques. This may allow the linking of data across survey and administrative data sets to provide new detailed data categories.

## Process

75. Some adjustments will be required to add components. In this sense, it is important to closely examine the metadata associated with the data sources to assess coherence between data sources. Assess whether or not the definitions conform to and/or support those set out for the required activities in the design stage. If not, is the shortcoming important or can it be overcome with estimates based on alternate sources? Also, key at this stage is to clearly ascertain the classification, conceptual and coverage differences across the various data sets to be used as basic inputs.
76. Decide if for some elements there are better alternatives than the supply approach. For households and government, a demand side approach may be the best one, i.e. measuring their expenditure. Instead, the activities of market producers may be best approached from the supply side.
77. Prepare estimates, including the estimation of data for any data gaps. Many of the efforts to estimate EGSS have been based on using proxies from other data sources to estimate ratios that are applied to national accounts information. Given the use of proxies to estimate some data and the varying

quality and coverage of these, it is likely that different methods will need to be considered for each industry/sector of the economy.

78. Once all required variables have been derived, they should be put into a common format and confronted with existing data from other sources such as the SNA, business association outputs or measures from other departments or agencies.

#### Analyse

79. Analyse tables and graphic representations including undertaking an analysis of time series where possible and recognising the likely need for multiple iterations of this and the previous step. Data quality should be assessed and documented at this stage.
80. The steps in the above three paragraphs are the core activities in building the estimates and will be repeated in cycle during each production period. This allows the strength of the accounting approach to be used to confront the various data sources and check for consistency and reasonableness in comparison to other datasets such as the related national accounts values.
81. The first time accounts are estimated for a new program, particular attention needs to be made with regard to adjustments required to the source data to ensure the methods used are appropriate and sound. Given that proxy data and ratios are likely to be used for these estimates, the reasonableness of the initial estimates needs to be thoroughly assessed.
82. It is recommended that in cases where significant basic data come from other agencies, the staff of those agencies be asked to participate in the analysis of the estimates. These experts often have in depth knowledge that can allow the identification and resolution of inconsistencies.

#### Disseminate

83. Disseminate estimates, including material to assist interpretation (e.g. indicators, methodological notes and statements of data quality)
84. The dissemination of data should always be accompanied by sufficient documentation and metadata to allow users to fully understand the information being disseminated. This is particularly important for the initial dissemination of a new program of data where one might want to identify the initial data as 'experimental' or 'preliminary' and make it clear that user input is being sought in order to improve future releases.

#### Evaluate

85. Archive data and related methodological and other documentation. Review estimates, data sources, methods and systems, including actively seeking user feedback.
86. These last two steps are very important for all statistical programs but when initiating a new program of data, seeking user feedback is crucial. This in turn depends on the existence of good documentation on the methods and systems so as to properly inform users and assess their feedback.

## VII. References

- SEEA-Central Framework: [https://seea.un.org/sites/seea.un.org/files/seea\\_cf\\_final\\_en.pdf](https://seea.un.org/sites/seea.un.org/files/seea_cf_final_en.pdf)
- SNA 2008: System of National Accounts <https://unstats.un.org/unsd/nationalaccount/sna2008.asp>
- Integrated framework [https://seea.un.org/sites/seea.un.org/files/briefing\\_note\\_for\\_unceea\\_-\\_integrated\\_framework\\_sv\\_002.pdf](https://seea.un.org/sites/seea.un.org/files/briefing_note_for_unceea_-_integrated_framework_sv_002.pdf) and [https://seea.un.org/sites/seea.un.org/files/seea\\_paper\\_integrated\\_framework\\_estat\\_v5.pdf](https://seea.un.org/sites/seea.un.org/files/seea_paper_integrated_framework_estat_v5.pdf)

### **Handbooks:**

- [Eurostat Handbook Environmental Goods and Services Sector, edition 2016](#)
- [Eurostat Practical Guide Environmental Goods and Services Sector, edition 2016](#)
- [Eurostat EGSS list of environmental products based on CPA and CN – 2015 \(V. June 2016\)](#)
- [OECD-Eurostat Environmental goods and services industry manual, edition 1999](#)
- [SERIEE — European System for the collection of economic information on the environment, 1994 version](#)

### **Examples of disseminations of statistics, Eurostat:**

- Statistics Explained: [https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Environmental\\_economy\\_%E2%80%93\\_statistics\\_on\\_employment\\_and\\_growth](https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Environmental_economy_%E2%80%93_statistics_on_employment_and_growth)

### **Examples of dissemination of statistics, country level:**

- Instituto Nacional de Estadística Spain: [https://www.ine.es/dyngs/INEbase/en/operacion.htm?c=Estadistica\\_C&cid=1254736177053&menu=ultiDatos&idp=1254735976603](https://www.ine.es/dyngs/INEbase/en/operacion.htm?c=Estadistica_C&cid=1254736177053&menu=ultiDatos&idp=1254735976603) (In Spanish and English)
- Statistics Finland: <https://stat.fi/en/statistics/ylt> (in Finnish and English)
- Statistics Netherlands: <https://www.cbs.nl/en-gb/news/2022/27/environmental-sector-keeps-growing-in-importance> (Dutch and English)

### **National studies:**

- Statistics Canada (2022): <https://www150.statcan.gc.ca/n1/pub/11-627-m/11-627-m2022029-eng.htm>