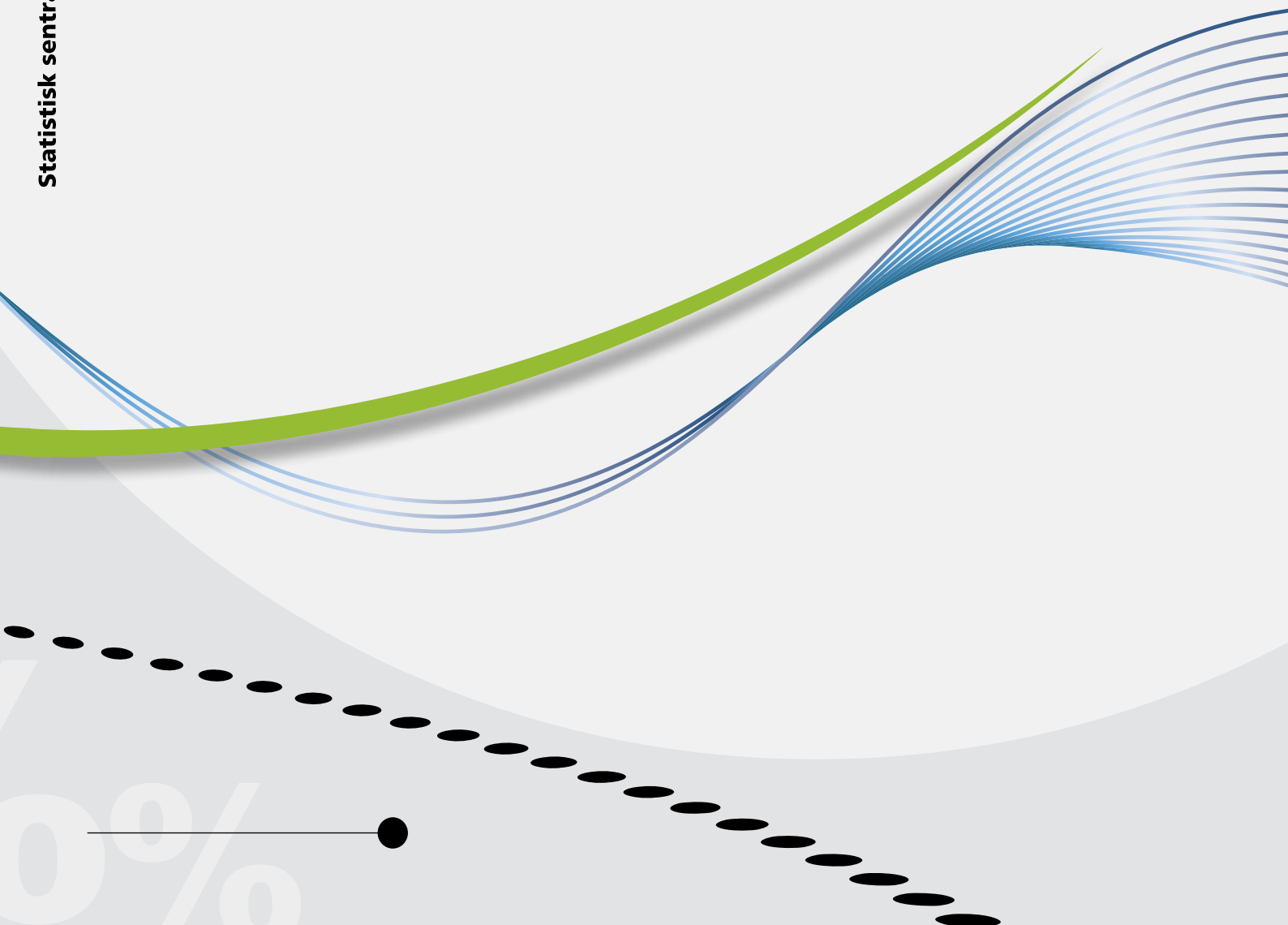
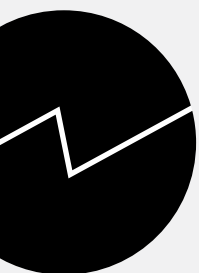


*Sigrid Hendriks Moe, Håkon Karlsen and  
Nadiya Fedoryshyn*

## **Environmental Protection Expenditure Accounts**

New reporting requirements and basic data needed





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	Category not applicable	.
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	Not for publication	:
	Nil	-
	Less than 0.5 of unit employed	0
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## Preface

The regulation (EU) No 691/2011 on European environmental economic accounts establishes a common framework for the collection, compilation and transmission of data on environmental accounts. Norway, represented by Statistics Norway, is according to the EEA-agreement obliged to adopt the regulation and new modules amending the regulation as Norwegian law and provide data in future annual reporting. This includes the new module for Environmental Protection Expenditure Accounts (EPEA) which is planned to enter into force in 2015 with first data delivery in 2017.

The project was initiated by a grant proposal from Statistics Norway under the leadership of Ms. Kristine E. Kolshus, in cooperation with the head of the Division for Energy and Environmental Statistics, Ms. Tonje Køber.

Contributors to the project and editors of this report have been Ms. Sigrid Hendriks Moe, Mr. Håkon Torfinn Karlsen and Ms. Nadiya Fedoryshyn in the Division for Energy and Environmental Statistics. The Division for National Accounts and the Division for Public Finances has participated in meetings and discussions during the project.

Statistics Norway would like to thank Eurostat for supporting the project on EPEA by the contribution of a grant.

Statistics Norway, 8 January 2014

Hans Henrik Scheel

## Abstract

This report presents the results from the project evaluating the requirements for the proposed module on Environmental Protection Expenditure Accounts (EPEA) amending Regulation 691/2011 on environmental economic accounting. The report will, together with a separate report on the evaluation of requirements for the Environmental Goods and Services Sector (EGSS), present the results from the project “Evaluation of requirements for EPEA and EGSS in the European Statistical System” according to Eurostat grant agreement no. 50904.2012.004-2012438.

The objectives have been to:

1. Identify the requirements, sources and costs related to the proposed inclusion of the module of EPEA in the EU-regulation 691/2011 on environmental accounting.
2. Develop alternative methods for estimating environmental protection expenditure (EPE).
3. Examine the national uses and demands of EPE data and accounts.

We have used the draft regulation presented at DIMESA November 2012, agenda item 4.1, as at the basis of the evaluation (see appendix). The draft questionnaire for EPE legal module (printed 08.03.2013) has been used to identify the necessary data sources to comply with the proposed requirements. We have used Eurostat guidelines and relevant pilot study reports from other countries as important subject matter input. We have also had close cooperation with The Division for National Accounts and the Division for Public Finances in Statistics Norway to identify possible data sources for EPEA.

The main conclusions are the following:

- We have identified the main national data sources for the proposed legal module for EPEA.
- These main data sources are the national accounts, COFOG statistics and EPE survey data from the structural business statistics (SBS).
- There are still some challenges related to fulfilling the requirements. These challenges are mainly connected to the classification criteria of COFOG, and data gaps and the level of detail in the national accounts.
- We will engage in a project together with the Division for Public Finances in 2014 to identify and code EPE relevant for the EPEA. Depending on available funding arrangements, we expect to engage in a similar project with the Division for National Accounts in 2015 to accommodate available national account data to the requirements of the EPEA.
- We have outlined an alternative approach for estimating EPE for corporations which may reduce the resources needed for data collection. The new approach may also be better suited to monitor effects of environmental policy than the previous method.
- We have estimated the total developing costs needed for complying with the requirements for EPEA to be 20 weeks without any unexpected challenges (excl. costs in order to establish a dissemination routine). The annual operational costs are estimated to be around 9 weeks. We aim at conducting a test reporting of EPEA in 2016.
- We will proceed to explore new possible uses of data. It is also important that we find accessible and understandable ways to present the data to the users. This may create new national demands for EPE data and accounts.

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## 1. Introduction

Environmental protection expenditure accounts (EPEA) are, together with Environmental Goods and Services Sector (EGSS) and Physical Energy Flow Accounts (PEFA), the proposed new modules in the EU-regulation 691/2011 on environmental accounting. The modules received the green light from the European Statistical System Committee in February 2013 and have been submitted to the Council working group on statistics. If everything goes as planned the three new modules should enter into force in 2015 with first data delivery in 2017. The first reporting year will be 2014.

The main objective of EPEA is to value the national expenditures for environmental protection, i.e. the economic resources devoted by the resident units of the economy to environmental protection<sup>1</sup>. The EPEA follows the same system boundaries as the European System of National Accounts (ESA) and classifies economic units into producers, consumers and the rest of the world. The environmental expenditure should be categorized by environmental domains according to the Classification of Environmental Protection Activities (CEPA).

Norway has since 2002 produced Environmental Protection Expenditure (EPE) statistics according to the SBS-regulation. The statistics are produced for mining and quarrying, oil and gas extraction, manufacturing, electricity supply and water supply. However, there are some methodological and quality related issues, and the current statistics are not sufficiently developed according to the requirements of the EPEA. Data on general government environmental protection expenditure are being produced in Statistics Norway, but does not cover the requirements in EPEA in its current state. In addition, we have not yet developed data compiling methods for calculating environmental expenditure by specialist producers of market environmental protection services and households.

These challenges call for examination of additional (both internal and external) data sources and alternative methods of data collection. It is also necessary to make realistic cost estimates for Statistics Norway of complying with the new module, as well as an estimate of the probable increased reporting burden for corporations. Finally, it is important to identify which statistical indicators can be developed based on the data collected, and what national needs that could potentially be covered by those.

This report summarizes Statistics Norway's progress in resolving the issues mentioned above. In chapter 2, we identify the requirements to fulfil the proposed module for EPEA. The main characteristics of the accounts are defined in accordance with ESA and distinguished into nine CEPA classes. In chapter 3 we describe the existing data sources and data gaps for each of the minimum reporting tables for EPEA and evaluate the alternatives to the current survey method of data collection for the SBS-reporting. Chapter 4 provides a comparison of EPEA and one of the other new reporting module – EGSS, while cost estimates for compiling the data for EPEA are included in chapter 5. In chapter 6, the potential users and uses of the data are described. The results and conclusions from the project are summarized in chapter 7.

<sup>1</sup> OECD/Eurostat Environmental Protection Expenditure and Revenue Joint Questionnaire / SERIEE Environmental Protection Expenditure Conversion Guidelines. European Communities 2005  
[http://epp.eurostat.ec.europa.eu/cache/ITY\\_OFFPUB/KS-EC-05-001/EN/KS-EC-05-001-EN.PDF](http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-EC-05-001/EN/KS-EC-05-001-EN.PDF)



## 2. What is EPEA?

The Environmental Protection Expenditure Accounts (EPEA) is a way of calculating, compiling and disseminating data on environmental protection expenditure. To be able to identify available data sources and data gaps, we had to conduct a detailed review to understand the requirements presented by the new module. Therefore, this chapter presents the EPEA module in accordance with the reporting requirements as presented in the legal text of the Regulation No 691/2012 that was submitted to the Council working group on statistics.

### 2.1. Objectives and coverage

The main objective of the EPEA is to assess the economic resources devoted by the resident units of the economy to environmental protection, i.e. the expenditure for environmental protection made by the total economy<sup>2</sup>. This kind of an assessment contributes to create an overall picture of how much and in which way different institutional sectors of the national economy contribute to environmental protection. We can also assess the value of environmental protection services produced by the national economy and which environmental domains that gets the most attention valued by environmental protection expenditure.

EPEA is designed as a satellite account to the national accounts and follows the same principles and system boundaries as the data reported under European System of National Accounts (ESA). The EPEA uses a two-stage classification of economic units: units are first classified according to their relation to production of environmental protection (EP) services and are then further classified according to the institutional sectors they belong to<sup>3</sup>. The economic units are classified into producers, consumers and the rest of the world:

- Producers of EP services: general government (incl. NPISH), corporations as institutional sectors and specialist produces that produce EP services as their principal activity.
- Consumers of EP services: corporations, general government and households.
- Transfers for environmental protection to the rest of the world.

The environmental expenditure should be categorized by environmental domains according to the Classification of Environmental Protection Activities (CEPA):

1. Protection of ambient air and climate
2. Wastewater management
3. Waste management
4. Protection and remediation of soil, groundwater and surface water
5. Noise and vibration abatement
6. Protection of biodiversity and landscapes
7. Protection against radiation
8. Environmental research and development
9. Other environmental protection activities.

The draft legal module for EPEA suggests using already existing information from the national accounts, structural business statistics (SBS-regulation) and business registers to fulfil the requirements of the legal module.

<sup>2</sup> SERIEE EPEA – Compilation Guide

<sup>3</sup> CD/Eurostat Environmental Protection Expenditure and Revenue Joint Questionnaire / SERIEE Environmental Protection Expenditure. Conversion Guidelines. Page 11. European Communities 2005  
[http://epp.eurostat.ec.europa.eu/cache/ITY\\_OFFPUB/KS-EC-05-001/EN/KS-EC-05-001-EN.PDF](http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-EC-05-001/EN/KS-EC-05-001-EN.PDF)

## 2.2. Terms and definitions

The EPEA should be reported based on the characteristics which are listed in the text of legal module.

The data from Norway shall be reported in NOK million on a yearly basis within 24 months of the end of the reference year. The transmission of data shall provide data annually for the years  $n-3$ ,  $n-2$  and  $n-1$ , where  $n$  is the reference year. If everything goes as planned, the new modules should enter into force in 2015 with first data delivery in 2017. The first reporting year will be 2014.

In order to understand the requirements of the legal module, we studied these characteristics closer by defining them according to the framework in ESA or the System of National Accounts (SNA). The definitions presented in this chapter give a general overview; more practical examples of the characteristics are presented in chapter 3.

- **Environmental protection expenditure (EPE)** are related to environmental protection activities which in turn are defined as

*”an activity (involving the use of equipment, labour, manufacturing techniques and practises, information networks or products) where the main purpose is to collect, treat reduce, prevent or eliminate pollutants and pollution or any other degradation of the environment resulting from the activity of the business”<sup>4</sup>*

Environmental protection activities thus include all purposeful activities directly aimed at the prevention, reduction and elimination of pollution or any other degradation of the environment resulting from the production or consumption process. Activities that primarily satisfy technical needs or other internal requirement while at the same time are beneficial to the environment are excluded. Activities such as energy and material saving are only included to the extent that they mainly aim at environmental protection. Payments of interest, fines and penalties for non-compliance with environmental regulations or compensations to third parties are excluded.

The emphasis is on “main purpose”. This excludes any activity which has another main purpose, where a positive effect on the environment is accidental or a collateral effect in the pursuit of other goals. In line with the practice in compiling other economic statistical accounts, expenditure cannot be regarded as partly environmental, i.e. a fraction of the total assigned as environmental. It is either in total environmental or not at all. Thus, the main purpose criterion of classifying expenditure as environmental protection expenditure, in its strictest interpretation, excludes any activity which increases short or long term profitability or corporation competitiveness.

Finally, one should note the distinction between expenditure and costs. Expenditure is synonymous with cash flow, i.e. the money spent each year. The difference is particularly important when discussing investments and investment costs in the business sector: the cost of an investment is the depreciation, interest etc. spread out over a number of years. Also, the final cost of an environmental activity will most likely be shared with the customer as prices shift due to a shift in the cost curve, as is demonstrated for taxation in economic theory.

- **Output of environmental protection services**

Output of environmental protection services defines output as market output, output produced for own final use (e.g. output of ancillary activities) and other non-market output (ESA 2010).

<sup>4</sup> Environmental expenditure statistics: Industry data collection handbook. Eurostat 2005, page 13

Market output is output that is sold at prices that are economically significant or otherwise disposed of in the market or intended for sale or disposal on the market (SNA 6.45)<sup>5</sup>. It can be produced by specialist producers as a principal activity or by a producer unit as a secondary activity.

Output of ancillary activities can be approximated by the amount of in-house current expenditure, i.e. compensation of employees plus intermediate consumption for environmental protection other than the intermediate consumption of EP services. In other words, it includes in-house expenditure for producing EP services for own use and it excludes expenditure from purchasing EP services on the market from specialist service producers<sup>6</sup>.

Other non-market output covers output that is provided free, or at prices that are not economically significant, to other units.

- **Intermediate consumption of EP services by specialist producers**

Intermediate consumption is the value of the goods and services consumed as inputs by a process of production, excluding fixed assets whose consumption is recorded as consumption of fixed capital. The goods and services may be either transformed or used up by the production process (ESA 1995). In case of EPEA, intermediate consumption can be defined as uses of EP services (either market or ancillary) by the producers of the national economy (excluded are the purchases of EP services by the producers of EP services).

- **Imports and exports of EP services**

Exports of EP services consist of transactions from non-resident consumers of EP services to resident specialist producers of EP services. Imports consist of transactions from resident consumers to non-resident specialist producers.

- **VAT and other taxes less subsidies on products on EP services**

Value added tax (VAT) on EP services is a tax collected in stages by specialist producers and which is ultimately charged in full to the final purchasers. Other taxes on products are taxes that are payable per unit of some EP service produced or transacted.

- **Gross capital formation and acquisitions less disposals of non-financial non-produced assets for the production of environmental protection services**

Gross capital formation means gross of consumption of fixed capital for the production of EP services for sale or for own use. It consists of gross fixed capital formation, changes in inventories and acquisitions less disposals of valuables. Valuables are defined as non-financial goods that are not used primarily for production or consumption, do not deteriorate (physically) over time under normal conditions and that are acquired and held primarily as stores of value (ESA 1995).

The total investments are the sum of the following two categories:

- End-of-pipe investments: serve to treat already generated pollution
- Investments in integrated technologies: lead to a modified or adapted production process.

- **Final consumption of environmental protection services**

Final consumption of EP services by general government is government expenditure on EP services that are used for the direct satisfaction of individual needs (individual consumption) or collective needs of members of the community (collective consumption).

<sup>5</sup> OECD Glossary of Statistical Terms: Market output SNA <http://stats.oecd.org/glossary/detail.asp?ID=1606>

<sup>6</sup> OECD Glossary of Statistical Terms: Ancillary activity Eurostat <http://stats.oecd.org/glossary/detail.asp?ID=108>

Final consumption of EP services by households is household expenditure on EP services that are used for the direct satisfaction of individual needs (individual consumption).

- **Environmental protection transfers (received/paid)**

Environmental protection transfers comprise subsidies, investment grants, social benefits and other current and capital transfers, including transfers to and from the rest of the world.

### 3. Review of the reporting tables

This section presents Statistics Norway review of the reporting tables for EPEA. We have used the draft questionnaire for EPE legal module (printed 08.03.2013) to identify the necessary data. We have mainly reviewed the mandatory draft tables required by the draft legal act, but we have also reviewed variables in the voluntary tables that make up the sum of the mandatory variables. We have identified both existing data and data gaps.

The questionnaire is designed to sum up the national expenditure for environmental protection. We have used the same structure as the draft questionnaire to present our results. Each table has its own chapter describing requirements and definitions, data sources, data gaps and other challenges.

#### 3.1. Table 1 - General government

DRAFT - QUESTIONNAIRE FOR EPE LEGAL MODULE		Table 1. General government					
Country: <span style="background-color: #f4a460; border: 1px solid black; padding: 2px 10px;"> </span>		Data required by the draft legal act					
Expenditure	Year	CEPA 2	CEPA 3	CEPA 6	Sum of CEPA 1+4+5+7	Sum of CEPA 8+9	TOTAL
( O ) EP output (O.11+O.12) <i>Sum of market and non market output</i>	2013						
	2014						
	2015						
( O.11 ) Market output <i>Sales of EP products including partial payments</i>	2013						
	2014						
	2015						
( O.12 ) Non-market output	2013						
	2014						
	2015						
( G ) Gross capital formation and acquisition less disposals of non-financial, non-produced assets for the production of EP services <i>( A ) Investments for the production of EP services</i>	2013						
	2014						
	2015						
( F ) Final consumption of EP services <i>O.12 + ( B2 ) fees and purchases</i>	2013						
	2014						
	2015						

#### Requirements and definitions

The general government is both producers and consumers of EP services. Table 1 allows for reporting data on output of EP services (O), gross capital formation of assets for the production of EP services (G) and purchases of EP services from specialist producers consumed by the general government (B2). The general government in the EPEA includes all local and central government units that produce EP services delivered free or at a non-economically significant price for individual or collective consumption (non-market). The general government in the EPEA also includes market producers which do not have autonomy of decision and which are subject to control by government units<sup>7</sup>. Publicly owned enterprises and departments in large municipalities which have autonomy of decision are to be reported in table 3 – Specialist producers. The government market output of wastewater management (CEPA 2) and waste management (CEPA 3) in table 1 will therefore be minimal.

The production should be divided into market (O.11) and non-market output (O.12). A general government unit may recover parts of its cost of production through revenues from users or beneficiaries. If the recovered part is more than 50 per cent of the cost of production, the unit will be classified as market producer. In addition, if part of its cost of production is covered by partial payments, this part should be recorded as market output. Non-market output is valued by its internal

<sup>7</sup> CD/Eurostat Environmental Protection Expenditure and Revenue Joint Questionnaire / SERIEE Environmental Protection Expenditure Conversion Guidelines. Page 11. European Communities 2005  
[http://epp.eurostat.ec.europa.eu/cache/ITY\\_OFFPUB/KS-EC-05-001/EN/KS-EC-05-001-EN.PDF](http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-EC-05-001/EN/KS-EC-05-001-EN.PDF)

current cost of production, e.g. compensation of employees, and market output is valued as revenues from sales. Nearly all governmental EP activities in Norway are financed through the state budget. Preliminary studies imply that the market output of EP services from the general government will be minimal.

The table should also include data on investments for the production of EP services (G - Gross capital formation and acquisition less disposals of non-financial, non-produced assets for the production of EP services). This may for example include investments in land for the preservation of landscapes and biodiversity.

Finally, the mandatory table includes a section on final consumption of EP services. This is the sum of non-market output of EP-services (O.12) and fees/purchases of EP services from specialist producers consumed by the general government (B2).

### Existing data sources

The main data source for table 1 is the national accounts. The basic data on general government revenue and expenditure are classified in main groups according to type. The division by type is based on the national accounts' chart of accounts, which again is based on international standards. The expenditure is classified according to their main function in accordance with the international standard Classification of the functions of government (COFOG). COFOG has its own division devoted to environmental protection (COFOG 5). Table 3-a shows the correspondence between COFOG 5 – Environmental protection and CEPA<sup>8</sup>:

**Table 3-a. COFOG 05 and CEPA**

COFOG 05 – Environment Protection (ESA 95)	CEPA 2000 (SEEA, EPEA, JQ)
05.1.0 Waste management	3. Waste management
05.2.0 Wastewater management	2. Wastewater management
05.3.0 Pollution management	1. Protection of ambient air and climate
	4. Protection and remediation of soil, groundwater and surface water
	5. Noise and vibration abatement
	7. Protection against radiation
05.4.0 Protection of biodiversity and landscape	6. Protection of biodiversity and landscape
05.5.0 Research and development environment protection	8. Research and development
05.6.0 Environment protection n.e.c.	9. Other environmental protection activities

The COFOG data cover all central and local governments according to the national accounts regulations for general government. Public corporations and unincorporated public enterprises (financial or non-financial) are not included. The primary sources are the central government fiscal account, the individual accounts for municipalities and county municipalities (KOSTRA), and accounts for other state, municipal and county municipal units (e.g. funds) that are considered part of general government.

The mandatory variables in reporting table 1 are in accordance with the variables that are reported annually by Statistics Norway on general government in the ESA transmission programme<sup>9</sup>. Table 3-b shows the correspondence between the variables in reporting table 1 and the national accounts:

<sup>8</sup> Environmental expenditure statistics 2007 edition. General Government and Specialised Producers data collection handbook ([http://epp.eurostat.ec.europa.eu/portal/page/portal/environmental\\_accounts/documents/KS-RA-07-012-EN.pdf](http://epp.eurostat.ec.europa.eu/portal/page/portal/environmental_accounts/documents/KS-RA-07-012-EN.pdf))

<sup>9</sup> Regulation (EC) No 1392/2007 of the European Parliament and of the Council of 13 November 2007 amending Council Regulation (EC) No 2223/96 with respect to the transmission of national accounts data. Table 2. (<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2007:324:0001:0078:EN:PDF>)

**Table 3-b. Corresponding variables between EPEA reporting table 1 and the national accounts**

EPEA	Mandatory variables table 1	Variables in the national accounts	ESA 95
O.11	Market output of EP services	Revenues from sales including partial payments	P.11
O.12	Non-market output of EP services	Output for own final use = Intermediate consumption (except fees and purchases of EP services) + Compensation of employees + Consumption of fixed capital+ Other taxes - Subsidies on production	P.12 = Parts of P.2 + D.1+ K1 + D.29 – D.39
G	Gross capital formation and acquisition less disposals of non-financial, non-produced assets for the production of EP services	Gross capital formation + Acquisitions less disposals of non-financial non-produced assets	P.5 + K.2
B2	Fees and purchases of EP services	Fees and purchases (parts of intermediate consumption)	Parts of P.2

The mandatory variables in reporting table 1 should be filled in for CEPA 2, 3, 1+4+5+7, 6 and the sum of CEPA 8+9. The correspondence between the COFOG classification of environmental expenditure and the mandatory reporting table is very good, since it does not require splitting COFOG 5.3 into CEPA 1, 4, 5 and 7. The data are available for reporting 1 year and 11 months after the reference year.

### Data gaps and challenges

Even though we have detailed data on governmental revenues and expenditure related to EP activities available, we have some issues related to the classification criteria of COFOG. COFOG 5 is a good starting point, but it does not cover all the EP expenditure relevant for the EPEA.

The items in the central and local government accounts are classified by COFOG according to the main purpose criteria. Only items with environmental protection as the main purpose will be classified as COFOG 5. All expenditure related to the Ministry of the Environment will for example be classified as 05.06-Environment protection, while the expenditure items from the Norwegian Environment Agency will be classified as 05.3- Pollution management. These two examples are very clear, but we know that there are EP expenditure classified under other COFOG divisions. For example R&D in environmental protection (CEPA 8) is classified as COFOG 09- Education and expenses related to the construction of road noise barriers (CEPA 5) are classified as COFOG 04.5 – Transport. This issue can be illustrated in the Table 3-c (x'es are placed randomly just as an example):

**Table 3-c. COFOG and CEPA correspondence (illustrative)**

CEPA → COFOG ↓	CEPA1	CEPA2	CEPA3	CEPA4	CEPA5	CEPA6	CEPA7	CEPA8	CEPA9
COFOG 1 ...	x						x		x
COFOG 2				x				x	
COFOG 3		x				x			
COFOG 4 ...	x					x	x	x	
COFOG 5 ...	x	x	x	x	x	x	x	x	x
COFOG 6 ...	x			x					x

A solution to these issues could be to classify all environmental related account items with a specific environmental classification code (CEPA or CReMA<sup>10</sup>). This would make it possible to split COFOG 05.3 and to compile EPE from other COFOG divisions. This approach will mean that EPE presented by CEPA will be higher than COFOG 5.

We have received Eurostat Grants for work in 2014 concerning the identification of government expenditure on environmental protection activities in COFOG. The aim of the project is to identify environmental protection and resource management account items and classify them with a CEPA or CReMA code. We aim at

<sup>10</sup> CReMA is the classification of resource management activities.

excluding all activities linked to resource management from EPEA; these should instead be included in EGSS or ReMEA. We will use budget analysis in order to identify relevant items. There are limits to how detailed we can go in our investigations, and we will focus the analysis on COFOG 1, 4, 6 and 9. This will enable us to produce more accurate and more detailed data on environmental protection government expenditure. We will for example be able to split COFOG 05.3 into CEPA 1, 4, 5 and 7. This project will also make it possible to produce data on environmental transfers (see reporting Table 6 - Transfers).

### 3.2. Table 2 - Corporations

DRAFT - QUESTIONNAIRE FOR EPE LEGAL MODULE		Table 2. Corporations: ancillary production (total)				
Country: <span style="background-color: #f4a460; border: 1px solid black; padding: 2px 10px;"></span>		Data required by the draft legal act				
Expenditure	Year	CEPA 1	CEPA 2	CEPA 3	Sum of CEPA 4+5+6+7+8+9	TOTAL
( O.12 ) Output of ancillary activities	2013					
	2014					
	2015					
( G ) Gross capital formation and acquisition less disposals of non-financial, non-produced assets for the production of EP services ( A ) Investments for the production of EP services	2013					
	2014					
	2015					

#### Requirements and definitions

Corporations denote all statistical units of NACE rev. 2, divisions 05 – 36. Of particular importance to Norwegian environmental expenditure is that reporting table 2 includes division 06 – oil and gas extraction.

Reporting table 2 is subdivided into reporting tables 2a – 2e dealing with section B (divisions 05 – 09), section C (divisions 10 – 33) section D (division 35) as well as division 36 which is part of section E. Each table consists of a mandatory summary and a more detailed and voluntary part.

The mandatory reporting tables require:

- **Output of ancillary (EP) activities,**  
i.e. output that “is not intended for use outside the enterprise. An ancillary activity is a supporting activity undertaken within an enterprise in order to create the conditions within which the principal or secondary activities of local KAUs can be carried out. Enterprises may have a choice between engaging in ancillary activities or purchasing such services on the market from specialist service producers”. The ancillary activities are the sum of intermediate consumption<sup>11</sup> (where purchased EP Services are subtracted<sup>12</sup>) and compensation of employees, both to be specified in the voluntary parts of the tables.

What is to be reported is therefore different from the requirement in the current SBS reporting. “Current expenditure” in the SBS does not distinguish between in-house ancillary activities and services purchased from outside.

<sup>12</sup> Uses of EP services (either market or ancillary) by the producers of the national economy (excluded are the purchases of EP services by the producers of EP services).  
Source: [http://epp.eurostat.ec.europa.eu/cache/ITY\\_OFFPUB/KS-EC-05-001/EN/KS-EC-05-001-EN.PDF](http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-EC-05-001/EN/KS-EC-05-001-EN.PDF)



- **Gross capital formation**

Gross capital formation consists of end-of-pipe investments and integrated investments. End-of-pipe investments are also called “pollution treatment investments”.<sup>13</sup>

The following discussion on how to identify an integrated investment is cited from the EPE Industry collection handbook, Eurostat 2005, page 27

Pollution prevention also includes capital expenditure on methods, processes, technologies and equipment that are integrated with the overall operating activity (production process/installation) in a way that may make it difficult to identify separately the pollution-prevention component.

- In these cases ("integrated measures"), only the environmental-protection component in the total investment should be reported as expenditure on environmental protection.

- This component corresponds to the additional cost of the selected investment over and above the capital expenditure that would have been incurred had it not been for the environmental protection considerations.

- The alternative for comparison therefore corresponds to the cheapest alternative available to the business that has similar functions and characteristics in all respects except for those relating to environmental protection.

- When the selected option is standard technology and there is no cheaper, less environmentally beneficial alternative available to the business, the measure is by definition not an environmental protection activity, and no environmental protection expenditure should be reported”

This category comprises cases where the investments are partly driven or motivated by environmental considerations but the main purpose is usually production. When a specific measure or a specific component cannot be identified, the only remaining possibility for identifying a possible extra cost for environmental protection is to go back to the time when the decision to implement the measure was taken – that is to say, when a new item of equipment was bought that was needed for the normal operation of the business and the business chose a variant (or a specific modification) that was more beneficial to the environment than it would have chosen if it had disregarded environmental considerations.

### Existing data sources

The starting point for reporting EPEA figures is the current report according to the SBS directive.

For division 06 (oil and gas extraction) all local kind of activity units<sup>14</sup> in the population are in the survey. No data is collected nor estimated for division 09.1 (services related to oil and gas extraction) after 2009 since the environmental protection expenditure proved to be insignificant compared to the rest of the oil and gas industry.

<sup>13</sup> Pollution treatment investment is defined as capital expenditure on methods, technologies, processes or equipment designed for collecting and removing pollution and pollutants (e.g. air emissions, effluents or solid waste) after their creation, preventing the spread and measuring the level of the pollution, and treating and disposing of pollutants generated by the operating activity of the business. Source: EPE Industry collection handbook, Eurostat 2005

<sup>14</sup> Active offshore oil and gas installations as well as installations in the shutdown phase. Also includes all onshore terminals and processing plants. In total approximately 70 units.

Activities related to exploration and field development are therefore not included.

Data for the environmental protection expenditure in Nace rev. 2 divisions 05 and 07-36 are currently collected in an annual survey. A stratified sample is drawn from the structural business statistics sample of “local kind of activity” units (LKA). Population estimates are calculated using intermediate consumption for current expenditure and “employment” for environmental investments.

In Nace 05, 07 – 36, the survey is sent to a stratified sample of local kind of activity units (LKA), whose corporations satisfy these criteria:

1. Employment > 199 in year T-1
2. Employment > 199 in year T  
Within divisions 05, 07, 08, 10, 11, 19, 20, 21, 23, 24, 25, 28, 33:  
LKA with
3. Employment > 100 in year T-1
4. Sales > 150 NOK million in year T-1
5. Total acquisitions > 5 NOK million in year T-1

Also, new LKA in year T that have

6. Turnover > 50 NOK million
7. New LKA with employment > 50

Finally, a number of units are selected randomly by division.

In the 2009 from population of 19264 LKA units, 1163 were selected based on the selection criteria and 410 were selected randomly.

All areas of environmental protection activities are included, in four groups of CEPA 1, 2 3 and the sum of CEPA 4-9. The Norwegian questionnaire already includes separate questions on CEPA 1-6. CEPA 1 is further split into separate questions on expenditure for climate protection activities and the protection of ambient air.

The questionnaire specifies both end-of-pipe and integrated investments. In the latter case, the environmental expenditure is by definition limited to the additional cost compared to a (less environmentally friendly) investment alternative. This requires the actual existence of a non-environmentally beneficial alternative where an investment analysis has been performed. The Norwegian current practice in EPE data collection has been to deviate from this principle. Instead we encourage respondents to estimate how important environmental considerations have been for the investment decision in relation to other purposes and assign this fraction as an environmental investment.

### **Data gaps and challenges**

The current survey and estimation practice has several problems or deficiencies:

- The structural business statistics has recently migrated to using corporation as the statistical unit. The EPE selection criteria therefore need to be modified accordingly. Also, it is no longer obvious that LKA is the most useful data collection unit.
- There is increasing evidence that the variables “intermediate consumption” and “employment” are not very precise indicators of environmental expenditure in total, nor by division or CEPA.
- The coverage of NACE rev2. divisions 35 and 36 is insufficient in the current survey. The current selection criteria are not suited for the industry characteristics in these divisions. The existing method will require considerably more respondents, thus increasing the overall reporting burden.
- As will be demonstrated in the following analysis, current expenditure for waste water and solid waste as not adequately covered.

It would also be desirable to reduce the number of respondents while selecting units that are likely to have significant or representative environmental protection expenditure.

Finally, it is important to note some limitations to both the current SBS statistics and the forthcoming EPEA reporting tables: all environmental expenditure come from industrial installations that are in the production phase, and for offshore installations also in the shutdown/dismantling stage of their life cycle. In most cases, the large investments are made when a production facility is constructed and readied for production. This means that any environmental investment in the project development phase, the construction phase, as well as possible plant dismantling in Nace 05, 07-36, will not be included in the statistics. This is possibly why large investments in protection of biological diversity and landscape are consistently absent in the statistics. Examples from the energy sector of such investments may be: the postponement of offshore seismic surveys in the cod spawning season in the Norwegian Sea, the construction of channels for salmon migration bypassing hydro power installations, extra costs in choosing power line trajectories etc.

### 3.2.1. Alternative method for estimating EPE in corporations

Today we collect data required for the SBS-reporting through a sample survey. The oil and gas extraction industry, Nace rev.2 06 and 09.1, has been subject to a full census survey since 2008. The total EPE is about half of the estimated Norwegian EPE. EPE data for Nace 05, 07-36 are collected through a sample survey and the population totals are estimated. The current data collection and estimation methods are relatively costly and we have issues with quality and methodology.

An investigation has been carried out looking into alternatives to the current survey data collection for Nace 05, 07-36. The purpose has been to alleviate known shortcomings as described above, and if possible reduce the work load of both respondents and the statistical office. The latter has been particularly important since the EPEA module is otherwise expected to require significantly more resources. The rest of this chapter explores the possibility of using government registers of potentially polluting corporations as the statistical population for corporations<sup>15</sup> with the exception of Nace 06.

The rationale for this choice is the discussion in chapter 2.2: A strict interpretation of environmental expenditure requires it to be involuntary, i.e. imposed by some outside agent. In Norway, that means the central or local government.

It can be argued that profitability is a corporation's only principal objective. The cost of voluntary initiated activities that benefit the environment must thus be attributed to securing public and market goodwill, i.e. long term profitability and competitiveness. Hence, any expenditure with a primarily environmental purpose is by definition involuntary.

EPE must therefore be initiated by external constraints, i.e. through explicit government intervention or general legislation. The expenditure may be the result of actions that are mandatory as a prerequisite for ongoing operation, or in order to avoid taxation. In Norway we have examples of voluntary agreements between government and industry to reduce environmental pressures or emissions, e.g. emissions of NO<sub>x</sub>. Failure to reach specific targets would automatically trigger specific government intervention on the industry in total.

Therefore, by definition only the subset of corporations that are subject to government environmental supervision will have environmental protection

<sup>15</sup> The EPEA requires reporting of aggregated EP expenditure from all corporations in NACE 05 - 36 (the "theoretical population"). By "statistical population" we mean the set of corporations that is practically available for analysis and that will provide the required statistics for the theoretical population.

expenditure. It should be noted that using government registers as the sole set of corporations for which data are to be collected, means that no random selections are involved. Hence, this set cannot be regarded as a “sample” from which a population total can be estimated.

There are two distinct key questions:

Can the government registers replace the current sample and consequent estimation procedures, as a statistical population with respect to:

- A. The SBS reporting requirements?
- B. The forthcoming EPEA requirements?

### **Norwegian Environment Agency registers**

In order to intervene or levy specific taxes on the release of harmful substances, the government must have adequate records of corporation activities in relation to the environment. The Norwegian Environment Agency (NEA) maintains registers of corporations and localities (i.e. local kind of activity units) that have been granted a permit for the release of harmful substances. Each corporation must report by location and substance, its conformity to the standards set by the NEA and if relevant, the execution of preventive actions.

There are two separate registers for polluters (or potentially polluting localities):

- Emissions to air, water and unspecified recipients – activities at each locality
- Pollution of soil – maintained at corporation level.

Table 3-d shows the distribution of corporations in the EPE population<sup>16</sup> and the Environment Agency registers. As may be expected, the number of corporations in the registers varies greatly between divisions, also relative to the population size. Corporations that take part in voluntary agreements such as the agreement to reduce NO<sub>x</sub> emissions are not necessarily in the registers, e.g. maritime transport.

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<sup>16</sup> The entire population of the oil and gas extraction industry is subject to strict government monitoring and requirements of health, safety and the environment. As all LKAs are currently in the survey and this seems satisfactory, NACE 06 is omitted from the following discussions.

**Table 3-d. Corporations in the 2011 population, divisions 05, 07-36 versus the Norwegian Environmental Agency's registries as of November 2012.**

NACE rev. 2	EPE population	Norwegian Environmental Agency Number of corporations		
	Number of corporations	Total of Unique corporations	Emissions to air, water, other	Pollution of soil
05	1	1		1
07	7	5	5	1
08	655	18	14	8
09	20	1		1
10	1 930	118	114	8
11	76	8	8	0
13	594	8	7	1
14	772	2	2	0
15	59	2	2	2
16	1 900	41	9	34
17	71	20	16	11
18	1 288	2	1	1
19	12	3	3	2
20	225	52	46	15
21	37	4	4	0
22	379	9	5	4
23	738	32	24	14
24	126	33	28	18
25	2 432	49	16	35
26	291	2	1	1
27	413	5	2	3
28	1 281	11	2	9
29	125	7	5	2
30	486	49	6	47
31	957	4		4
32	1 071	4	3	1
33	2 222	88	3	86
35	387	20	16	6
36	447	3	3	0
TOTAL	19 002	601	345	315
TOTAL NACE 05 – 96 incl. Undetermined		2 798	755	2 119

Table 3-d shows that the 2011 population consists of 19 002 corporations in NACE 05, 07 – 36, of which 601 are found in the NEA registries.<sup>17</sup>

The current survey encompasses 1500-1600 LKA units that are “owned” by approximately 900 unique corporations, of which 597 were in the NEA registries.

In total, the NEA has records of 2 798 entities that correspond to units in the Norwegian Business register, of which 1 240 are potentially soil polluters that have not been fully identified due to wrong or absent identification. The latter category includes a large number of abandoned (inactive) industrial sites. We suspect some are dormant in the sense that they have been included in the NEA registry for historical reasons. Secondly, the corporations in the NEA registry are assigned a “risk class”. Some of the entries with the lowest risk classification as well as many dormant sites may be omitted from the list of actual corporations of interest to the SBS and EPEA statistics.

#### ***The NEA registries as statistical population of divisions 05, 07-36***

We will now examine whether the NEA registry can be used in data collection and relate it to the current method. The primary difference from the current method is that respondents will be selected according to their actual or potential impact on the environment rather than size (employment, sales, turnover and investments) or randomly. The analysis will be confined to corporations as the statistical unit, consistent with the structural business statistics. A second reason is that the NEA registry on soil pollution is aggregated at that level.

Figure 3-a illustrates the framework of the analysis. The subsets A, B, C and E represents the population of corporations, where EPE are in the survey sample or

<sup>17</sup> A particular corporation may appear in both registries

estimated based on the sample. The shaded area represents the corporations in the NEA registries. Area D comprises the collection of corporations, organisations and government entities etc. in the NEA registries that are not in NACE 05 – 36. Explicit information on the environmental protection expenditure of corporations in the NEA registry, is only available for corporations that are also part of the survey, i.e. the subset denoted by B in figure 3-a<sup>18</sup>

**Figure 3-a. Framework of the analysis**

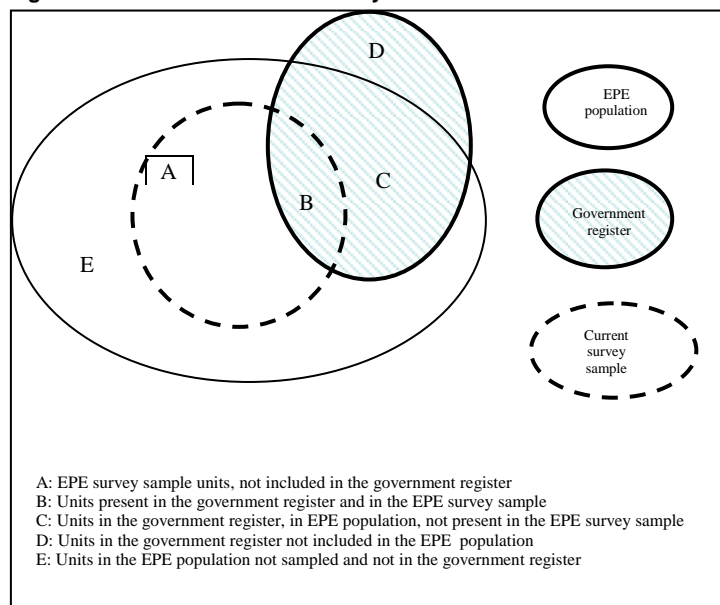


Table 3-e shows the corresponding 2011 distribution of corporations in region A and B. The number of corporations in NEA registry, not covered by the sample (see subset C in figure 3-a), are primarily in divisions 10, 16, 20, 24, 25, 30, 33 and 35. It is possible – though not investigated – that these corporations are too “small” for non random selection in the current survey, but still significant from the point of the environmental impact. The difference between the survey sample total and the NEA sub set, is particularly large in divisions 25-28, in relative and absolute terms.

<sup>18</sup> By definition all corporations in the NEA register in NACE 05 – 36 are included in the EPE population. However, due to changes of NACE coding between 2011, the latest finalised EPE survey and the date at which the NEA register is up to date, there is a small deviation. Area D comprises these few corporations as well as the much larger collection of corporations, organisations and government entities etc that are not in NACE 05 – 36.

**Table 3-e. Distribution of corporations and environmental protection expenditure. 2011 survey**

Nace rev. 2	Survey sample (Figure 3-a: area A+B)		of which in the government registry (Figure 3-a: area B)		NEA corporations not in the sample (Figure 3-a: area C)
	No of corporations	EPE total (NOK million)	No of corporations	EPE total (NOK million)	No of corporations
05 .....	0	8	0	11	0
07 .....	5	11	3	12	0
08 .....	35	42	13	0	4
09 .....	7	0	0	0	0
10 .....	205	867	83	623	34
11 .....	14	77	8	55	0
13 .....	15	33	2	2	6
14 .....	5	3	1	1	1
15 .....	10	1	2	1	0
16 .....	41	18	7	2	28
17 .....	12	36	11	36	7
18 .....	18	7	1	0	0
19 .....	7	386	2	384	1
20 .....	46	245	37	230	12
21 .....	9	19	3	11	1
22 .....	35	29	5	12	2
23 .....	64	140	22	91	8
24 .....	27	537	19	526	11
25 .....	93	94	12	6	29
26 .....	24	31	2	0	0
27 .....	34	18	5	4	0
28 .....	74	100	4	2	4
29 .....	10	15	5	13	1
30 .....	59	51	19	32	18
31 .....	16	7	2	4	1
32 .....	10	5	1	1	2
33 .....	57	42	9	14	50
35 .....	7	8	3	5	16
36 .....	5	0		0	1
<b>TOTAL</b> <sup>19</sup> .....	<b>944</b>	<b>2 829</b>	<b>281</b>	<b>2 078</b>	<b>237</b>

**Table 3-f. Environmentally motivated EPE divisions 05, 07- 36. Survey sample corporations under government supervision (NOK million)**

Year	Current expenditure	Share of sample total	End of pipe Investment	Share of sample total	Integrated investments	Share of sample total	Total	Share of sample total
2008 .....	1 910	79 %	713	89 %	1 219	98 %	3 842	86 %
2009 .....	1 847	80 %	285	87 %	1 371	98 %	3 504	87 %
2010 .....	1 464	71 %	264	61 %	918	98 %	2 646	77 %
2011 .....	1 577	72 %	255	74 %	246	87 %	2 078	73 %

Table 3-f suggests that the NEA corporations included in the sample, cover the largest part of the survey sample totals for each category of environmental expenditure.

Some corporations (area A in figure 3-a) report environmentally motivated expenditure even if there are no legally imposed limits on their release of harmful substances nor precautionary investments or other actions imposed by the government. This may have several explanations. The corporation has taken precautionary measures to avoid future taxation etc. although it is not currently listed as a potentially hazardous producer. Or it may take part in voluntary business-government agreements. Finally, it may be due to a fundamental misunderstanding of the survey questions where profitable activities with environmentally positive effects are included, such as energy conservation. This is shown in Table 3-g for divisions 05, 07 – 36.

<sup>19</sup> The total of NEA corporations (281 + 237 = 524) is smaller than the total of unique corporations in table xx-1 (601). This is because table xx-1 includes NEA corporations that may not longer be part of the population as of 2011 due to closure or reassignment of NACE.

**Table 3-g. Environmentally motivated EPE divisions 05, 07- 36. Survey sample corporations NOT under government supervision (NOK million)**

Year	Current expenditure	Share of sample total	End of pipe Investment	Share of sample total	Integrated investments	Share of sample total	Total sample total	Share of
2008 .....	476	20 %	81	10 %	28	2 %	586	13 %
2009 .....	470	20 %	42	13 %	24	2 %	536	13 %
2010 .....	602	29 %	167	39 %	20	2 %	790	23 %
2011 .....	624	28 %	88	26 %	38	13 %	750	27 %

The share of the sample total is significant can be further broken down into the different CEPA codes as shown in table 3-h to 3-j.

**Table 3-h. Environmentally motivated current expenditure. divisions 05, 07 - 36. Survey sample corporations NOT under government supervision (NOK million)**

	Total	Waste water	Solid waste	Air and climate	Ambient air	Climate	Bio-diversity	Soil	Noise	Other
2008 ....	481	179	276	9	5	4	2	3	1	11
2009 ....	473	177	267	16	15	1	1	2	1	10
2010 ....	607	217	359	15	13	2	1	1	1	13
2011 ....	627	272	329	12	7	5	1	7	2	4

**Table 3-i. Environmentally motivated end –of-pipe investments. Divisions 05, 07 - 36. Survey sample corporations NOT under government supervision (NOK million)**

	Total	Waste water	Solid waste	Air and climate	Ambient air	Climate	Bio-diversity	Soil	Noise	Other
2008 ....	81	12	11	32	31	1	1	19	1	6
2009 ....	42	17	9	8	7	1	0	2	4	3
2010 ....	167	18	27	87	77	11	0	32	1	2
2011 ....	88	8	14	6	4	2	0	59	2	0

**Table 3-j Environmentally motivated integrated investments. divisions 05, 07 - 36. Survey sample corporations NOT under government supervision (NOK million)**

	Total	Waste water	Solid waste	Air and climate	Ambient air	Climate	Bio-diversity	Soil	Noise	Other
2008 ....	28	2	7	14	13	1	0	2	1	2
2009 ....	24	2	7	12	5	7	0	0	2	1
2010 ....	20	1	6	11	3	8	0	0	1	1
2011 ....	38	0	5	3	2	0	0	0	0	30

Current expenditure in waste water and solid waste treatment, are by far the largest. It is important to keep in mind that the current expenditure includes EP services bought from others which are to be reported according to the SBS, but not in EPEA.

Environmental investments in waste water and solid waste have generally been lower than for ambient air and soil protection. This supports the suggestion, but not conclusively, that environmental expenditure in the survey sample for corporations not in NEA registry may be related to preventive measures in order to avoid future NEA attention. This observation is concurrent with the assumption that for these corporations EPE is economically motivated meaning that they are not relevant for the population of the EPEA survey.

#### ***Waste water and solid waste services***

For all corporations with no particularly large volumes or composition of waste water and solid waste (CEPA codes 2 and 3), adherence to regulations are monitored by local government bodies. Local community regulations require all corporations, as well as households to connect to waste water and solid waste collection systems, and they are charged accordingly. Many corporations have LKA that are little more than offices or small manufacturing shops that pay these expenses as an unspecified part of the rent. It is evident from table 3-h to 3-j that the total for NEA corporations is not adequate in representing the population or the current survey for the total current expenditure of CEPA 2 and 3. The SBS regulation requires reporting of total current expenditure (SBS), both ancillary output and purchase of EP services. For corporations not in the NEA registries, we propose to estimate the total current expenditure by the purchased services of



CEPA 2 and 3 (waste water and solid waste) from the market output of the specialist producers, i.e. NACE 37, 38 and 39 as compiled by the Division of National Accounts.

On the other hand, in the EPEA only the ancillary in-house activities are to be reported. In the current survey, we ask for the total current expenditure as well as the amount purchased. We suggest using the NEA corporations as the statistical population for collecting data on the ancillary output of Nace 05, 07-36 as these are most likely in line with the strict interpretation of environmental activity as involuntary. It is likely that there will be some ancillary output by corporations outside the NEA corporations, particularly for CEPA 2 and 3. However, we expect this output to be insignificant and therefore it will not be included in the reporting tables of the EPEA module. Table 3-k shows the distribution of corporations in the survey sample in the NEA registry.

**Table 3-k. Distribution of corporations – excluding waste water and solid waste management.<sup>20</sup>**

Nace rev. 2	Survey sample 2011				
	Waste water management and Waste management				NEA corporations not in the sample (Figure 3-a: area C)
	NOT included				
	Survey sample (Figure 3-a: area A+B)		of which in the government registry (Figure 3-a: area B)		
	No of EPE total (NOK corporations million)		No of corporations	EPE total (NOK million)	No of corporations
05 .....	0	2	0	0	0
07 .....	5	1	3	1	0
08 .....	35	11	13	9	4
09 .....	7	0	0	0	0
10 .....	205	86	83	78	34
11 .....	14	12	8	8	0
13 .....	15	0	2	0	6
14 .....	5	0	1	0	1
15 .....	10	0	2	0	0
16 .....	41	1	7	0	28
17 .....	12	6	11	6	7
18 .....	18	1	1	0	0
19 .....	7	169	2	169	1
20 .....	46	84	37	78	12
21 .....	9	1	3	0	1
22 .....	35	8	5	6	2
23 .....	64	46	22	41	8
24 .....	27	279	19	279	11
25 .....	93	60	12	1	29
26 .....	24	25	2	0	0
27 .....	34	1	5	0	0
28 .....	74	3	4	0	4
29 .....	10	2	5	2	1
30 .....	59	6	19	2	18
31 .....	16	0	2	0	1
32 .....	10	0	1	0	2
33 .....	57	1	9	0	50
35 .....	7	5	3	5	16
36 .....	5	0		0	1
TOTAL .....	944	811 mil.	281	685 mill.	237

Approximately one third of the corporations in the survey sample for 2011 are also present in the NEA registry. About half of the identified NEA corporations are in the survey. Nevertheless, 84 per cent of the environmental expenditure among the corporations in the sample, waste water and solid waste excluded, is found in the NEA corporations. If the NEA corporations are to be used as the statistical population, we need to have a closer look the survey sample corporations not under government supervision (see Table 3-l).

<sup>20</sup> In Nace 05 and 08, there is an apparent inconsistency between the columns. This is due to the fact that the survey is actually carried out at the LKA level.

**Table 3-I. Environmentally motivated EPE. Divisions 05, 07- 36. Survey sample corporations not under government supervision (NOK million). Waste water and solid waste are excluded.**

Year	Current expenditure	Share of sample total	End of pipe Investment	Share of sample total	Integrated investments	Share of sample total	Total	Share of sample total
2008 .....	26	1 %	58	7 %	19	2 %	110	2 %
2009 .....	30	1 %	16	5 %	15	1 %	75	2 %
2010 .....	31	2 %	122	28 %	14	1 %	184	5 %
2011 .....	26	1 %	67	19 %	33	11 %	118	4 %

When we have excluded waste water and solid waste (CEPA 2 and 3), the remaining expenditure is small as a fraction of the sample totals, with the possible exception of end-of-pipe investments in 2010 and 2011. Assuming that that this also holds for the part of the population that has not been part of the survey, the NEA corporations can be used as the statistical population for the corporations in NACE rev.2 divisions 5, 7 – 36 with respect to the SBS reporting for CEPA 1, 4-9, but not for CEPA 2 and 3. Arguably, ancillary output in CEPA 2 and 3 is small from corporations not in the NEA registries. For the purpose of EPEA reporting the NEA corporations can be used as a statistical population for all CEPA.

We can therefore conclude that the corporations in the NEA registries can be used to obtain environmental protection expenditure as required by the EPEA reporting table 2, but not by the SBS regulation. The NEA population may underestimate the total expenditure as voluntary agreements and preventive actions may not be covered. Still, the totals will be from a precisely defined population, and be more reliable since no estimation procedure is involved.

### Summary and conclusions

Today's practice with a full census of all 70 statistical units in NACE 06 should continue. With respect to the EPEA, the NEA registries can be used as a statistical population of NACE rev.2 divisions 05, 07 – 36. It is in our opinion preferable to move from a sample survey of the theoretical population with estimation, to full census survey of the statistical population, as this reduces the level of uncertainty connected to the estimation methods. We expect this new method to reduce the resources devoted to data collection and the data may also be better suited to monitor effects of environmental policy than the previous method.

For corporations that fall within today's non-random selection criteria as well as for corporations that only can be randomly selected, there is some uncertainty concerning how much environmental expenditure that will not be accounted for. An example of this type of expenditure may be pre-emptive actions to avoid future taxation or direct government intervention<sup>21</sup>. Means for estimating the expenditure from business – government voluntary agreements and business environmental initiatives should be investigated further. On the other hand, using the statistical population, we will have a more precise account of a well defined (statistical) population, rather than poorly estimated totals for the larger theoretical population.

### Further work

In total, the NEA has records of 2798 entities that correspond to units in the Norwegian Business register, of which 1240 are potentially soil polluters that have not been fully identified due to wrong or absent proper identification. The latter category includes a large number of abandoned (inactive) industrial sites which may be omitted from the census. There is a potential for further reducing the number of corporations as the NEA registries assign a risk class to each entity. It may be useful to examine this classification practice to exclude corporations, particularly for the large number of entities which we so far have not been able to fully identify.

<sup>21</sup> Provided that respondents have a proper understanding of the definition of environmental expenditure.

Means for estimating the expenditure from business – government voluntary agreements and business environmental initiatives should be investigated further. Practical means of extracting the market output of the specialist producers of waste and waste water services must be elaborated. A preliminary estimate of the resources needed are presented in Table 3-m.

**Table 3-m. A preliminary estimate of the resources needed**

Type of cost	Issue	Time estimated
Development costs: Adapt current SBS reporting to EPEA reporting	Establish statistical population	5 weeks
	Adapt existing IT procedure of Nace 06 to full census of Nace 05, 07-36	1 week
	Adapt existing IT procedure for output to JQ to EPEA report tables	1 week
Operational costs: Data collection and publication	Submission of questionnaire ( not including support staff)	3 days
	Questionnaire data revision	1 week
	Data collection from other stats.	1 week
	Publication	2 days
	Time needed annually to fill in table 2	

### 3.3. Table 3 - Specialist producers of market EP services

DRAFT - QUESTIONNAIRE FOR EPE LEGAL MODULE		Table 3. Specialist producers of market EP services			
Country: <span style="background-color: #f4a460; padding: 2px 10px;"> </span>		Data required by the draft legal act			
	MIO NAT CURRENCY				
Expenditure	Year	CEPA 2	CEPA 3	CEPA 4	TOTAL
( O.11 ) Market output ( E ) Revenues (sales of EP products including partial payments)	2013				
	2014				
	2015				
( G ) Gross capital formation and acquisition less disposals of non-financial, non-produced assets for the production of EP services ( A ) Investments for the production of EP services	2013				
	2014				
	2015				

#### Requirements and definitions

This reporting table requires reporting data on the output of specialist producers and their gross capital formation and acquisition less disposals of non-financial, non-produced assets.

Specialist producers are producers of environmental protection services sold on the market for the use of other units, mainly financed by the users of these services. This includes publicly owned enterprises and waste and wastewater departments in municipalities recorded under NACE Rev.2 divisions 37 – Sewerage, 38 – Waste collection and treatment (except 38.3 – Material Recovery) and 39 – Remediation activities.

#### Existing data sources

The main data sources for this reporting table are supply and use tables from the national accounts produced by Division for National Accounts at Statistics Norway. Market output (O.11), capital investments (G.11) and other economic variables by specialist producers (Nace Rev 2. 37-39) are reported annually by Statistics Norway through the ESA Transmission programme table 15 and 16.

The tables are published and reported annually in November containing data for year n-2, where n is the reference year. This means that there will be available data up to 2015 in the first reference year (2017), which satisfies the requirement in the Section 4, Annex IV of the Regulation stating that statistics shall be transmitted within 24 months of the end of the reference year.

In ESA Tables, NACE divisions 37–39 are reported together so there was the need to investigate whether this data is available for each division separately. We have been

in contact with Division for National Accounts and they have confirmed that this data is available for reporting to Eurostat.

### Data gaps and other challenges

One major challenge in reporting table 3 is the need to separate out material recovery (subdivision 38.3). It is stated that activities like recycling should only be included to the extent that they mainly aim at environmental protection<sup>22</sup>. Our interpretation is that all economic activity by producers of services linked to material recovery should be kept outside EPEA legal module, and instead reported as resource management in EGSS. The national accounts have market output data on material recovery, but it is not possible to separate data on the other components like intermediate consumption, import, export, VAT and other taxes on service (reporting table 4). We will therefore have a problem with consistency if we only separate material recovery from market output and not the other variables in this table.

For now, waste management (CEPA 3) should be reported as the sum of economic activity in Nace Rev 2. 38 where material recovery is not specified.

### 3.4. Table 4 - Total supply of EP services

DRAFT - QUESTIONNAIRE FOR EPE LEGAL MODULE		Table 4. Total supply of environmental protection services							
Country:		Data required by the draft legal act							
	MIO NAT CURRENCY	CEPA 1	CEPA 2	CEPA 3	CEPA 4	CEPA 6	Sum of CEPA 1+4+5+7	Sum of CEPA 4+5+6+7+8+9	TOTAL
Expenditure	Year								
( O ) EP output (O.11+O.12+O.13) Sum of market, non market output and secondary output	2013				This part is automatically calculated				
	2014								
	2015								
( O.11 ) Market output Sales of EP products including partial payments	2013								
	2014								
	2015								
( O.12 ) Non-market output	2013				This part is automatically filled in				
	2014								
	2015								
( O.13 ) Secondary output of EP services	2013								
	2014								
	2015								
( IC ) Intermediate consumption of EP services Intermediate consumption of EP services by specialist producers	2013								
	2014								
	2015								
( M ) Imports Imports of EP services	2013								
	2014								
	2015								
( X ) Exports Exports of EP services	2013								
	2014								
	2015								
( V ) VAT and other taxes on EP services Non-deductible VAT and other taxes less subsidies on EP services	2013								
	2014								
	2015								
( O.2 ) EP output at purchasers' price available for national uses EP output available for national uses (O - IC + I - E + V)	2013				This part is automatically calculated				
	2014								
	2015								

### Requirements and definitions

Reporting table 4 is a supply table for the total supply of EP services. The first rows sums up the total output of EP services from the previous reporting tables. Market output (O.11) is the sum of market output from the general government (table 1) and specialist producers (table 3). Non-market output (O.13) is the sum of non-market output from the general government (table 1) and output of ancillary activities from corporations (table 2). To get the total supply of EP services in the Norwegian economy we also need secondary output (O.13) of EP services, intermediate consumption of EP services by specialist producers, imports and exports of EP services, VAT and other taxes less subsidies on EP services. Reporting table 4 allows for this.

Environmental protection services for the use by others may also be produced as a secondary activity (O.13). Corporations in manufacturing may for instance offer waste management services to others and this may be recorded as secondary output of EP services. The intermediate consumption of EP-services by specialist producers

<sup>22</sup> Explanatory notes p. 2. Draft questionnaire for EPE legal module.

of EP services (IC) may also be recorded to calculate total supply. This includes all in-house expenses on EP services used as input in the production, including compensation of employees and other operating costs.

Given the same system boundaries of ESA, the EPEA are intended to record the supply and use of EP services by resident units. The total supply and use of EP services will need to be corrected by import (M) and export (X) of EP services. Exports are output of EP services produced by resident units and use by non-resident units, and imports are EP services produced by non-resident units and consumed by resident units.

The output of EP services is valued at basic prices. This means that non-deductible VAT and other taxes on products and services are excluded (V). In order to calculate the value of EP services at purchaser prices, we need to include these taxes. Subsidies on EP services are kept out of this table and will be reported as transfers in table 6.

All the mandatory variables should be filled in for CEPA 2, 3 and 4.

### **Existing data sources**

Like reporting table 3, the main data source for this reporting table is the supply and use tables in the national accounts produced by the Division of National Accounts. Most of the data required for reporting in table 4 can be retrieved from this source.

### **Data gaps and other challenges**

Secondary output of EP services (O.13) on environmental activities (CEPA 2-4) is not recorded in the Norwegian national accounts or in the underlying basic statistics. It will not be possible to report any data on this variable. We only have data on the production of EP services for others as the principal activity.

We can report data on the total intermediate consumption by specialist producers, but it is currently not possible to separate and report only the intermediate consumption of EP services by specialist producers (IC). We have some information in the underlying basic statistics, but this will result in issues with consistency compared to the rest of the variables in this table. In addition, it is currently not clarified if this detailed data is available for reporting (ref. issues discussed for reporting table 3).

The imports (M) and exports (X) of EP services are only available for CEPA 4 (Nace Rev 2. 39). There are no records of import and export of wastewater management (Nace 37) in the national accounts. The only import and export of waste management (Nace 38) are from goods from material recovery (38.3). Neither goods nor material recovery should be covered in the EPEA, so this issue is a bit tricky for us. Also, it is currently not possible for us to separate material recycling from waste management (ref. issues discussed for reporting table 3).

### 3.5. Table 5 - Households

DRAFT - QUESTIONNAIRE FOR EPE LEGAL MODULE		Table 5. Households		
Country: <span style="background-color: #f4a460; border: 1px solid black; display: inline-block; width: 50px; height: 15px;"></span>		Data required by the draft legal act		
MIO NAT CURRENCY	Year	CEPA 2	CEPA 3	TOTAL
( F ) Final consumption of EP services (B2) Fees and purchases	2013			
	2014			
	2015			

#### Requirements and definitions

This table requires reporting of final consumption of EP services by households. The data should be filled in for CEPA 2 and 3.

The household sector groups together those units that belong to the institutional sector of households in the national accounts, considered in their capacity as final consumers. Final consumption of EP services by households is household expenditure on EP services that are used for the direct satisfaction of individual needs. This expenditure includes all payments and fees for EP services purchased from the public sector or public and private producers of EP services.

#### Existing data sources

ESA95 Questionnaire 1600 provides information on the final consumption of households divided into different product groups. Among other products this includes sewerage; waste collection, treatment and disposal activities; materials recovery; remediation activities and other waste management services.

As already mentioned earlier, the Use Table is published and reported annually in November containing data for year n-2, where n is the reference year. This means that there will be available data for reporting up to 2015 in the first reference year (2017) that satisfy the requirements in the Section 4, Annex IV of the Regulation stating that statistics shall be transmitted within 24 months of the end of the reference year.

As for reporting table 3, it is possible to split data for this table into different CEPA classes based on the national accounts data.

#### Data gaps and other challenges

It seems that we are able to report all data required in the obligatory part of reporting table 5.

### 3.6. Table 6 - Transfers

DRAFT - QUESTIONNAIRE FOR EPE LEGAL MODULE		Table 6. Transfers					
Country: <span style="background-color: #f4a460; border: 1px solid black; padding: 2px 10px;"></span>		Data required by the draft legal act					
MIO NAT CURRENCY							
Expenditure	Year	CEPA 2	CEPA 3	CEPA 8	Sum of CEPA 1+4+5+7	Sum of CEPA 8+9	TOTAL
( T.11 ) General Government: current and capital transfers paid <i>Paid to GG and other sectors</i>	2013						
	2014						
	2015						
( T.21 ) General Government: current and capital transfers received <i>Received from GG and other sectors</i>	2013						
	2014						
	2015						
( T.22 ) Corporations: current and capital transfers received <i>Received from GG and other sectors</i>	2013						
	2014						
	2015						
( T.24 ) Households: transfers received <i>Received from GG and other sectors</i>	2013						
	2014						
	2015						
( T.11 ) Rest of the World: current and capital transfers paid <i>Paid to GG and other sectors</i>	2013						
	2014						
	2015						
( T.21 ) Rest of the World: current and capital transfers received <i>Received from GG and other sectors</i>	2013						
	2014						
	2015						

#### Requirements and definitions

Table 6 requires reporting of transfers by institutional sectors. EP output at purchases prices, calculated in reporting table 4, will underestimate the actual cost of environmental protection. To get the total national expenditure we need to include transfers. This reporting table asks for current and capital transfers paid (T.11) and received (T.21) by the general government, in addition transfers paid to and received from the rest of the World are asked for. For corporations (T.22) and households (T.24) and only received transfers are asked for.

An environmental transfer (subsidy or a similar transfer) is a transfer that is intended to protect the environment or reduce the use and extraction of natural resources (covered in EGSS) and that is classified as current or capital transfer in ESA95<sup>23</sup>. Transfers on environmental protection aims at preventing, reducing and eliminating pollution and other forms of degradation of the environment. Environmental protection transfers comprise subsidies, investment grants, social benefits and other current and capital transfers to and from the rest of the world<sup>24</sup>.

EPEA asks only for transfers recorded in the national accounts. Support measures such as tax abatements and other “off-budget” subsidies are excluded. The decision whether a particular transfer is given by the government is environmental or not is based on the main purpose of the transfer. A subsidy given to a specialist producer will immediately be identified as environmental because it is given to an activity which is intended to support and protect the environment. There are still some challenges in deciding whether a transfer is fully environmental, or if it’s partially or weakly environmental. This will be discussed further under challenges. To avoid double counting in the accounts, it is important that reporting table 6 only includes transfers for EP that are not already recorded as environmental expenditure in the other tables.

Current transfers include subsidies, social contributions and other current transfers. The current transfers are classified into subsidies on products, including import subsidies, and other subsidies on production. Currents transfers tend to be small and are often made frequently. An example of an environmental protection subsidy may be transfers to R&D (CEPA 8).

<sup>23</sup> Environmental subsidies and similar transfers. Guidelines. Draft June 2013. Eurostat <https://circabc.europa.eu/w/browse/c99de3e2-4d7f-4675-aab5-8a84e04e4054>

<sup>24</sup> Draft regulation NO xxx/xxxx amending Regulation 691/2011 on European environmental economic accounts. Section 3.



Capital transfers are transfers linked to the acquisition (or disposal) of fixed assets. Capital transfers tend to be large and infrequent. An example of an environmental protection is the capital transfer from the Norwegian government to the Brazilian rain forest preservation fund (CEPA 1).

Those transfers for EP that are not already reflected in the expenditure recorded under the two previous categories include in particular subsidies which lower the prices paid by the users of EP characteristic products. Ignoring subsidies would result in an underestimation of total expenditure.

In the mandatory part of table 6 should be filled in for CEPA 2, 3, 6, 1+4+5+7, 8+9.

### Existing data sources

The main data source for reporting table 6 is the national accounts and the COFOG classification of general government expenditure (see table 1 – General government). Environmental protection transfers in the national accounts should be classified as COFOG 5.

The mandatory variables in reporting table 6 are in accordance with the variables that are reported annually by Statistics Norway on general government in the ESA transmission programme<sup>25</sup>. Table 3-n shows the correspondence between the variable in reporting table 6 and the national accounts:

**Table 3-n. Corresponding variables between EPEA reporting table 6 and the national accounts**

EPEA	Mandatory variables table 6	Variables in the national accounts	ESA 95
T.11 ...	General Government- current and capital paid	Subsidies + Social contributions and benefits+ Other current transfers + Capital transfers	D.3+ D.6 + D.7+D.9
T.21 ...	General Government- current and capital received	Subsidies + Social contributions and benefits+ Other current transfers + Capital transfers	D.3+ D.6 + D.7+D.9
T.22 ...	Corporations - current and capital received	Subsidies + Social contributions and benefits+ Other current transfers + Capital transfers	D.3+ D.6 + D.7+D.9
T.24 ...	Households – transfers received	Social contributions and benefits+ Other current transfers	D.6 + D.7
T.11 ...	Rest of the world - current and capital paid	Subsidies + Social contributions and benefits+ Other current transfers + Capital transfers	D.3+ D.6 + D.7+D.9
T.21 ...	Rest of the world - current and capital received	Subsidies + Social contributions and benefits+ Other current transfers + Capital transfers	D.3+ D.6 + D.7+D.9

The mandatory variables in reporting table 6 should be filled in for CEPA 2, 3, 1+4+5+7, 6 and the sum of CEPA 8+9. The correspondence is very good between the COFOG classification of environmental expenditure and the mandatory reporting table. The data will be available for reporting in November (1 year +11 months after the reference year).

### Data gaps and other challenges

We have the same data issues for reporting table 6 as for table 1 – General government. We will address these issues in the Eurostat Grant project 2014 by coding relevant transfers in COFOG with a CEPA/CRMA code. The work will be focused on division 1, 5, 4, 6 and 9. We know for example that there are environmental protection transfers to the rest of the world classified as COFOG 1.2 - Foreign economic aid. In 2010, Statistics Norway conducted an analysis where the aim was to identify environmental motivated transfers in the Norwegian national accounts<sup>26</sup>. We may be able to use some of the findings in that analysis to identify the relevant transfers for this table. We are also planning to use budget analysis to identify the transfers according to CEPA 1-9.

<sup>25</sup> Regulation (EC) No 1392/2007 of the European Parliament and of the Council of 13 November 2007 amending Council Regulation (EC) No 2223/96 with respect to the transmission of national accounts data. Table 2. (<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2007:324:0001:0078:EN:PDF>)

<sup>26</sup> Environmentally motivated transfers in Norway. Statistics Norway Documents 15/2011. Håkon Torfinn Karlsen [http://www.ssb.no/a/english/publikasjoner/pdf/doc\\_201115\\_en/doc\\_201115\\_en.pdf](http://www.ssb.no/a/english/publikasjoner/pdf/doc_201115_en/doc_201115_en.pdf)



## 4. The relation to EGSS

The Environmental Goods and Services Sector (EGSS) is together with the EPEA the proposed new module in the EU-regulation 691/2011 on environmental accounting. EGSS is defined as a heterogeneous set of producers of technologies, goods and services that:

- Measure, control, restore, prevent, treat, minimise, research and sensitise environmental damages to air, water and soil as well as problems related to waste, noise, biodiversity and landscapes. This includes ‘cleaner’ technologies, goods and services that prevent or minimise pollution.
- Measure, control, restore, prevent, minimise, research and sensitise resource depletion. This results mainly in resource-efficient technologies, goods and services that minimise the use of natural resources.

One can see from the definition that there is some potential overlapping between areas covered by EPEA and EGSS. An attempt to look closer at the relation between these two modules is made in Table 4-a. The table compares requirements for reporting on variables relevant for in the EPEA and EGSS framework. As EPEA should only include activities aimed at environmental protection, we compare this module only with EGSS (A) Environmental Protection and disregard EGSS (B) Resource Management.

**Table 4-a. EPEA in relation to EGSS**

Characteristic	Module	Requirements for reporting
Market output	EPEA	Obligatory. Includes market output of EP <i>services</i> by general government and specialist producers (NACE rev.2 div.37 - 39)
	EGSS(A)	Obligatory. Includes market output of EP <i>products</i> for general government and corporations (all NACE rev.2 divisions)
Non - market output	EPEA	Obligatory. Includes non-market output of EP <i>services</i> by general government and output of ancillary activities by corporations (NACE B -D and div.36)
	EGSS(A)	Voluntary. Includes ancillary output of EP <i>products</i> by general government and corporations (all NACE rev.2 divisions)
Employment	EPEA	Voluntary. Includes labour input into the production of EP <i>services</i> in full time equivalents for general government, corporations (NACE B - D and div.36) and specialist producers (NACE rev.2 div.37 - 39)
	EGSS(A)	Obligatory. Includes labour input into the production of EP <i>products</i> in full time equivalents for general government and corporations (all NACE rev.2 divisions)
Exports	EPEA	Obligatory. Includes total exports of EP <i>services</i>
	EGSS(A)	Obligatory. Includes exports of EP <i>products</i> for general government and corporations (all NACE rev.2 divisions)

As EP products in EGSS framework include both goods and services, it is clear that some of the data should be reported both in EPEA and EGSS (for example, market output of general government).

This has both positive and negative sides. The advantage is that one module could be used as a source of the data for the other module. In this case, one has to be sure that same boundaries and definitions are used in the reporting tables for EPEA and EGSS so that there is consistency between them. However, it is not always possible to relate to the same boundaries, for example because of the lack of detailed data. Thus there is the possibility of double counting of values or including values in the wrong module.

One example of this is subdivision 38.3 Material Recovery. Our interpretation of the legal act requirements is that all economic activity by producers of services linked to material recovery should be kept outside EPEA legal module, and instead reported as resource management in EGSS. However, it is not possible to separate data on the intermediate consumption, import, export, VAT and other taxes on service for this subdivision. For now, we will only be able to report waste management (CEPA 3) as the sum of economic activity in Nace Rev 2. division 38 in the EPEA module.

## 5. Further work

In chapter 5.1 we summarize the main tasks that remain to be solved before SN will be able to report the EPEA in 2017. This summary is used as a starting point for estimating the costs of preparing the first set of EPEA reporting in 2017 as well as the cost of annual reporting in the following years.

### 5.1. Summary of challenges

This chapter summarizes the main challenges connected to filling in the reporting tables.

#### Methodological challenges

The legal text of EPEA module specifies that only those activities that have environmental protection as their main purpose should be included in the accounts. However, in cases when an activity (investment) is complex, only some part of it may have EP as a main purpose. In these cases there is a need for clear guidance on whether to split out the part of the activity that has EP purpose, or include the whole value of activity as EPE if the part is over 50 per cent and reject the activity otherwise.

#### Challenges related to data sources

We have identified three main data sources to meet the requirements in the proposed reporting module of the EPEA; COFOG data from the national accounts, current survey on environmental protection expenditure in corporations and supply and use tables from the national accounts. None of these can be used to fully report data on EPEA without certain adjustments. The level of detail required for the reporting and existing quality issues with the data sources calls for further work:

- COFOG will be used for reporting EPE by general government (reporting tables 1 and 6). Our concern about COFOG 5 as a source of data is that it underestimates the total value of environmental expenditure by the government. This is because some EPE by the government are likely to be coded in other COFOG divisions than COFOG 5. In 2014, we will work on identifying environmental items in other COFOG divisions and labelling them with relevant CEPA codes.
- There is a potential underreporting of EPE investments in corporations, especially for Nace 06, as we can only collect EPE from statistical units that are in the operational phase of their life cycle. Environmental investments in the exploratory phase and construction phase will be omitted.
- Supply and Use Tables will be used for reporting EPE for specialist producers and households (reporting tables 3, 4 and 5). We will work on establishing regular data transfers in the right form and detail level from the Division of National Accounts for compiling the reporting tables. We also need to discuss with the EGSS working group whether to report subdivision 38.3 material recovery as a part of EPEA or EGSS.

#### Challenges due to overlapping with EGSS

As described in chapter 4, there is a certain overlap between EPEA and EGSS. This may lead to double reporting or misplacing of certain values. It is therefore important to establish and maintain close collaboration between different divisions and project teams in Statistics Norway involved in the EPEA and EGSS work. This collaboration is necessary both during the preparation of the first set of reporting tables in 2017 (for example review of potential data sources) and in the annual reporting afterwards (data collection and compilation of the reporting tables). One important part of this cooperation is to ensure that all parts involved understand the requirements of the legal act for EPEA and EGSS and that common

definitions and delimitations are used by the SN staff involved in the project. We have already had a joint meeting of EPEA- and EGSS-working groups where we discussed the delimitations of CEPA and CReMA classes. Similar meetings with other divisions in Statistics Norway will be organized during 2014.

### **Challenges due to overlapping with SBS**

One should be aware of the difference in the requirements in EPEA and SBS concerning the reporting of purchased EP services. The SBS regulation requires reporting of total current expenditure for corporations, both ancillary output and purchase of EP services. In the EPEA, on the other hand, only the ancillary in house activities are to be reported for corporations, while EP services purchased are to be reported in table 3 - Specialist producers of EP services.

The new statistical population based on NEA data will most likely exclude some corporations that have expenditures (both ancillary output and purchase of EP services) in waste and wastewater management (see chapter 3.2.1 for more detail). However, in the framework of EPEA we are only interested in ancillary output and we assume that it will be insignificant among the corporations in NEA database. As for the SBS reporting, we assume that purchase of EP services in CEPA 2 and 3 can be approximated to the market output of specialist producers in these CEPA domains.

## **5.2. Further work and cost estimates**

Cost estimations for compiling existing data in Statistics Norway and for filling the data-gaps and compiling data for EPEA are summarized in Table 5-a. We have distinguished two types of work that is planned:

- Development tasks that must be conducted before the first year of data delivery (2017). These include facilitating efficient routines for data collection and publication, and testing them.
- Operational tasks that will be performed in connection with annual reporting of EPEA module. These include annual process of data revision, publication and reporting to Eurostat.

There is a certain degree of uncertainty connected to the estimated time use presented in Table 5-a. We have estimated this to be 20 per cent of total time use.

**Table 5-a. Summary of further work**

Data source (reporting tables)	Task type	Issue	Further work	When	Estimated costs
COFOG 5 (Reporting Tables 1 and 6)	Development	COFOG 5 in the national accounts does not capture all governmental EPE and EP transfers relevant for EPEA.	Identify environmental protection expenditure and transfers for EP in the national accounts (COFOG 5) by coding the relevant transactions in the state budget with CEPA.	2014	5 weeks (financed by Eurostat Grant 2014).
	Operational	Approximated amount of time needed annually to fill in table 1 and 6	New account items must be identified and the CEPA coding should be evaluated and updated at a regular basis.	from 2017	3 weeks
EPE survey (Reporting Table 2)	Development		Adapt current SBS reporting to EPEA reporting and create reporting for CEPA 2,3 using NA.	2014-2015	7 weeks
	Operational	Annual data collection and publication, including filling in table 2		from 2017	4 weeks
The national accounts Statistics (Reporting Tables 3, 4 and 5)	Development	Need to establish data collection routine from the Division of National Accounts.	Discuss with the Division for National Accounts when and how EPEA - relevant data can be transferred.	2015	4 weeks
	Operational	Approximated amount of time needed annually to fill in table 3, 4 and 5		from 2017	2 weeks
Other costs	Development	Costs of establishing a production and publication routine of the data on the national level in SN	Discuss and develop technical support system that will enable efficient annual data processing and publication by SN; prepare a test reporting of data in 2016.	2015-2017	4 weeks
Total development costs		Estimated total time use before the first year of data delivery		2014-2016	20 weeks
Total operational costs		Estimated annual time use in connection with annual publication and reporting		from 2017	9 weeks
Uncertainty		There is some uncertainty due unexpected extra time use. We have estimated this to be 20 per cent of the total costs.			

## 6. National needs and uses of EPE data and accounts

The proposed module on EPEA means that we will have national data valuing environmental protection expenditure by different parts of the economy and environmental domains. We have international demand for EPE data and accounts, but there have been few national demands for this type of data, at least for the SBS data that we publish today. The potential new uses of EPEA data have not yet been explored.

In order to assess national needs for EPE data, we invited regular expert users of environmental statistics to a meeting. Among the participants were representatives from ministries, directorates and special interest organizations. The goal with this meeting was to inform and advocate the implementation of the new module to potential users, and to get input on national needs for EPE data and accounts. This chapter sums up the feedback and the output from the meeting.

The main part of the meeting was devoted to inform the expert group on new the module. EPE data from corporations (according to the SBS-regulation) have been published by Statistics Norway since 2002 so most of the participants were familiar with the topic, but the coverage and characteristics of the EPEA were new. We suggested indicators and analysis by linking EPEA data to other data sources such as the national accounts, air emission accounts and environmentally related taxes to advocate for possible uses of data.

The expert group emphasized the importance of good indicators and correct dissemination of EPE data. The data must be of good quality before any conclusions can be made and relevant information must be added to give the

correct picture. Major capital formation (e.g. in the oil and gas industry) may for example have major impact on the total EP investments one year. The expert group pointed out that most of the investments in EP technology is done before the company moves on to the operation phase. These investments are not captured in the current Norwegian EPE data, since the population only covers active corporations. Excluding these costs could present a wrong picture of total EPE for Norway, especially for energy, oil and gas industries.

Data on environmental expenditure does not directly value the economy's impact in the environment. It is not straightforward to determine whether an increased output of EP services in an economy is good or bad for the environment. The group particularly recognized the relevance of seeing environmental expenditure in relation to environmentally related taxes and emissions. They pointed out that an interesting analysis would be to assess which policy instruments that would give the most effective reduction in emissions and pollution.

The Norwegian Environmental Agency has voluntary agreements with corporations to reduce pollution. This is an alternative measure to policy instruments like environmentally related taxes. The intention is that these voluntary agreements would release capital, unlike paying taxes, to invest in EP technology. The expert group suggested that it could be useful to analyse EPE data in the industry classes that engage in these voluntary agreements to measure the impact of these measures.

EPE data and accounts is a new statistical product in Statistics Norway. Our interpretation of the feedback is that we need to continue to advocate potential uses of EPE data and accounts in order to explain why these data are needed. The group pointed out that it would be interesting to proceed with research projects to improve data quality and to explore new possible uses of data. This could in turn increase the national demand.

We also believe that a strict interpretation of EPE will increase the national demand and use of data. A strict interpretation means that we for corporations use registers from the Norwegian Environmental Agency that only include units that are subjected to environmental legislation and regulation. This makes the data better suited to monitor effects of environmental policy; although we know that using these registers may exclude some corporations (e.g. EP investments in establishing corporations), we are confident that the data would be better with this method.

It is also important that we find good tools to present the data, so that it is accessible and understandable to the users. Statistics Norway will continue to identify new uses of data on EPE and work on developing new statistical products in the area.

## 7. Conclusions

The main objective of this pilot study was to evaluate the requirements for the proposed module on Environmental Protection Expenditure Accounts (EPEA) amending Regulation 691/2011 on environmental economic accounting. We have identified possible data sources, costs and changes that would be necessary before Statistics Norway can comply with the requirements in the proposed reporting from 2017. We have based our studies on the draft regulation presented at DIMESA November 2012, agenda item 4.1, as at the basis of the evaluation (see appendix). The draft questionnaire for EPE legal module (printed 08.03.2013) has been used to identify the necessary data sources to comply with the proposed requirements.

We have identified the national accounts and the COFOG classification of general government expenditure as the main data source for reporting *Table 1 – General government* and *Table 6 – Transfers*. COFOG has its own division devoted to environmental protection (COFOG 5). We have also detected EPE in other COFOG divisions. To be able to assess the total value of EPE by the general government, we will engage in a project together with the division for Public Finances in 2014. Budget analysis will be carried out to classify the EPE items with a relevant CEPA code. We must also establish a production system to be able to report in 2017.

The data required for reporting *Table 2 – Corporations* must be collected through a survey. Today we collect data for the SBS-reporting through a sample survey. Population totals are estimated and the data is reported according to the requirements in the SBS-regulation. The current data collection method is relatively costly and we have issues with quality and methodology. There are also some methodological differences between EPEA and EPE in the SBS-regulation. After conducting a study in alternative methods for estimating EPE (chapter 2.3.1), we made the decision to redefine the population. We have chosen a strict interpretation of EPE to define the population. The EPE must be involuntary, i.e. imposed by the government, to be included in the EPEA. The Norwegian Environment Agency has registers with corporations under supervision by the government. Only these corporations will be included in the population and we aim at having a full census survey. We expect this new method to replace the old survey and reduce the resources devoted to data collection. The data collected in this way may also be better suited to monitor effects of environmental policy than with the previous method. The aim is to implement this new method in 2014 or in 2015.

The data required for reporting *Table 3 – Specialist producers of market EP services*, *Table 4 – Total supply of EP services* and *Table 5 – Households* will be collected from the national accounts. There are some challenges due to data gaps in the national accounts, but we consider these to have little effect on the assessment of the national expenditure for environmental protection. We will continue working on establishing a production system to extract the data with the right level of detail. We aim at engaging in a project together with the Division for National Accounts in 2015.

We have estimated the total developing costs to be 20 weeks, and the annual operational costs to be 9 weeks. Our goal is to conduct a test reporting of 2014 data in 2016.

EPE data and accounts are new statistical products for Statistics Norway and our users. We will proceed with research projects to explore possible new uses of data. It is also important that we find accessible and understandable ways to present the data to the users. We believe that this will create new national demand for EPE data and accounts.

## 8. Appendix

### Regulation on European Environmental Economic Accounts New modules

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#### ANNEX IV

### MODULE FOR ENVIRONMENTAL PROTECTION EXPENDITURE ACCOUNTS

#### Section 1

##### Objectives

Environmental protection expenditure accounts present data, in a way that is fully compatible with the data reported under ESA, on the expenditure for environmental protection, i.e. the economic resources devoted by resident units to environmental protection. The accounts allow compiling the national expenditure for environmental protection (EP) which is defined as the sum of uses of EP services by resident units, gross capital formation for EP activities, and transfers for EP which are not a counterpart of previous items, less financing by the rest of the world.

The environmental protection expenditure accounts should make use of the already existing information from the national accounts (production and generation of income accounts; GFCF by NACE, supply and use tables; data according to COFOG), structural business statistics (SBS), business register and other sources.

This Annex defines the data to be collected, compiled, transmitted and evaluated for environmental protection expenditure accounts by the Member States.

#### Section 2

##### Coverage

Environmental protection expenditure accounts have the same system boundaries as ESA and show environmental protection expenditure for principal, secondary and ancillary activities. The following sectors are covered:

- General government (including Non-Profit Institutions serving Households) and corporations as institutional sectors producing EP services. Specialist producers produce EP services as their principal activity.
- Households, general government and corporations as consumers of EP services.
- The rest of the world as beneficiary or origin of transfers for environmental protection.

Environmental protection expenditure is presented according to the Classification of Environmental Protection Activities (CEPA), which distinguishes nine classes:

CEPA 1 - Protection of ambient air and climate

CEPA 2 - Wastewater management

CEPA 3 - Waste management

CEPA 4 - Protection and remediation of soil, groundwater and surface water

CEPA 5 - Noise and vibration abatement

CEPA 6 - Protection of biodiversity and landscapes

CEPA 7 - Protection against radiation

CEPA 8 – Environmental research and development

CEPA 9 - Other environmental protection activities.

### **Section 3**

#### **List of characteristics**

Member States shall produce environmental protection expenditure accounts according to the following characteristics which are defined in accordance with ESA:

- Output of environmental protection services. Market output, non-market output and output of ancillary activities are distinguished. The output of ancillary activities can be approximated by the amount of in-house current expenditure, i.e. compensation of employees plus intermediate consumption for environmental protection other than the intermediate consumption of environmental protection services.
  - Intermediate consumption of environmental protection services by specialist producers
  - Imports and exports of environmental protection services
  - VAT and other taxes less subsidies on products on environmental protection services
  - Gross capital formation and acquisitions less disposals of non-financial non-produced assets for the production of environmental protection services
  - Final consumption of environmental protection services
  - Environmental protection transfers (received/paid). Environmental protection transfers comprise subsidies, investment grants, social benefits and other current and capital transfers, including transfers to and from the rest of the world.
- All data shall be reported in million national currency.

### **Section 4**

#### **First reference year, frequency and transmission deadlines**

1. Statistics shall be compiled and transmitted on a yearly basis.
2. Statistics shall be transmitted within 24 months of the end of the reference year.
3. In order to meet user needs for complete and timely datasets, the Commission (Eurostat) shall produce, as soon as sufficient country data becomes available, estimates for the EU-27 totals for the main aggregates of this module. The Commission (Eurostat) shall, wherever possible, produce and publish estimates for data that have not been transmitted by Member States within the deadline specified in point 2.
4. The first reference year is the year in which this Regulation enters into force.
5. In the first data transmission, Member States shall include annual data from 2013 to the first reference year.
6. In each subsequent data transmission to the Commission, Member States shall provide annual data for the years  $n-3$ ,  $n-2$ ,  $n-1$  and  $n$ , where  $n$  is the reference year.

### **Section 5**

#### **Reporting tables**

For the characteristics referred to in Section 3, data shall be reported in a breakdown by:

- Types of producers/consumers of environmental protection services as defined in section 2.
- Classification of Environmental Protection Activities (CEPA) as listed in section 2 aggregated as follows:

For general government non-market activities and for environmental protection transfers:

- CEPA 2
- CEPA 3



- Sum of CEPA 1 + 4 + 5 + 7
- CEPA 6
- Sum of CEPA 8 + 9

For ancillary activities of corporations:

- CEPA 1
- CEPA 2
- CEPA 3
- Sum of CEPA 4 + 5 + 6 + 7 + 8 + 9

For corporations as secondary and specialised producers:

- CEPA 2
- CEPA 3
- CEPA 4

For households as consumers:

- CEPA 2
- CEPA 3
- The following NACE codes for the ancillary production of EP services: NACE Rev. 2 B, C, D, division 36. Data for section C shall be presented by divisions. Divisions 10-12, 13-15 and 31-32 shall be grouped together. Members States which according to Regulation (EC) No 295/2008<sup>2</sup> of the European Parliament and of the Council as regards the definitions of characteristics, the technical format for the transmission of data, the double reporting requirements for NACE Rev.1.1 and NACE Rev.2 and derogations to be granted for structural business statistics are not obliged to collect environmental protection expenditure data for one or more of these NACE codes do not need to provide data for these NACE codes.

The European Commission (Eurostat) may in accordance with the examination procedures referred to in Article 11(2) update these breakdowns.

## Section 6

### Maximum duration of the transitional periods

For the implementation of the provisions of this Annex, the maximum duration of the transitional period is 2 years from the first transmission deadline.

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