Integrating Monetary Environmental Accounts - phase 2

Julius Hage
Jocelyn van Berkel
Sjoerd Schenau

Final report Eurostat Grant 2020

Project and Grant report commissioned by the European Union
Project of Directorate E, Eurostat, European Commission

CBS Den Haag
Henri Faasdreef 312
2492 JP The Hague
P.O. Box 24500
2490 HA The Hague
+31 70 337 38 00

www.cbs.nl

31 december 2020

Index

1. Introduction

Economy and environment are becoming more interlinked and higher on the political agenda. The environment provides natural resources and ecosystem services that benefits human welfare and the economy. On the other hand, economic activities have an effect on the environment such as pollution which is a main policy concern. There is great need in monitoring these dependencies and interlinkages in order to fully understand this relation and for policy makers to be able to make data driven decisions. The Environmental Accounts describe the relation between the economy and environment in a consistent, comprehensive and coherent way. This report focusses on the integration of the Monetary Environmental Accounts (MEA). MEA records economic activities and transactions in monetary terms that are considered environmental (SEEA CF, 2012).

The integrated framework encompasses connecting the processes of producing the environmental accounts modules. Currently, these modules are produced separately while sometimes same data sources are used or there are overlapping figures and output. The first objective of this project is to streamline the statistical work processes with regard to the main data sources that are the input for the integrated framework. The second objective is to streamline the outputs of the integrated framework. The development of an integrated system for monetary activity accounts is one of the topics on the SEEA CF research agenda. This report will show the results of the implementation of the integrated framework.

This report builds on research done in earlier years by Statistics Netherlands and Eurostat. Chapter 2 gives an overview of the previous work. Chapter 3 provides theoretical background information on the modules and integration of MEA. Chapter 4 explains the model design of the integrated framework and the streamlining of the inputs and outputs of the model described. Chapter 5 show the results of the model of the integrated framework. The work on the integrated framework is continuously in progress and improving. Chapter 6 gives the conclusions of this report and next steps.

2. Phases of research on integrated framework

This report builds on the previous work done by Statistics Netherlands and Eurostat on the subject integrated framework. This chapter explains the development of the research of the past years.

In 2016, a grant project was done to construct integrated monetary accounts for the Netherlands for one year (2013). The main findings of this study were that it is feasible to compile a set of environmental activity accounts based upon a) the EPEA framework as presented in SEEA CF, b) the accounting structure proposed by Eurostat for the EPE/ReMEA modules, c) and the harmonized set of definitions proposed by Eurostat. The integrated set of accounts consists of two sets of accounts, namely an environmental production account – environmental expenditure account, and supply and use tables for environmental products.

In 2019, an Eurostat grant was conducted 'Implementing the integrated system for monetary environmental activity accounts in the Netherlands – phase 1'. In 2019, a production process has been set up for an integrated set of monetary activity accounts. A key outcome of the first phase of this project was that an additional step is needed with regard to the data inputs and data outputs. The inputs for the integrated framework database are a large number of excel sheets which represent intermediate data products, which in turn are generated from the different data sources. The input processes for the integrated framework need to be further streamlined to generate an efficient work process. In addition, a data infrastructure needs to be built to generate all relevant data outputs.

In 2020, the year of this report phase 2, the focus is on streamlining the inputs and outputs of the integrated framework. The input processes for the integrated framework need to be further streamlined to generate an efficient work process and data infrastructure needs to be built to generate all relevant data outputs. In this report, up to date data sources are used to produce a revised time series and a quality check is done comparing the outcomes with the published results for the monetary environmental accounts.

3. Monetary Environmental Accounts

3.1 Modules of Environmental Accounts

Environmental accounts consist of physical and monetary accounts. Physical Environmental Accounts show the physical flows and assets, namely air emissions, material flows and the energy accounts. The Monetary Environmental Accounts record the activities in an economy that are considered to be environmental. Modules of Environmental Accounts are:

- Environmental Goods and Services Sector (EGSS)
- Environmental Protection Expenditure Accounts (EPEA)
- Resource Management Expenditure Account (ReMEA)
- Environmental Taxes by Economic Activity (ETEA)
- Environmental Subsidies and Similar Transfers (ESST)

Environmental activities are activities that aim to protect the environment or manage natural resources. Environmental protection covers activities whose main purpose is to prevent, reduce and eliminate pollution and any other degradation of the environment. This is recorded using Classification of Environmental Protection Activities (CEPA), classified by environmental domain such as air, water or soil. Natural resource management covers activities aimed at preserving and maintaining the stock of natural resources and hence their safeguarding against depletion. This is recorded using Classification of Resource Management Activities (CReMA), classified by type of resource such as energy resources or minerals. The economic variables are the output, gross added value, employment and export by NACE industries.

Environmental Goods and Services Sector

The purpose of EGSS is to assess the contribution of the environmental sector to the total economy and employment. This module covers the producers of technologies, goods and services for purposes of environmental protection and resource management. Environmental goods and services can be produced by corporations and the government. Goods, services and technologies with primary purpose of environmental protection or natural resource management are included, namely the specific services and the connected products. Also, the secondary purpose goods are included such as the adapted products, the cleaner and resource efficient products. The EGSS applies the CEPA and CReMA classification. Examples of activities in the EGSS are renewable energy production, insulation activities, waste management, environmental consultancy and the production of energy saving equipment. Data sources are Classification of the Functions of Government (COFOG), other government finance statistics, supply and use tables (SUT), labour statistics, production statistics, international trade statistic and agricultural statistics. The methodology applies by Statistics Netherlands is based on the National Accounts, micro approach and using additional data sources.

Environmental Protection Expenditure Accounts

The EPEA aims at describing the economic resources devoted to all activities which have as their main purpose the prevention, reduction and elimination of pollution or any other degradation of the environment. This module does not focus on the management of natural resources, but rather on protecting the environment and therefore uses the CEPA classification. The main result is the National Expenditure on Environmental Protection (NEEP). EPEA describe production, consumption, investment, transfers and employment in environmental protection products or activities. It covers the expenditure to protect the environment by government,

industry and households. Data sources are COFOG, other government finance statistics, SUT, business statistics and environmental taxes. ReMEA is not compiled yet by Statistics Netherlands.

Environmental taxes and subsidies

An environmental tax should meet the two following conditions to be considered an environmental tax. First, the tax base should be a physical unit of something that has a negative impact on the environment. Second, it should be defined as a tax in the European system of accounts. Four categories of environmental taxes are distinguished: energy tax, transport tax, pollution tax and resource tax. The main data source is the national taxation list. Other data sources are additional figures of government finance statistics, SUT and other supplementary statistics on for example investments. The subsidies are not covered in this report since this is not a compulsory deliverable to Eurostat. However, it is an objective in the future to incorporate the subsidies in the integrated framework.

3.2 Integration of the modules

Why streamline and integrate the set of monetary activity accounts? First, integrating the set of monetary activity accounts will enhance the coherence across modules. From a theoretical point of view, it is logical to have a coherent set of accounts on topics that are so interlinked. However, in practice it is possible to have overlap between the modules with slight differences due to other use of data sources. Second, integrating the set of monetary activity accounts creates consistency with the System of National Accounts (SNA). Using the same concepts and classifications, data can be directly compared to SNA data, such as GDP. Third, integrating the set of monetary activity accounts will create a more comprehensive data framework. Applying the accounting structure forces full coverage of environmental activities and products. Putting data into an integrated framework helps to compile the different modules more efficiently, as this ensures that data are not compiled twice. Synergy is achieved when the modules are compiled as parts of a broader system.

To be able to create an integrated system, all definitions, concepts, classifications and terms should be the same to not have differences in overlapping figures. Unfortunately, this is not yet the case and therefore some differences can occur due to inconsistencies. The development of an integrated system is one of the topics on the SEEA CF research agenda. So effort is being made in creating harmonised terminology.

How to streamline and integrate the set of monetary activity accounts? This is explained in the next chapter on the model design of the integrated framework.

4. Model design

In the 2019 grant project we focused on setting up a data framework for the integrated framework, in the 2020 grant project we mainly focused on streamlining the input and output of the integrated framework.

The inputs for the integrated framework database were a large number of excel sheets which represent intermediate data products, which in turn are generated from the different data sources. The input processes for the integrated framework needed to be further streamlined to generate an efficient work process. In addition, a data infrastructure needed to be built to generate all relevant data outputs.

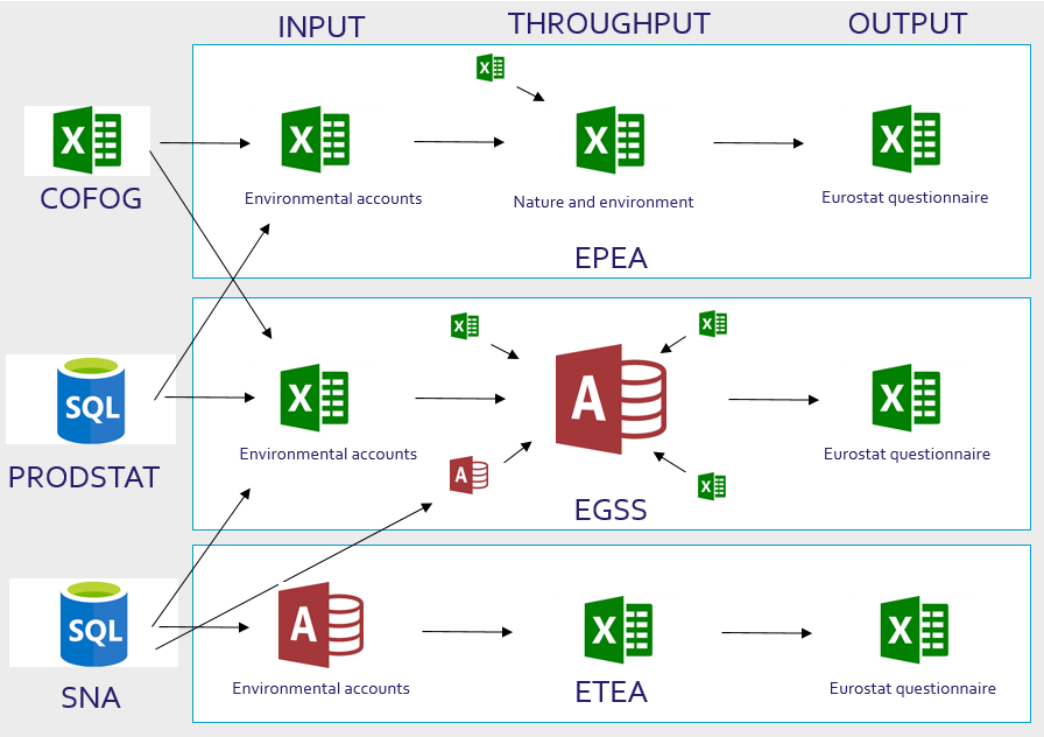
In chapter 4.1, a short summary is provided on the description of the situation where the 2019 grant project ended. This is also the starting point of the 2020 grant project. In chapter 4.2, we discuss the desired situation by sketching a picture of the application landscape and explaining the choices made for streamlining the input. These input streams are described in chapter 4.3 to the desired data structure and stored in the second resting-point. We conclude with chapter 4.4, in which we describe how the output of the integrated framework is now stored and how we can now access this data.

4.1 Description of starting situation

In 2019 the grant project began to start implementing the integrated framework for Statistics Netherlands. A production process has been set up for an integrated set of monetary activity accounts. The inputs for this production process were the data output sources that were used at the time for EPEA, EGSS, ReMEA and transfers.

All these statistical working processes often use the same input sources and sometimes the same calculations take place in different places. In the 2020 grant project, the focus was on merging these input flows. Figure 4.1 provides an overview of the starting situation of these processes.

Figure 4.1 schematic representation of the resting points data infrastructure



This maze of different processes results in an unclear application landscape. Many of these Excel sheets are manually filled with input data or work with linked formulas to other Excel sheets. Both situations are very prone to error when new records are added or when records disappear from the source statistic.

Description of the disadvantages that may arise as a result:

- Sensitive to errors
- risk of double work
- different snapshots, causing differences between statistical processes
- takes a lot of time

Because many calculations are very similar or are sometimes exactly the same, there is an enormous quality and efficiency improvement when these calculations are taken together. Statistics Netherlands has already been working on minor improvements on the EGSS in recent years, so it is likely to continue with the End-user development (EUD) approach we already worked with.

4.2 Description of data input

The input data can be divided into two different categories. First of all, there are the data systems such as the COFOG, SNA, labor accounts, company register and production statistics. These are large and important input streams for all monetary environmental statistics. Second, there are the smaller and more fragmented input streams used for small specialist parts. This group may change from time to time because processes are modified which change the structure of the data or resources cease to exist and alternative input streams must be found.

Especially with the larger components it is easy to book more synergy. Sometimes the same results were calculated in two different places in the old situation which is not desirable. By standardizing all large input sources and recoding in the same way, these kind of situations are prevented.

In this chapter we describe the main data sources for the integrated framework.

- National accounts
- Production statistics
- Environmental goods and service sector (EGSS)
- EPE statistics for businesses

National accounts

- **Combined production and income accounts**
  Some data from the combined production and income accounts by NACE category can be directly used for the integrated framework: data for NACE 37, 38 and 39 is used (specialist producers. In addition, data from other NACE categories are used as a proxy to allocate the data of certain environmental production data (from EGSS) to the different income categories. For example, for organic agriculture, total production and value added are known, but not the different components of value added. So the income structure of total agriculture is used as a key for this.

- **SNA supply and use tables**
  Data for some environmental products can be directly obtained from the SNA supply and use tables. These include environmental services produced by NACE 37, 38 and 39 and waste products. Thus, for these products the full supply and use tables can be easily compiled. In addition, data from the SNA supply and use tables have been used as to distribute data over NACE classes in the use table. For example, the use of electricity from renewable sources have been distributed over NACE classes and households by looking at the use of total electricity.

- **Data on gross fixed capital**
  Data on environmental gross fixed capital for NACE 37, 38 and 39 can be directly obtained from the National accounts.

Production statistics

- Production statistics provide more detail with regard to NACE than the National accounts. Accordingly this data can be used to provide more details (CEPA categories) for NACE 37, 38, and 39 (output data and gross fixed capital).

Environmental goods and service sector (EGSS)

- The data of the environmental goods and service sector provides key information on total output, total value added and exports of all environmental production activities. The Dutch EGSS is sub-divided into 16 'environmental activities', as presented in the annex 8.1

- In the Netherlands we apply the activity approach to compile data for the EGSS (and not the product approach). The EGSS is an 'intermediate' data source, as it is based on many different data sources, including national accounts, the business register, COFOG, international trade statistics, environmental-, energy-, educational- and PRODCOM statistics. In addition, data is obtained from websites of businesses, such as year reports, and from branch associations related to environmental activities. These source data and the methodology to obtain this data is described elsewhere (Statistics Netherlands, 2006; 2008).

COFOG statistics and other government statistics

- COFOG statistics provide information on the production of environmental protection services by government (COFOG 05). In a previous report (Statistics Netherlands, 2014a) we have described how we have used this data for the EPE questionnaire and what additional corrections have been made. For central government the COFOG data have been reclassified for the CEA classification using data direct form the central government database (Statistics Netherlands 2014b).

EPE statistics for businesses

- The current Dutch EPE statistics for businesses provide information on environmental investments and environmental costs (capital costs and current costs) for NACE 06-36 (ancillary activities). The data are based on an annual survey. The questionnaire comprises questions on the costs incurred by enterprises in the environment domains waste, wastewater, environmental permits, environmental damage, soil decontamination, environmental research, environmental coordination, investments in new environment equipment installed (end-of-pipe and integrated facilities), and plans for environmental provisions coming into operation in the two years following the survey. The following accounting items can be directly obtained from the Dutch EPE statistics for businesses: gross capital formation by ancillary activities, output of ancillary activities and consumption of fixed capital by ancillary activities. More details are described in chapter 5 of this document.

Data on environmental gross fixed capital

- Data on environmental gross fixed capital is available from several different sources. Data for investments in renewable energy comes from subsidy programmes, but also from physical information (annual new capacity installed) combined with cost information.

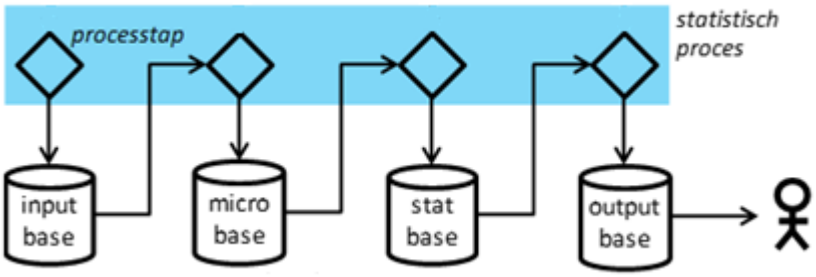
A dynamic shell has been created for all data streams that doesn't fall into the above category. Many of these processes have been converted to R-studio tooling in order to be in line with the IT developments within statistics Netherlands. Nevertheless, there are always some processes left for which excel is a better choice to participate in the processing. This is sometimes because an input source cannot provide it in an automated way or because the data changes from year to year and it is necessary for it to be manually assessed and processed.

4.3 Description of data throughput

The Integrated Framework for Monetary environmental Accounts (IFMEA) system was set up in the 2019 grant project, based on the 'resting points philosophy' [1] of statistics Netherlands. It was decided to initially use Microsoft Access for the new system, and to transfer the data to an SQL server In the 2020 grant project. During the design phase of the data framework, the data was already normalized and the system designed in the style of an SQL server database so that a switch can be made easily.

The SQL system has four resting points, namely 1) the inputbase where all raw data comes in, 2) the microbase where the data is stored in a normalized structure, 3) the statbase where the data is stored in aggregated shape for publication and / or for further processing and 4) the outputbase where al specific output formats are stored. In addition to these resting points, there is the assistbase where all links and the algorithms of the actual formulas are stored.

Figure 4.2 schematic representation of the resting points data infrastructure



Inputbase

Microdata is stored in the inputbase in the format for which the data is available. Nothing is corrected or normalized yet. This way reproducibility is guaranteed. When a data source changes or a new data source is added , it is usually necessary to create a new table for the inputbase.

[1] Resting points are a central concept in the design for a statistical process. A resting point is a conclusion of a certain data compilation step in which value has been added to the data. Each resting point thus contains a collection of data (data including metadata).

Microbase

In the microbase, microdata are stored in a standardized way together with corresponding specifications/ classifications. This is where the building blocks of the system are created. These variables can then be used generically for the calculation of the various components of the integrated framework.

Statbase

The results from the algorithms are stored in the statbase from which they serve as input for the tables of the integrated framework. In the statbase, the data is no longer traceable to specific sources, but is stored in an aggregated way.

Outputbase

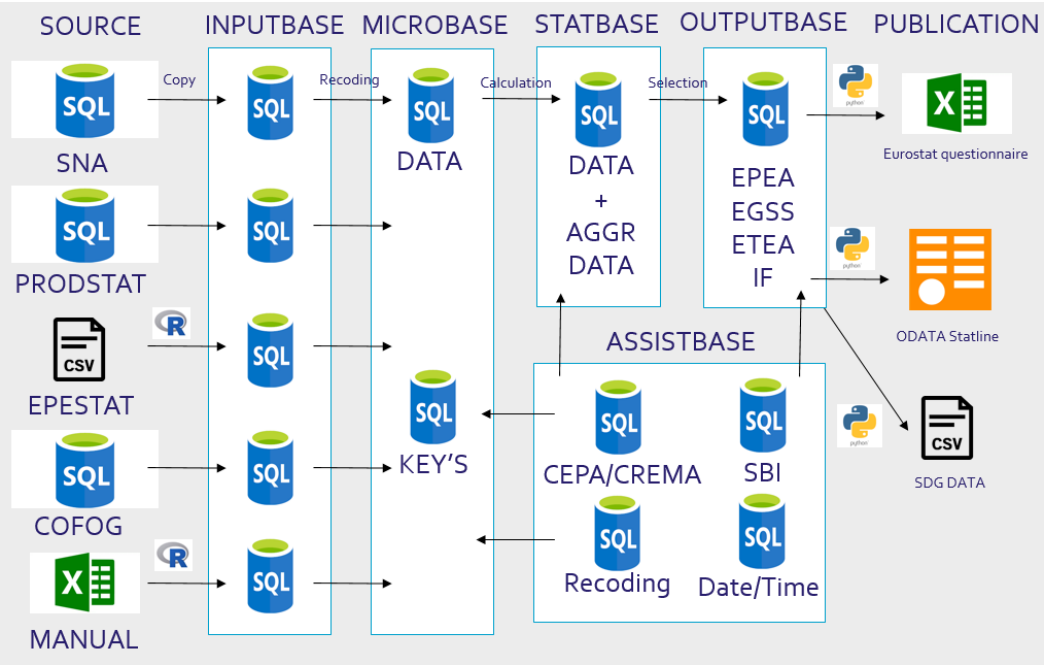
The results from the stat base are stored per statistic in the output base in the desired format. This creates a clear overview that forms the basis for further processing. Different versions (rebases) can be saved here with corresponding timestamp.

Assistbase

The assistbase is the spider in the web in the system. Here are the connections stored between the variables in the microbase and the desired output for the statbase.. The coherence across modules will be enhanced by doing this.

These resting points, combined with the input files described earlier, provide a complete picture of the integrated framework.

Figure 4.3 schematic representation of the IFMEA system



In the 2020 grant project, we moved these 'resting points' from Microsoft Access to the SQL server environment. This ensures that the data is secured much better and the chance of data errors is considerably limited.

Now all resting points have been described and there is a clear overview of the system, the last step is to describe the processes between the resting points. The processes ensure that all data flows from resting point to resting point.

Copy - from Source to Inputbase process

To get from the source files (ACCDB, CSV, etc. etc.) to the inputbase, use is made of the programming language R. R-Studio contains the specific instruction per input file to bring the data to the source-specific rest point. The description consists of the file structure and some checks on the number of records, alphanumeric values in the numbers and a selection on the date of the data. The result is an orderly filled table for each input source without any sort of selection. Stored procedures are used to copy the SQL data to the inputbase.

Figure 4.4 Example Inputbase (COFOG)

Leveringstype	Jaar	Periode	Status	COFOG	Rekening	Sector	Tegenrekening	Transactie	TransactieSoort	Omschrijving	Waarde
Geaggregeerd	2000		R2016	CG0408	LT	S.1311		D.74	B		45
Geaggregeerd	2000		R2016	CG0506	LT	S.1311		D.74	B		4
Geaggregeerd	2000		R2016	CG1009	LT	S.1311		D.74	B		3

Recoding – from inputbase to microbase process

For the process step from Inputbase to Microbase, the data is converted to the desired format. In addition to collecting the different data in the same resting point, it is important that all data are stored in the same structure. This recoding of the data is source-dependent and with the assistbase tables, source-specific data is converted to the standardized format. The standard ESA codes are used for this.

Figure 4.5 Example of used ESA codes

Variable	Corresponding ESA code
EP output	P1
Market EP output	P11
Non market EP output	P13
Gross capital formation and acquisition less disposals of non-financial, non-produced assets for the production of EP services	P5
Final consumption of EP services	P3
Intermediate consumption	P2
Intermediate consumption (excluding EP services)	P2
Compensation of employees	D1
Intermediate consumption of EP services	P2
Other taxes less subsidies on production	D29-D39
Consumption of fixed capital	K1
Imports	P7
Exports	P6
VAT	D221

Simple things such as date fields are standardized and values such as SBI, CEPA / CREMA are supplemented and recoded if available. The standardized tables from the assistbase are also used for this. This prevents differences in definition from arising in the various environmental statistics.

The results are eventually stored in the second resting point, the microbase.

Figure 4.6 Example of the IFMEA Microbase

dbo_IFMEA_Microbase01_Hercodering_Resultaten							
Transactie	transactiecode	Sector	SBI	Milieuactiviteit	EPRM	Jaar	Waarde
Gross capital formation for the production of EP services [P5 + NP]	GCF.1	S.1311D			CEPA1	2017	4
Gross capital formation for the production of EP services [P5 + NP]	GCF.1	S.1313A			CEPA1	2017	58

Calculation – from Microbase to statbase

The microbase and the statbase are comparable with that difference that the statbase now also includes the calculated and aggregated data. The structure of the tables is identical. Sometimes it is just aggregation but sometimes it is also working with keys and / or manual expert judgements. This is sometimes included in the calculation, but sometimes separate values are also included in the calculation. The last is preferred.

As in the previous steps, the assistbase is also used in this step. The different aggregation schemes are stored in the assistbase. For example, for aggregating over Standard Industrial Classifications (Dutch SBI 2008, NACE and ISIC) a parent-child construction is used.

Figure 4.7 Example assistbase (Aggregation_SBI/NACE)

dbo_AggregatieSchemaControle		
AS_Code	AS_Parent	AS_Child
1	C	C10-C12
1	C	C13-C15
1	C	C16-C18
1	C	C19
1	C	C20
1	C	C21
1	C	C22_C23

By using this parent-child construction errors are avoided during aggregation and changes are easy to implement.

Selection – from statbase to outputbase

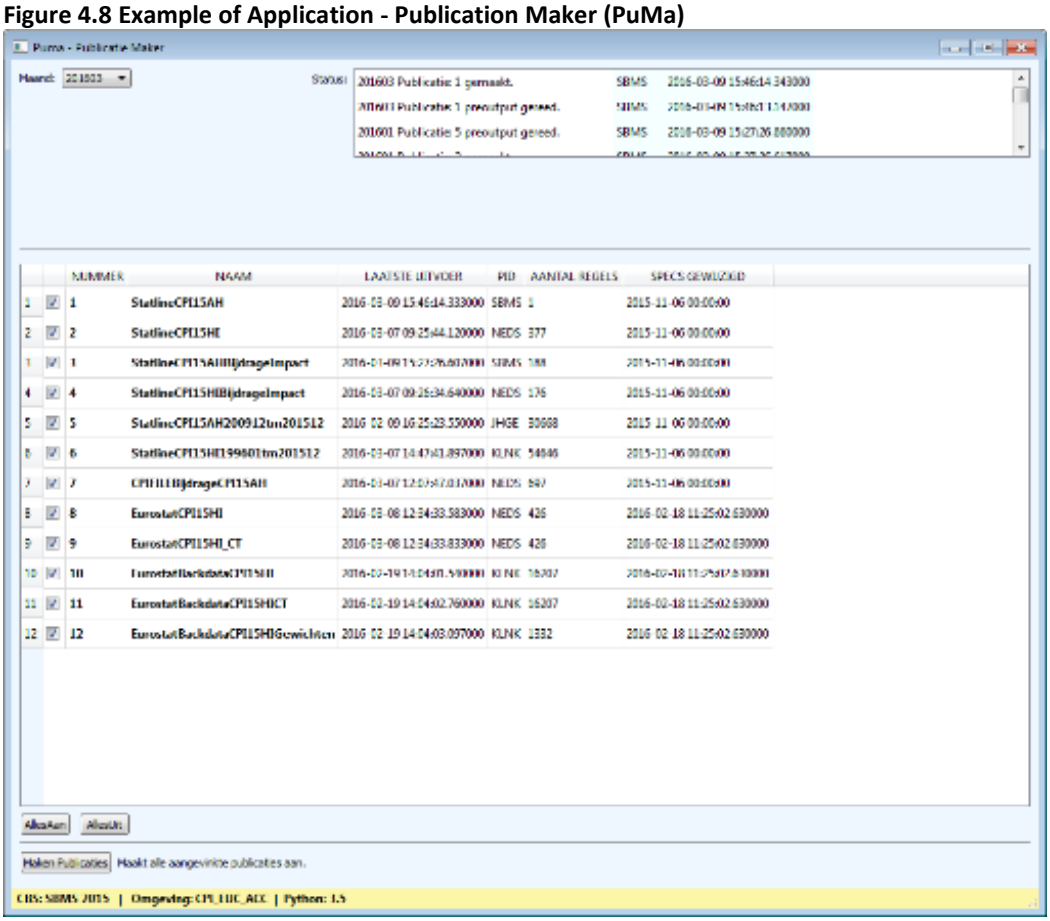
Now that all data is available in the statbase, the final step is to select and save the various output streams. Output-specific data is added here, such as codes that are required for, for example, the ODATA publication. By keeping track of when certain datasets have been created, tracing and analyzing any errors in the process has become a lot easier.

4.4 Description of data output

For the publication of the data stored in the outputbase, we opted for an application that already existed within Statistics Netherlands. This application called PuMa (Publication Maker) is a Client-Server system programmed in the python programming language. The Client part is a full Python + QT Designer design. The Server is a SQL Server device.

PuMa offers the user a user interface in which the various pre-programmed publications are presented. By choosing a publication and a period, the output file is saved in the output directory of the application. Changes to the publications are made in Puma's data model.

Figure 4.8 Example of Application - Publication Maker (PuMa)



The drop-down selector of the period is visible in the top left corner. The log file is visible at the top right, which records which publications have already been published. All pre-programmed publications are visible below. At the bottom of the application are the buttons to start the application.

In the PuMa data model, the SQL table specifies which data source should be used and the form of the output is also registered. By adding a variable for the period, it is possible to simply go through the same process over and over again for many different periods. This avoids human errors and improves the quality of the process.

Figure 4.9 data model of PuMa SQL-server

PUP_NR	PUP_NAAM	PUP_\	PUP_TEKST	PUP_SQL	PUP_LENGTE	PUP_UITLIJNING	PUP_HEADER	PUP_DECIMAALTEKEN	PUP_OUTPUT_FORMAT
31	Statlinetabel_83154_Milieusector_I	0	Milieusector_M	NULL	NULL	NULL	N	,	ASCII
31	Statlinetabel_83154_Milieusector_I	100	Beid	NULL	10	L	NULL	NULL	NULL
31	Statlinetabel_83154_Milieusector_I	101	SBI2008	NULL	10	R	NULL	NULL	NULL
31	Statlinetabel_83154_Milieusector_I	102	Gembaan	NULL	15	R	NULL	NULL	NULL
31	Statlinetabel_83154_Milieusector_I	103	fte	NULL	15	R	NULL	NULL	NULL
31	Statlinetabel_83154_Milieusector_I	900	NULL	SELECT [beid]					

The output files are stored in a predefined directory and also contain the specified period in the output name. This is the starting point for further processing of the data.

For example, it is possible to have the results written in CSV so it can be used directly in the Eurostat SDMX converter. The Statistics Netherlands ODATA portal can also be easily loaded using the specific ODATA R package. For filling the Excel questionnaires, there is an R-studio script to read the data from the SQL directly into the form. It should be taken into account, however, that the scripts also have to be adjusted if there are changes in the questionnaires.

5. Results and analysis

Chapter 4 provided an overview of how the input, throughput and output of the IMFEA system were presented during the 2020 grant project. This chapter will discuss the results of the IFMEA system in more detail. First of all, the results of the main input flows are compared and possible follow-up actions are described. Furthermore, the new results will be examined at the main level.

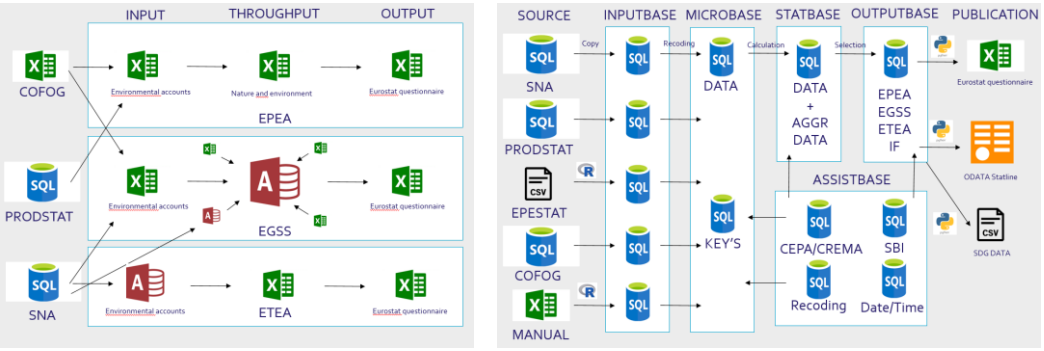
The following objectives have been recorded in the 2020 grant project proposal:

> "Implementation of an integrated set of monetary activity accounts will have several impacts. First, the coherence across modules will be enhanced. Although there is already a partial overlap of these modules, because both modules are using COFOG as source data, further fine tuning should help to improve both EPEA and EGSS figures. Second, data will be fully coherent with the SNA. Using the same concepts and classifications, data can be directly compared to SNA data, such as GDP, total GFCF etc. Third, applying the accounting structure with the columns and rows as defined here ensures full coverage of environmental activities and products, i.e. data will be more comprehensive. Finally, putting data into an integrated framework helps to compile the different modules more efficiently, as this ensures that data are not compiled twice. Synergy is achieved when the modules are compiled as parts of a broader system. "

By using standardized data stored in the assistbase, more coherence is created between the different accounts. The connection to the SNA is now complete because there are no more indirect links between the two systems and the same codes are used.

The new structure provides more clarity and in this way it is possible to work towards better results of the accounts. Because there is now an integrated framework, it is easier to identify any blank spots and then fill them in. This often goes hand in hand with the source statistics that provide the input data.

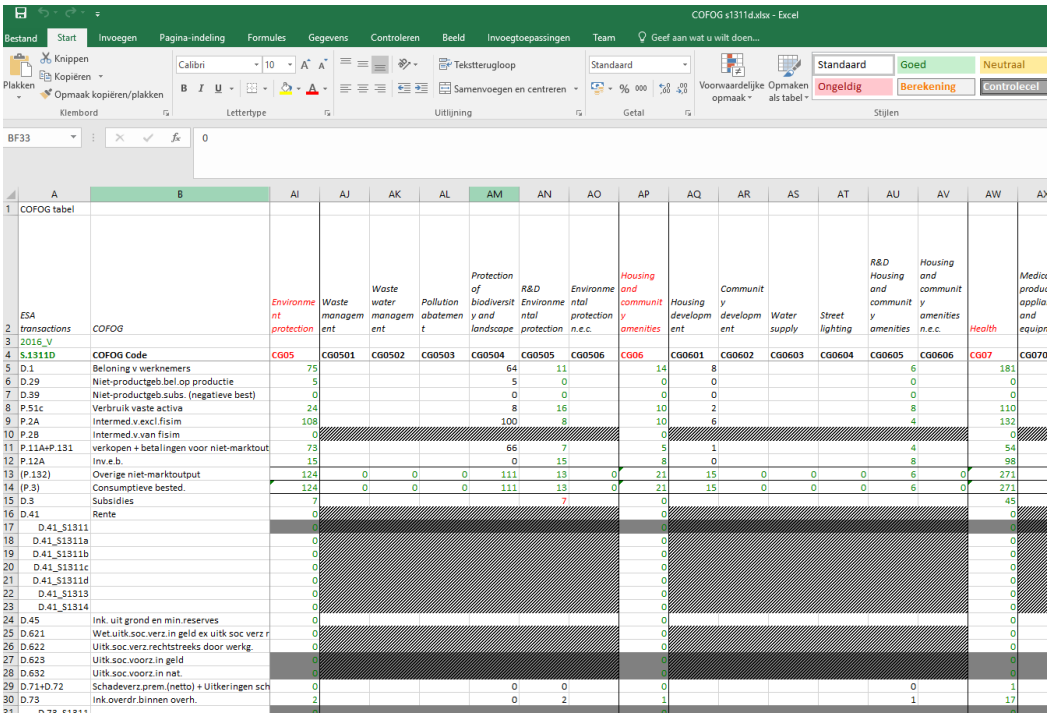
Figure 5.1 Starting point input and final IFMEA system



The biggest change on the input side of the IFMEA system is that the COFOG data is no longer supplied from an Excel sheet but from an SQL database. The recoding and aggregation is now also performed via tables, which also benefits the quality and reproducibility.

The results of the EPEA are therefore almost identical to those of the old processing system. The only discrepancy found is caused by applying some manual "expert judgments" to the EPEA Questionnaire. These manual adjustments will be reviewed in 2021 and together with the department responsible for submitting the EPEA it will be decided whether these adjustments are still necessary or whether they should be updated.

Figure 5.2 Example of old COFOG excel datasheet



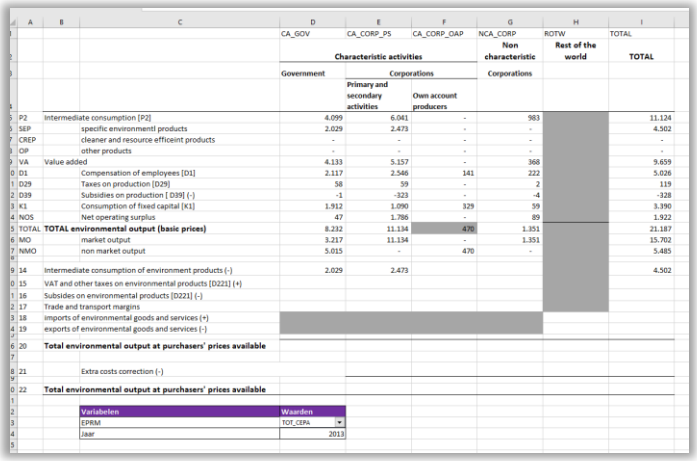
	A	B	AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AU	AV	AW
1	COFOG tabel																
2	*ESA transactions*	*COFOG*	*Environment protection*	*Waste management*	*Waste water management*	*Pollution abatement*	*Protection of biodiversity and landscape*	*R&D Environmental protection*	*Environmental protection n.e.c.*	*Housing and community amenities*	*Housing development*	*Community development*	*Water supply*	*Street lighting*	*R&D Housing and community amenities*	*Housing and community amenities n.e.c.*	*Health*
3	2016_V																
4	S.1311D	COFOG Code	CG05	CG0501	CG0502	CG0503	CG0504	CG0505	CG0506	CG06	CG0601	CG0602	CG0603	CG0604	CG0605	CG0606	CG07
5	D.1	Beloning v werknemers	75				64	11		14	8				6		181
6	D.29	Niet-productgeb.bel.op productie	5				5	0		0	0				0		0
7	D.39	Niet-productgeb.subs. (negatieve best)	0				0	0		0	0				0		0
8	P.51c	Verbruik vaste activa	24				8	16		10	2				8		110
9	P.2A	Intermed.v.excl.fisim	108				100	8		10	6				4		132
10	P.2B	Intermed.v.van fisim	0							0							0
11	P.11A+P.131	verkopen + betalingen voor niet-marktout	73				66	7		5	1				4		54
12	P.12A	Inv.e.b.	15				0	15		8	0				8		98
13	(P.132)	Overige niet-marktoutput	124	0	0	0	111	13	0	21	15	0	0	0	6	0	271
14	(P.3)	Consumptieve bested.	124	0	0	0	111	13	0	21	15	0	0	0	6	0	271
15	D.3	Subsidies	7					7		0							45
16	D.41	Rente	0							0							0
17	D.41_S1311		0							0							0
18	D.41_S1311a		0							0							0
19	D.41_S1311b		0							0							0
20	D.41_S1311c		0							0							0
21	D.41_S1311d		0							0							0
22	D.41_S1313		0							0							0
23	D.41_S1314		0							0							0
24	D.45	Ink. uit grond en min.reserves	0							0							0
25	D.621	Wet.uitk.soc.verz.in geld ex uitk soc verz r	0							0							0
26	D.622	Uitk.soc.verz.rechtstreeks door werkg.	0							0							0
27	D.623	Uitk.soc.voorz.in geld	0							0							0
28	D.632	Uitk.soc.voorz.in nat.	0							0							0
29	D.71+D.72	Schadeverz.prem.(netto) + Uitkeringen sch	0				0	0		0					0		1
30	D.73	Ink.overdr.binnen overh.	2				0	2		1					1		17

The results of the EGSS also hardly differ from the results of the old system. Fortunately, there were many similarities with the already developed structure in the EGSS system in Microsoft Access, so the results could be calculated in the same way. Any differences that still exist between the EPEA and the EGSS will be further investigated in 2021 and resolved if possible.

The new IFMEA system is a transparent environment where the different environmental accounts can be calculated using the same standard. Any adjustments in, for example, the classifications can now be implemented more easily and apply directly to all accounts. In 2021, Statistics Netherlands will examine whether the new IFMEA system can be used to realize the publication of the EPEA and the EGSS.

The final step in the process is to check the results of the IFMEA system. For this, an excel file has been designed in which tables of the Integrated Framework are displayed.

Figure 5.3 preview of the excel sheet output for the Integrated Framework

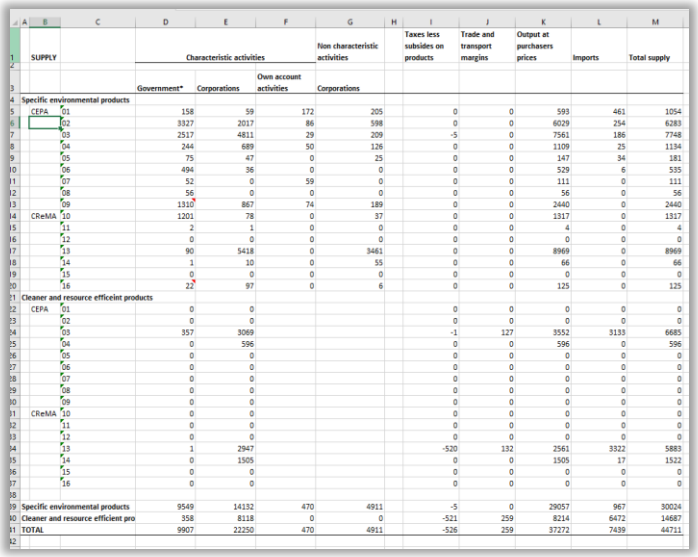


			CA_GOV	CA_CORP_PS	CA_CORP_OAP	NCA_CORP	ROTW	TOTAL
			Characteristic activities			Non characteristic	Rest of the world	TOTAL
			Government	Corporations		Corporations		
				Primary and secondary activities	Own account producers			
P2		Intermediate consumption [P2]	4.099	6.041	-	983		11.124
SEP		specific environmentl products	2.029	2.473	-	-		4.502
CREP		cleaner and resource efficeint products	-	-	-	-		-
OIP		other products	-	-	-	-		-
VA		Value added	4.133	5.157	-	368		9.659
D1		Compensation of employees [D1]	2.117	2.546	141	222		5.026
D29		Taxes on production [D29]	58	59	-	2		119
D39		Subsidies on production [D39] (-)	-1	-323	-	-4		-328
K1		Consumption of fixed capital [K1]	1.912	1.090	329	59		3.390
NOS		Net operating surplus	47	1.786	-	89		1.922
TOTAL		**TOTAL environmental output (basic prices)**	8.232	11.134	470	1.351		21.187
MO		market output	3.217	11.134	-	1.351		15.702
NMO		non market output	5.015	-	470	-		5.485
14		Intermediate consumption of environment products (-)	2.029	2.473				4.502
15		VAT and other taxes on environmental products [D221] (+)						
16		Subsides on environmental products [D221] (-)						
17		Trade and transport margins						
18		imports of environmental goods and services (+)						
19		exports of environmental goods and services (-)						
20		**Total environmental output at purchasers' prices available**						
21		Extra costs correction (-)						
22		**Total environmental output at purchasers' prices available**						

Variabelen	Waarden
EPRM	TOT_CEPA
Jaar	2013

The integrated set of accounts consists of two sets of accounts, namely an environmental production account – environmental expenditure account, and supply and use tables for environmental products.

Figure 5.4 preview of the excel sheet output for the supply/use table



	SUPPLY		Characteristic activities			Non characteristic activities	Taxes less subsides on products	Trade and transport margins	Output at purchasers prices	Imports	Total supply
			Government*	Corporations	Own account activities	Corporations					
Specific environmental products											
	CEPA	01	158	59	172	205	0	0	593	461	1054
		02	3327	2017	86	598	0	0	6029	254	6283
		03	2517	4811	29	209	-5	0	7561	186	7748
		04	244	689	50	126	0	0	1109	25	1134
		05	75	47	0	25	0	0	147	34	181
		06	494	36	0	0	0	0	529	6	535
		07	52	0	59	0	0	0	111	0	111
		08	56	0	0	0	0	0	56	0	56
		09	1310	867	74	189	0	0	2440	0	2440
	CReMA	10	1201	78	0	37	0	0	1317	0	1317
		11	2	1	0	0	0	0	4	0	4
		12	0	0	0	0	0	0	0	0	0
		13	90	5418	0	3461	0	0	8969	0	8969
		14	1	10	0	55	0	0	66	0	66
		15	0	0	0	0	0	0	0	0	0
		16	22	97	0	6	0	0	125	0	125
Cleaner and resource efficeint products											
	CEPA	01	0	0			0	0	0	0	0
		02	0	0			0	0	0	0	0
		03	357	3069			-1	127	3552	3133	6685
		04	0	596			0	0	596	0	596
		05	0	0			0	0	0	0	0
		06	0	0			0	0	0	0	0
		07	0	0			0	0	0	0	0
		08	0	0			0	0	0	0	0
		09	0	0			0	0	0	0	0
	CReMA	10	0	0			0	0	0	0	0
		11	0	0			0	0	0	0	0
		12	0	0			0	0	0	0	0
		13	1	2947			-520	132	2561	3322	5883
		14	0	1505			0	0	1505	17	1522
		15	0	0			0	0	0	0	0
		16	0	0			0	0	0	0	0
Specific environmental products			9549	14132	470	4911	-5	0	29057	967	30024
Cleaner and resource efficient pro			358	8118	0	0	-521	259	8214	6472	14687
TOTAL			9907	22250	470	4911	-526	259	37272	7439	44711

Comparison between the new and the old system shows that the adjustments made to the input system did not tremendously affect the results. There are, however, some shifts between the various items because source data has changed over the years.

For both systems, it is useful to reconsider certain 'expert judgement' decisions made in the past. Over the years, changes have occurred in the source data, as a result of which better groups may be available to create specific keys. This checking is an ongoing process and due to the clear database structure it is now easier to analyze this periodically.

6. Conclusions and next steps

After two grant projects we have set up a solid system for the Integrated framework for monetary Environmental Accounts (IFMEA). We applied the general set up for statistical processes as implemented at Statistics Netherlands, using different data bases and 'resting points'. Accordingly, an automated system was created that allows the integration and processing of several data sources. We streamlined the most important data so we no longer have to rely on excel sheets. By doing so we created a more efficient statistical process and better quality data. An additional advantage is that we can also work more cost-efficiently with this system. Retrieval, processing and reporting is now faster and less prone to errors.

The first objective of this project was to streamline the statistical work processes with regard to the main data sources that are the input for the integrated framework.

These main data inputs are:

- output/ value added data for Environmental goods and services (EGSS)
- COFOG data
- Data from the National accounts
- Environmental tax data (primarily form national accounts)

The second objective was to streamline the outputs of the integrated framework. First, the main outputs are the questionnaires for Eurostat (EGSS, EPEA, ETEA, etc.). The outputs should be aligned that they can be sent by SDMX. Second, an important output is data for electronic database Netherlands (STATLINE). Third, key outputs are the indicators for SDGs and Monitor of well-being.

The tests show that there are little or no differences in the output of the different accounts. Also, the integrated framework can still be calculated with the new input streams. There are still some points for attention with regard to outdated keys and possible white spots. These are points of attention for 2021.

Next steps

Statistics Netherlands wants to further professionalize the integrated framework system in 2021. First of all, we want to see whether the EPEA and the EGSS can be published with the new system and we will also further work out how the Integrated framework can be published. A regular data table is probably not the appropriate format and modern visualization techniques may be used. The calculation will also be further fine-tuned to remove any noise from the integrated framework.

Furthermore, in 2021 it will be examined whether it is possible to expand the IFMEA system with environmental subsidies and the output flow will also be set up for the ETEA.

7. Literature

Statistics Netherlands (2014a). Compiling the EPE module for the Netherlands: short time series plus improvements, Eurostat grant report.

Statistics Netherlands (2014b). EPEA: classification of COFOG based source data to CEPA & CReMA, Eurostat grant report.

Statistics Netherlands 2016. Testing the integration of environmental activity accounts for the Netherlands. Eurostat grant report.

Statistics Netherlands 2019. Implementing the integrated system for monetary environmental activity accounts in the Netherlands – phase 1. Eurostat grant report.

SEEA CF, 2012

8. Annex

Annex 8.1 Environmental activities in Dutch EGSS

#	Environmental activities in Dutch EGSS	Methodology
1	Ideological environmental organisations	Micro-approach
2	Environmental engineering activities	Micro-approach
3	Production of industrial env. equipment	Micro-approach
4	Environmental consultancy, engineering	Micro-approach
5	Electric transport	Micro-approach
6	Energy systems and energy conservation (excl. insulation activities)	Micro-approach and additional methods (like energy statistics)
7	Insulation activities construction industry	Based on sales of materials and ratios
8	Production of renewable energy	Energy statistics, price statistics and subsidies
9	Organic agriculture	National Accounts and statistics on surface area of organic agriculture
10	Education about the environment	National Accounts and educational statistics
11	Specialised producers of env. services	National Accounts and NACE-selection
12	Preparation for recycling	National Accounts and NACE-selection
13	Environmental inspection, certification	National Accounts and NACE-selection
14	Water quantity man. by Water Authorities	COFOG
15	Other governmental activities	COFOG
16	Water quality management	COFOG

Annex 8.2 Allocation of Environmental activities

Environmental activities	**allocated to**				
	Intermediate consumption	**GFCF**	**Household consumption**	**Government consumption**	*Key for intermediate*
Production of industrial envir equipment		X			n.a.
Environmental engineering activities.		X			n.a.
Environmental consultancy, engineering	X				??
Energy systems and energy conservation		X	X		
Production of renewable energy	X		X		electricity use
biofuels	X		X		Nace 19
Insulation activities constr. industry	X	X	X		insultation services
Organic agriculture	X		X		
Environmental inspection, certification	X				
Education about the environment				X	
Ideological environmental organisations			X		
Specialised producers of env. services	X		X		
Preparation for recycling					
services recycing	X				
waste products	X				
Government					
Central government				X	
Local government					
waste services	X		X		waste services
Water quantity man. by Water Authorities				X	
Water quality management				X	
Other	X			X	COFOG, env services
own account activities	X				