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Directorate E: Sectoral and regional statistics
Unit E-2: Environmental statistics and accounts; sustainable development

Background document
Point 6 of the agenda (21 Feb.)

ReMEA: draft guidelines

Eurostat – Unit E2

Disclaimer:
Please note that a review of the draft ReMEA guidelines is underway. The review has been undertaken in order to align the methodological rules underpinning ReMEA data compilation and reporting to Eurostat with the guidance contained in the 2016 edition of EGSS handbook and in the 2017 edition of EPEA handbook.
Until an updated version of the ReMEA guidelines is available, for all instances where no ReMEA-specific guidance exists or the draft ReMEA guidelines deviate from the methodological recommendations in the EGSS and EPEA handbooks, please follow the definitions and recording rules set out for EGSS and EPEA accounts.

Working Group on
Environmental Expenditure Statistics

Meeting of 20 and 21 February
BECH building - Room Ampere

These draft guidelines represent the output of the ReMEA TF for developing a methodological background in view of compiling resource management expenditure accounts. It is given as background document for point 6 of the 21February agenda of the WG on Environmental Expenditure Statistics. Tables of the ReMEA accounting framework (described in chapter 3 of these draft guidelines) are available in a separate Excel file.

The TF considered the framework complete and suggested that further progress has to come from practical testing. Further work on data sources and methods for ReMEA, as well as any operational decisions should be done first of all in the EGSS context. The ReMEA TF could continue working on improvements in about 3 years, based on the advancements in the EGSS module.

Delegates are asked to approve the guidelines and tables. Written comments can be sent by 14 March 2014.

Eurostat will incorporate comments received from the WG and publish the guidelines for testing purposes by this autumn, on the 'Environmental accounts' dedicated section.

Resource Management Expenditure Accounts (ReMEA)

Guidelines

14 January 2014

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Preface

Every economic actor plays a role in the overall efforts to reduce the pressure on natural resources. Governments at all level, companies involved in industrial or other businesses activities and households as producers (for example of renewable energy) and consumers are all involved in preserving resources.

How much does a nation spend on resource management and what form does this expenditure take? Who is financing this expenditure? What are the effects of this expenditure? Which economic activities are induced by resource management? These are questions which can be answered by building resource management expenditure accounts (for convenience also referred to simply as ReMEA).

ReMEA's main objective is to assess the economic resources a nation devotes to resource management, providing indicators of society's spending for preserving the stock of natural resources and fighting against depletion. This guideline focuses on the development of resource management expenditure accounts.

This guideline provides a step-by-step procedure for building ReMEA. Its purpose is to facilitate the production of harmonised data and to enable rigorous cross-country comparison of data. Full implementation of the recommendations in these guidelines should help to ensure that data are compiled on a consistent basis in all Member States of the European Statistical System (ESS).

Due to its clear focus on the practical implementation, this guideline complements existing guidelines for the accounting of environmental protection expenditure such as the SERIEE and international references such as the United Nations System of Integrated Environmental and Economic Accounting (SEEA 2012). For national compilers the guidelines may serve as a practical compilation guide. Interested data users may also benefit from this publication as a source of background information and clarification.

Anton Steurer

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Environmental statistics and accounts;
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Introduction

The Resource Management Expenditure Account (ReMEA) is a satellite account to the national accounts (NA), designed to describe in a way consistent with the national accounts the transactions related to natural resource management.

Resource management includes the preservation, maintenance and enhancement of the stock of natural resources and hence safeguarding against depletion. These activities include reducing the withdrawals of natural resources (through recovery, reuse, recycling, and substitution of natural resources); restoring natural resource stocks (increases or recharges of natural resource stocks); the general management of natural resources (including monitoring, control, surveillance and data collection); and the production of goods and services used to manage or conserve natural resources.

This statistical guide intends to complement the guidelines for the construction of environmental protection expenditure accounts described in the 2002 EPEA compilation guide[1], with new developments in the area of resource management expenditure. It includes practical aspects for the development of the resource management expenditure accounts and provides practical guidelines in particular for the management of water, energy, forests and minerals.

Context

The system of national accounts (SNA) 2008[2] describes in chapter 29 "Satellite accounts and other extensions" the aim of environmental accounts as reflecting in a close connection with the national accounts:

- the impacts of using (or using up) natural resources,
- the generation of residuals that pollute the air, water, etc., and
- the specific activities undertaken to prevent or combat the environmental impacts of human activity.

The System of Environmental-Economic Accounting (SEEA[3]) – Central Framework, which was adopted as an international standard by the United Nations Statistical Commission (UNSC) at its forty-third session in 2012, is a multipurpose conceptual framework for understanding the interactions between the economy and the environment, and for describing stocks and changes in stocks of environmental assets. The SEEA brings statistics on the environment and its relationship to the economy into the core of official statistics.

One of the important components of environmental–economic accounting is the recording of transactions in monetary terms between economic units that may be considered environmental. The SEEA makes reference (in section 4.11) to two main types of environmental activities for which transactions should be recorded with priority:

- those economic activities whose primary purpose is to reduce or eliminate pressures on the environment (environmental protection) and
- those economic activities whose primary purpose is to make more efficient use of natural resources (resource management).

[1] http://epp.eurostat.ec.europa.eu/portal/page/portal/environmental_accounts/documents/6.pdf
[2] http://unstats.un.org/unsd/nationalaccount/docs/SNA2008.pdf
[3] http://unstats.un.org/unsd/envaccounting/White_cover.pdf

In 1994, Eurostat published the European system for the collection of economic data on the environment (SERIEE[4]) with the purpose to set out a conceptual framework for a monetary description of environmental activities. SERIEE follows the recommendations of the SNA and served as input for the SEEA.

The SERIEE 1994 is composed of (para. 1047):

- the Environmental Protection Expenditure Account (EPEA),
- the Resource Use and Management Expenditure Account (RUMEA)
- 'intermediate systems' for the collection and treatment of basic data which refers to systems for recording general government and industries' environmental transactions or production of environmental products ('eco-industries')

A user-friendly compilation guide[5] to the 1994 SERIEE manual was published in 2002 to help compilers in the practical construction of expenditure accounts. This guide shows how the SERIEE framework can be implemented in practice and what to do with available data. The guide also summarised the new developments since the publication of the 1994 SERIEE, including the new CEPA 2000[6] and recommendations on connected and adapted products and in this regard complemented the 1994 SERIEE manual.

Methodological advancement and pilot data collections have led to the development of a number of manuals and compilation guides for EPEA and some of the 'intermediate systems', the most important one being the development of a data collection framework for the eco-industries, referred to as Environmental Goods and Services Sector (EGSS) statistics.

For the RUMEA, no statistical guide has been developed until the present document. A Task Force (TF) started working in 2009 on the development of a methodology for the compilation of RUMEA.

The TF decided to focus only on resource management expenditure accounts. It found that EPEA concepts and the methodological framework can be adapted to the ReMEA but concluded that a full-scale SERIEE-style accounting framework covering all dimensions (all tables, environmental domains, etc.) is too demanding both in terms of data sources needed to compile it and in terms of specialised knowledge. A simpler approach of collecting easily available information was chosen.

More recently the focus has moved to reduce the complexity of the accounting framework and to further integrate expenditure accounting with the intermediate systems as they have been developed so far in the different modules of monetary environmental accounts (the EGSS but also the environmental subsidies and similar transfers).

In fact all the modules of monetary environmental accounts are linked and complement each other in several ways. They use in part the same classifications, concepts, terms and definitions and they use the same data sources. The different work areas form in principle an integrated system. For example, the EGSS statistics focuses on the production of the goods and services used for environmental protection (EP) and resource management (RM), while the production and/or the use of several components of these products are also described in the EPEA and ReMEA. Environmental taxes or environmental subsidies and similar transfers also play a role in EPEA and ReMEA expenditure accounts.

Thus there is a clear case for streamlining the monetary modules into one integrated system, in order to make the production of data more efficient and increase their quality. An

[4] http://epp.eurostat.ec.europa.eu/portal/page/portal/environmental_accounts/documents/SERIEE%201994%20DE%20version.pdf

[5] http://epp.eurostat.ec.europa.eu/portal/page/portal/environmental_accounts/documents/6.pdf

[6] http://ec.europa.eu/eurostat/ramon/nomenclatures/index.cfm?TargetUrl=LST_NOM_DTL&StrNom=CEPA_2000&StrLanguageCode=EN&IntPcKey=&StrLayoutCode=HIERARCHIC

integrated system makes sure that data sources are analysed efficiently in an integrated way while each module can provide information according to its own needs and breakdowns.

Regulation (EU) 691/2011 on European environmental economic accounts provides a legal framework for a harmonised collection, compilation, transmission and evaluation of environmental accounts by the EU Member States. It covers three modules: air emissions accounts, environmental taxes and material flow accounts.

Article 10 of the Regulation contains a list of possible new modules to be introduced later based on Commission proposals. The first three of the new modules listed in Article 10 have been included in a draft amending Regulation[7]: EPEA, EGSS and energy accounts. The proposed module on EPEA includes significant simplifications which nevertheless still allow reaching the objective of having a measure of environmental expenditure, also for the whole economy, comparable with the national accounts. The proposed module on EGSS aims at providing information on market output and employment of those production activities of a national economy that generate environmental products. It includes the definition of resource management activities and refers to the CReMA classification, a classification of resource management activities which was developed within the European Statistical System for compiling statistics on the EGSS.

Article 10 of the Regulation (EU) 691/2011 also lists RUMEA as a new area to be developed and eventually included as a new module of the Regulation. Article 4 of the Regulation calls for pilot studies to be carried out by Member States on a voluntary basis in order to develop reporting and improve data quality, establish long time series and develop methodology for the modules not yet included under the Regulation.

Purpose and scope of the statistical guide

This statistical guide provides guidelines for the compilation of Resource Management Expenditure Accounts (ReMEA).

The guide is organised in two parts:

- Part A presents the concepts, definitions and classifications, highlighting the relationship with NA, the SERIEE and SEEA. It also presents the ReMEA accounting framework and a step by step compilation of a series of simplified accounting tables.
- Part B provides guidelines for the actual compilation of ReMEA by resource management domains and possible types of analyses. It includes a detailed description of each natural resource domain (taking into account priority domains as described thereafter) and gives an overview of the most important resource management activities including the main data sources.

Even if the accounting framework, definitions and concepts apply to all the resource management domains as described by the CReMA, the work done so far by the Task Force on ReMEA[8] shows that it is essential to establish priority domains. However, choosing the priority resource management domains is not straightforward and depends on the characteristics of the resource management sector in the countries as well as on the priorities and policy needs (data demands) expressed at national and EU level. The results of the Task Force on ReMEA showed clearly that among RM domains, energy, forests and minerals are the main domains to be explored.

[7] http://www.ipex.eu/IPEXL-WEB/dossier/document/COM20130247.do

[8] http://circa.europa.eu/Public/irc/dsis/envirmeet/library?l=/meetings_2011_archive/expenditure_20102011&vm=detailed&sb=Title

PART A - CONCEPTS AND DEFINITION

1. The ReMEA framework

The main objective of ReMEA is to assess the expenditure for natural resource management made by the total economy providing indicators of society's efforts to prevent natural resources depletion.

This indicator together with the one provided by the EPEA – i.e. indicator of the efforts of the society to protect the environment against pollution and degradation phenomena – give a complete picture of the measures carried out by the socio-economic system in order to defend the natural assets from both a quantitative (depletion) and qualitative perspective (pollution and degradation).

ReMEA are based on the same definitions, concepts, units and grouping of units, transactions and aggregates, and accounting framework as the EPEA. This methodological framework is described thereafter and the few differences and adaptations with respect to EPEA are highlighted.

1.1. Definition and scope of resource management

The natural resources within the scope of resource management (RM) are all natural biological resources (including timber and aquatic resources), mineral and energy resources, and water resources. All cultivated biological resources and land are excluded from this scope. Environmental services which result from uses of certain functions of natural resources (assimilation of pollutants, aesthetic value, etc.) are excluded as well as ecosystems and their services[9].

RM activities are those activities whose primary purpose is the preservation, maintenance and enhancement of the stock of natural resources and hence safeguarding against depletion. These activities include reducing the withdrawals of natural resources (such as the recovery, reuse, recycling and substitution of natural resources), restoring natural resource stocks (increases or recharges of natural resource stocks), the general management of natural resources (including monitoring, control, surveillance and data collection) and the production of goods and services used to manage or conserve natural resources.

RM activities, products, actual outlays (expenditure) and other transactions can be classified according to the classification of resource management activities (CReMA 2008).

[9] This is consistent with the SERIEE 1994 (para. 10043-10045) which defines the natural resources within the scope of resource management as follows: "According to the generally accepted definition, natural assets correspond to non-produced assets: water (marine and inland), air, land (soil, ecosystems, etc.), wild flora and fauna, sub-soil assets, as well as living assets produced by human activities (livestock, plants). Natural assets taken as a whole constitute the natural heritage. Natural assets give rise to natural resources, the use of which can translate into a quantitative depletion of the assets concerned, if the corresponding resource consists of a good, and/or the deterioration of their quality, if the corresponding resource constitutes a service (environmental services relevant to certain natural assets: air, etc.). Only those natural resources corresponding to non-produced natural assets whose use takes the form of goods, are dealt with in the natural resource use and management account. Hence, produced natural resources (livestock, plants) are excluded as well as those environmental services which result from uses of certain functions of natural assets (assimilation of pollutants, aesthetic value, etc.). The natural resources retained to illustrate the structure of the natural resource use and management accounts are water resources and sub-soil resources."

The CReMA was developed within the European Statistical System for compiling statistics on the Environmental Goods and Services Sector (EGSS).

The CReMA classes are as follows:

CReMA 10 – Management of water

CReMA 11 – Management of forest resources

CReMA 12 – Management of wild flora and fauna

CReMA 13 – Management of energy resources

- CReMA 13A – Production of energy from renewable resources
- CReMA 13B – Heat/energy saving and management
- CReMA 13C – Minimisation of the use of fossil energy as raw materials

CReMA 14 – Management of minerals

CReMA 15 – Research and development activities for resource management

CReMA 16 – Other resource management activities

The full description of the CReMA classes (as presented in Eurostat's 2009 EGSS Handbook) is available in Annex 2.

The CReMA builds on "single resource" logic. This is meant to facilitate the analysis of expenditure by resource domain and linking with relevant physical indicators. Nonetheless policy interest is often focused on areas involving two or more resource domains and even environmental protection domains. This is the case for example of climate change which could include the air protection domain but also other EP/RM domains which could contribute to fighting climate change as renewable energy, waste management, energy saving, etc.

1.1.1. The main purpose criterion

To be included under environmental protection or resource management activities, an activity (or part thereof) must satisfy the main purpose criterion, i.e. environmental protection or resource management is their prime objective. Activities having a favourable impact on the environment but which serve other goals do not come under environmental protection or resource management classification (SERIEE para. 2006 – 2008).

The main purpose as the basis for functional classifications is well accepted. However, in recent years, policies have become more integrated and therefore broader in their interest. Keywords in this context are climate change, sustainable development, green growth and resource efficiency.

The main classification criterion could be operationalized in a continuum from main purpose (or primary purpose) to effect, e.g. as follows:

- main purpose in a narrow sense (the real dominant intention or objective of actors) – true intentions are hard to measure;
- main purpose based on legislation or net costs (i.e. the idea that legal obligation or the proof of net costs[10] is sufficient evidence for intention – net costs are hard to measure in practice);
- main purpose based on revealed intentions (i.e. policy statements or declarations of respondents – there is a higher risk of bias and instability here);

[10] The net costs criterion refers to the idea that some environmental activities (EP or RM) could produce also positive effects as for example reduction of costs due to efficiency measures taken for reducing reosource use or pollution.

- technical nature of the activity (irrespective of intention, legislation or declarations);
- presumed effect (i.e. assumed environmental consequences of an activity or action – this is used e.g. for environmental taxes);
- real effect (i.e. the effective consequences on the environment of an activity or action – these are hard to measure).

From a statistical point of view, the technical nature is the most neutral basis for determining the primary purpose. In fact it allows checking the environmental purpose (either EP or RM) by considering the suitability from a technical perspective of various goods and services for achieving the EP or RM purpose.

1.2. Key concepts in the ReMEA framework

Defining the scope of resource management requires identifying:

- the activities characteristic for the field of resource management. These are activities whose main purpose is resource management. They are called *characteristic activities*. Thus RM characteristic products are the result of activities whose purpose is resource management;
- products whose uses are interesting because they are clearly covered by the concept of expenditure in a given field (i.e. whose use serves an RM purpose) without being typical (i.e. without being the result of an activity whose purpose is RM, in other words they are neither characteristic products nor do they constitute characteristic activities). These are *connected and resource efficient products*;
- the *transfers* (subsidies, investment grants, specific taxes, etc.) in favour of resource management.

This forms the conceptual basis necessary to compile the ReMEA.

From an accounting perspective this offers the possibility to answer questions such as: Which are the institutional units involved in resource management activities? What kind of activities are these institutional units undertaking in the field of resource management? Who is financing resource management?

1.2.1. Characteristic activities

Characteristic activities are activities whose main purpose is resource management.

To establish a list of characteristic activities, we can rely neither on the classification of activities of national accounts (even though certain activities defined in the Statistical Classification of Economic Activities in the European Communities, hereafter referred to as NACE Rev. 2, do constitute resource management activities), nor on existing functional classifications like the classification of functions of government (COFOG) or the classification of individual consumption by purpose (COICOP). Therefore it is necessary to draw up such a list by defining activities.

The characteristic activities of resource management are the following:

- activities aimed at reducing withdrawals: recovery, reuse, recycling, savings, substitution of natural resources;
- replenishment activities: increases/ recharges of natural resource stocks (for renewable resources, i.e. waters, forest and wild flora and fauna);
- natural resource administration and regulation activities carried out by the general government (including e.g. the elaboration of plans, the release of any kind of licenses and permits for exploiting resources, the enforcement of quotas, etc.);

- monitoring, control and surveillance (including the control on the observance of licenses, permits, quotas, etc.), measurement, inventories, data collection, etc.;
- teaching, training, information and communication activities;
- R&D activities in the field of natural resource management.

PRINCIPAL, SECONDARY AND ANCILLARY ACTIVITIES

To describe characteristic activities we consider local kind-of-activity units (local KAUs), industries.

In order to identify the RM output of enterprises it is generally advisable to partition the enterprises by reference to activities. A unit resulting from such a partitioning is called a kind-of-activity-unit (KAU) and it is a local KAU if it is situated in a geographically identified place. When partitioned into (local) KAUs the resulting units are more homogenous with respect to output, cost structure and technology than the enterprise as a whole. In order to establish statistics using the (local) KAU concept it is, however, necessary that the enterprises' information systems be capable of recording the indicators needed to calculate value added broken down by activity. When such information is available and used for the partitioning a secondary resource management activity of an enterprise may become the principal activity of one of its (local) KAUs, if this activity accounts for most of the (local) KAU's gross value added. KAUs may also have secondary resource management activities.

The output of principal or secondary activities is either sold on the market (market output) or provided free or at prices that are not economically significant (non-market output).

Characteristic resource management activities can also be executed as so-called in-house or ancillary activities in order to limit the depletion of natural resources by the enterprise. The output from these ancillary activities does not normally result in products that are marketed.

Producer units of the national economy which execute characteristic activities (principal, secondary and ancillary activities) are called characteristic producers. All other producer units of the national economy are called non-characteristic producers.

The following characteristic producers are distinguished:

- *specialist producers* which execute a characteristic activity as their principal activity
- *non-specialist producers* which execute a characteristic activity as secondary or ancillary to a principal non-characteristic activity.

Although this distinction is included in the SEEA, in the simplified accounting tables for ReMEA described in chapter 3 of this draft statistical guide only the distinction between ancillary on one side and principal and secondary producers on the other side is implemented.

1.2.2. Resource management products

In practice, the scope and definition of products varies depending on the type of account or set of statistics being compiled. For the ReMEA, the main adaptation compared to the EPEA is the inclusion of both production of goods and services as characteristic activities.

Resource management products are those products from characteristic activities. Examples of resource management services are insulation and consultancy for water and energy saving. An example of a resource management good is renewable electricity.

Connected and resource efficient products are neither characteristic products nor do constitute the output of characteristic activities but whose use serves a resource management purpose.

The ReMEA describes the uses of connected and resource efficient products by resident units, as well as certain specific transfers related to them. It does not describe their production as in the case of environmental goods and services sector (EGSS) statistics.

A list of connected products and resource efficient products should be established in order to compile comparable data across countries.

Connected products are products whose uses are clearly covered by the concept of expenditure in the RM field, without being typical (characteristic), either by nature or because they are classified in broader categories of products. These products directly serve an RM purpose (e.g. wind mills, rainwater storage tanks, and specific equipment for measurement of various characteristics of natural resources) and have no other use than RM, but they are not the output of characteristic RM activities, thus their production itself does not manage the use of resources. Connected products may be services or goods (durable or non-durable goods). Only products exclusively used for RM purposes are included (single use products). Dual use and multi-purpose products (as they have other uses than RM) are excluded.

Some connected products are exclusively used as intermediate consumption or capital formation by producers of characteristic, connected and resource efficient products. This is the case of the components of connected and resource efficient products, when they are used exclusively for connected goods as well as for resource efficient products. This is also the case of connected goods used exclusively for capital formation of RM characteristic activities (e.g. the construction of facilities for RM).

Expenditure accounts and EGSS can give a different detail of connected products. From the expenditure side the use of connected products as a whole is relevant. Components of connected and resource efficient products are taken into account already by the uses of connected and resource efficient products they are part of. The construction of facilities for RM is included when taking into account capital formation of RM characteristic activities.

Resource efficient products are less resource intensive at the time of their use than equivalent normal products (e.g. washing machines consuming less water). Equivalent normal products are those products which furnish similar utility, irrespective of the impact on resource management. Resource efficient products may be durable or non-durable products. They may be used for final or intermediate consumption or for gross capital formation. Examples for resource efficient products may be: energy efficient appliances, compact fluorescent lamps, etc.

As resource efficient products do not serve primarily an environmental purpose, for ReMEA purposes the expenditure for these products should not be accounted for at their total amount. Contrary to the EGSS, only the ‘environmental share’ should be accounted for, which can be measured by the extra cost of the resource efficient product compared to its equivalent normal product when the resource efficient product is more expensive than the normal one.

The basic principles of evaluation of resource efficient products are the same as for adapted products and are laid down in the SERIEE manual (para. 2029 seq. and para. 2050 seq.). Practical methods and example of calculation of extra costs are described in the SERIEE 2002 compilation guide (para 5.4.3).

In practice the extra cost criterion poses manifold practical measurement problems. It may be very difficult for some reporting units to report extra costs because their bookkeeping system record the total costs and not all may have made this comparison with equivalent normal products or are willing to report on it.

For this reason and in the absence of a list of connected and resource efficient products, the simplified accounting system (see chapter 3) excludes these products from the boundary of resource management expenditure accounting[11].

1.2.4. Resource management transfers[12]

Resource management transfers are unrequited payments received by resident or non-resident units which contribute to the financing of characteristic activities and uses of connected and resource efficient products or constitute a compensation for income or capital losses related with resource management. Current and capital transfers are distinguished.

Resource management transfers are categorised according to the ESA concepts and definitions.

Accordingly, within current transfers subsidies on production and other current transfers are distinguished. Within subsidies on production, subsidies on products and other subsidies on production are distinguished. Subsidies on products are payable per unit of a product. Other subsidies on production are not directly linked to the quantity or value of the products. Similarly to subsidies to reduce pollution accounted for within the EPEA, subsidies intended to cover all or part of the cost of avoiding/reducing depletion might be classified in the ESA context as other subsidies on production. Other current transfers are current transfers within general government, current international co-operation, current transfers to non-profit institutions serving households (NPISHs), etc.

Capital transfers are transfers linked to the acquisition (or disposal) of fixed assets. They are subdivided into investment grants and other capital transfers. Investment grants are intended to finance the cost of acquisition of fixed assets of resident or non-resident units. Other capital transfers are transfers to cover capital losses or accumulated deficits, large legacies or donations, etc.

RM transfers are a subset of environmental subsidies and similar transfers. Eurostat is currently developing guidelines on the compilation of statistics on these transfers.

1.3. Definition and scope of national resource management expenditure

In a national accounts perspective, resource management expenditure includes:

1. The domestic uses of RM products. These RM products are either RM characteristic products (e.g. energy savings services, water management) or connected and resource efficient products (e.g. energy efficient appliances). Uses are either final uses (final consumption or gross capital formation) or intermediate consumption. RM expenditure also includes the value of the RM characteristic products produced in-house for internal use (ancillary activity).
2. Domestic gross capital formation for resource management characteristic activities (investments for RM).
3. Those transfers for RM that are not already reflected in the expenditure recorded under the two previous categories. These are in particular subsidies, which lower the prices paid by the users of RM specific products. Ignoring subsidies would result in an underestimation of total expenditure.

[11] Nevertheless the recording the uses of connected and resource efficient products (only the extra costs) is possible in the non-mandatory part of the tables.
[12] Adapted from: SERIEE European System for the collection of economic information on the environment, 1994, para. 2039-2041.

The sum of these components gives total domestic RM expenditure. Adding transfers (financing) to the rest of the world and deducting transfers received from the rest of the world leads to total national RM expenditure. This aggregate is constructed in a way that avoids double counting and makes the sum comparable with standard national accounts aggregates such as gross domestic product (GDP) or gross national income (GNI).

Table 1 below describe the items necessary for calculating RM output and expenditure. The links with other modules of monetary environmental accounts are also highlighted.

Table 1 : RM production and expenditure in the simplified ReMEA accounting framework

	ReMEA	Other monetary environmental modules
	RM output of characteristic producers	EGSS
+	Imports	
-	Exports	EGSS
+	Items for going from producers' to purchasers' price (VAT, other taxes less subsidies on products, trade and transport margins)	
=	RM output at purchaser prices available for national uses	
		
	Domestic uses: uses of RM products[1] by resident units	
	Final consumption	
	Gross capital formation	
	Intermediate consumption	
+	Gross capital formation of RM characteristic activities	
+	RM domestic transfers which are not a counterpart of previous items	Environmental subsidies and similar transfers
+	RM Transfers to the RoW	Environmental subsidies and similar transfers
-	RM Transfers received from RoW	Environmental subsidies and similar transfers
=	Domestic RM expenditure	

[1] In principle RM products include characteristic products and connected and resource efficient products. In the simplified accounting framework described in chapter 3 the use of RM connected and resource efficient products is excluded from the scope of RM expenditure.

1.4. ReMEA accounting tables

As in the EPEA framework, the ReMEA framework includes a set of five interrelated tables:

- TABLE B: the supply (production) of RM products, and the way they are produced,
- TABLE B1: a table integrating supply and uses of RM products,
- TABLE A: the national RM expenditure, i.e. the expenditure for the uses (consumption) of RM characteristic products and of connected and resource

efficient products, for gross capital formation and some other transactions related with resource management (capital transactions and certain transfers),

- TABLE C: the financing of RM expenditure,
- TABLE C1: the net cost burden for resource management on the various sectors of the economy.

In practice, compilation usually starts with the analysis of the supply of RM characteristic products and the gross capital formation needed for this production (Table B) because such information is most widely available and most reliable. Table B determines the supply of RM characteristic products. This supply is then complemented with available information on the uses in the supply-use table (Table B1). These uses, together with some additional information (on certain transfers, on expenditures for connected and resource efficient products etc.) then allow to complete Table A and to determine national expenditure. Based on Table A, the financing and the net costs can be analysed (Tables C and C1).

This compilation sequence (B -> B1 -> A -> C -> C1) follows a natural progression from a minimum set of data most often available in countries to more complete accounts that require additional sets of data.

In annex 1, a detailed description of the compilation of each ReMEA table is given[13]. It first gives an insight of the concepts and definitions and then presents step by step filling in of the tables' cells. This accounting framework was tested by the TF in 2011 and 2012. The results are described in the document ENV/RM/TF/4 (2012)[14].

Given its practical experience with the accounting framework, the TF suggested that the full set of SERIEE-style tables (as described in Annex I) should stay as a reference accounting framework for ReMEA. Filling in the set of SERIEE-style tables proved in fact too demanding in terms of data and estimation methods to be developed and in terms of specialised knowledge. Thus a set of simplified tables which builds on the experience of the EPEA module for inclusion in Regulation 691/2011 was developed. These tables are described in chapter 3.

[13] Mainly based on and adapted from: Eurostat, SERIEE Environmental Protection Expenditure Accounts – Compilation Guide, 2002, pp. 67-106.

[14] Further details on the results from the TF pilot exercises can be found at : http://circa.europa.eu/Members/irc/dsis/envirmeet/library?l=/meetings_2011_archive/expenditure_20102011/rumea_exercisepdf/_EN_1.0_&a=d

2. Uses of and indicators derivable from the ReMEA

2.1. Uses of ReMEA

The ReMEA's main objective is to assess the economic resources a nation devotes to resource management, providing indicators of society's spending for preserving the stock of natural resources and fighting against depletion.

Every economic actor plays a role in the overall efforts to reduce the pressure on natural resources. Governments at all level, companies involved in industrial or other businesses activities and households as consumers are all involved in preserving resources.

How much does a nation spend on resource management and what form does this expenditure take? Who is financing this expenditure? What are the effects of this expenditure? Which economic activities are induced by resource management? These are questions which can be answered by using data derived from ReMEA.

More specifically ReMEA can be used for a variety of purposes[15]:

- to analyse the economic impact of resource management policy – for example, the possible effects on the competitiveness of businesses;
- to analyse the need for financing of RM activities and to follow up and monitor specific support and investment programmes;
- in environmental performance reviews, to show, for example, what action countries have taken to reduce the pressure on specific natural resources, to serve as an indicator of the response from society for reducing environmental pressure in general, and as a sustainable development indicator;
- at a micro-level as an internal tool to help businesses identify and minimise their costs and report to external stakeholders on action taken, and as input for financial analysts in their business evaluations;
- as a basis for descriptions of the market for environmental goods and services. Expenditure related to resource management is also an opportunity for the creation of new markets for goods and services to prevent natural resources depletion stimulating the development of a greener economy;
- to complete analysis based on physical indicators;
- as a source of data for the EGSS statistics. As the definition of RM activities is the same for ReMEA and EGSS and the same classification (CReMA) is used in both modules, ReMEA would be a perfect source of data for the RM part of the EGSS. In particular data on the production, exports and employment of RM characteristic activities (market, non-market and ancillary) which are asked for in the EGSS module are available through the ReMEA.
- as a source of data for environmental subsides and similar transfers. Transfers to RM activities are recorded by the ReMEA. Thus the ReMEA would be a source of data for compiling statistics on environmental subsidies.

[15] Adapted from Eurostat, Environmental expenditure statistics: Industry data collection handbook, Luxembourg, 2005, p. 7.

2.2. Main indicators derivable from ReMEA

Many different indicators can be derived from the ReMEA. These indicators give a picture of the measures carried out by the socio-economic system in order to safeguard the natural assets from a quantitative perspective (depletion) and can be linked to the environmental protection indicators which give information on a qualitative perspective (pollution and degradation).

Key aggregates derivable from the ReMEA are national expenditure for resource management, by categories of users/beneficiaries and financing units and by natural resource (CReMA classes).

Since these aggregates result from an accounting structure coherent with NA they ensure completeness and avoid double counting and other biases. Furthermore the ReMEA aggregates are closely comparable with national accounts aggregates, so that ratios may be calculated that are true shares. This is the case for example of the indicators such as national expenditure for RM/GDP, gross capital formation (GCF) for RM /GCF, household expenditure for RM /household final consumption, government expenditure for RM /government expenditure.

Capital expenditure for RM is an indicator of business activity in the field of RM. Fluctuations in this indicator can be considered to anticipate future business activity, business confidence and the pattern of economic growth in the field of RM. Gross capital formation for RM as a share of gross capital formation shows how much of the investments of an economy have the aim of combating resource depletion.

Households' consumption expenditure for RM is an indicator of what households spend on goods and services to protect natural resources. It can be expressed as a share of the total final consumption expenditure of households.

General government expenditure for RM shows the role played by the public sector in RM. It is an indicator of the importance of RM with respect to the many other objectives pursued by the government. It can be expressed as a share of general government expenditure.

The aggregate of national expenditure for resource management as well as the indicators derived as illustrated above can be used for international comparisons.

It must be stressed nevertheless that differences among countries should be interpreted with caution. For effective interpretation, the RM aggregates should be related to physical data (e.g. energy production, water supplied, etc.). For example, for international comparison a ratio of national expenditure for e.g. renewable energy to renewable energy consumption can be built in order to show national expenditure for renewable energy in euro per kWh of renewable energy consumed.

RM output and RM employment, which can be compared to the corresponding national aggregates for total output and employment of the economy, can be useful for the analysis of the EGSS. Export of resource management products can be an indicator of the competitiveness of RM producers in a country.

The ReMEA framework allows also for calculating the financing of the national expenditure for resource management which allows for illustrating who is in the end bearing the burden of natural resource preservation.

In fact the units that consume RM characteristic products or connected and adapted products or invest for RM activities are not necessarily the financing units, i.e. those actually bearing the expenditure from own resources because units may benefit from specific transfers.

3. Simplified framework for data collection and reporting

ReMEA tables can be directly derived from the tables as described in the SERIEE 1994 manual and EPEA 2002 compilation guide. These tables are described in Annex 1.

Since the full ReMEA framework is quite expensive in terms of resources to be set up, this guide proposes a set of simplified accounting tables which builds on the experience of the EPEA module for inclusion in Regulation 691/2011. The aim of the simplified tables is still to have a measure of resource management expenditure for the whole economy comparable with the national accounts.

The focus of the simplified ReMEA is on production and use. Nevertheless the simplified accounting framework focuses only on characteristic RM products. The use of connected and resource efficient products is not a priority of the current proposal (but their recording is still possible in the tables, see below). Information on the production connected and resource efficient products can be collected through the new module on the Environmental Goods and Services Sector (EGSS).

The simplified ReMEA does not distinguish between specialist and non-specialist producers but only between ancillary producers on one side and principal and secondary producers on the other side. In the ReMEA context, where most of the production of RM output is secondary, this implies to include for both principal and secondary producers RM output, gross capital formation, employment, etc.

No breakdown of costs of production is required for calculating output. For ancillary activities major simplifications apply. The inclusion of consumption of fixed capital and of taxes less subsidies is not obligatory in order to further reduce the response burden.

Finally, the information (transfers) asked for calculating financing is drastically reduced. The priority is given to current and capital transfers. Earmarked taxes are not a priority of the simplified ReMEA account.

In order to implement a simplified ReMEA the following tables are proposed:

- General government (table 1)
- Corporations: ancillary production (table 2)
- Corporations as market producers (table 3)
- Total supply of resource management products (table 4)
- Households (table 5)
- RM Transfers (table 6)
- Total economy (tables 7.1 and 7.2)

Additional sub tables for ancillary production of RM services could be added for detailing the ancillary production of RM services by NACE sector according to the main activity of the unit.

The information requested by the simplified ReMEA tables focuses on resource management expenditure of the general government, corporations, households and the rest of the world. NPISHs are not separately identified and they are included under general government.

The tables cover the same variables asked for by the EPEA module for Regulation 691/2011. The definition of resource management and the scope of natural resources (e.g. CReMA domains) are the same as the ones used in the EGSS module for Regulation (EU) 691/2011.

The aim of the simplified ReMEA being to have a minimum set of RM expenditure data collected by all countries, the tables were developed to make possible to countries to

transmit also some extra elements which are not priorities. In fact each table has 2 parts: the first one is the "minimal approach" and the second one is the "full approach".

The minimal approach contains only a reduced number of variables strictly necessary for calculating national expenditure for RM and an aggregation of resource domains to match data sources.

These domains are: forest management (CReMA 11A), renewable energy production (CReMA 13A), energy savings (CReMA 13B), material recovery (which includes parts of CReMA 14, 11 and 13C).

They match data sources in the sense that most of the producers for each domain are classified in some NACEs, as for example NACE 2 for forest management, NACE 35 for renewable energy production and NACE 38.3 for recycling and government expenditure is (in some but not all cases) recorded under some COFOG classes. More information on data sources and methodologies to derive the data asked for in the tables are presented (by resource domain) in part B of this guide.

The full approach allows for including more detailed variables (full breakdown of costs, earmarked taxes, employment, uses of connected and resource efficient products etc.) and gives the possibility of detailing all 7 CReMA classes.

3.1. Tables

The simplified ReMEA tables consists of seven tables: (1) general government, (2) corporations: ancillary production, (3) corporations as market producers, (4) total supply of resource management products, (5) households, (6) RM Transfers and (7) total economy.

Producing RM products for the use by others will be the main activity of market producers (both principal and secondary) which are to be reported in table 3. Table 4 allows for recording intermediate consumption of RM products, import, export, VAT and trade margins of resource management production activities. These variables together with output reported in tables 1 to 3 allows for calculating RM output available for national uses.

Table 6 is for reporting current and capital transfers of the different economic sectors financing RM activities. This information allows for calculating the financing of RM expenditure.

Tables 7.1 and 7.2 sum up the data reported and are filled in automatically using the data of tables 1 to 6.

Each table includes two separate areas. The first one is for reporting a small set of variable for a restricted set of resource domains (i.e. the minimal approach). The second one includes all the variables for calculating expenditure for all CReMA classes (i.e. the full approach).

The aim of the complete accounting tables (i.e. the full approach) is to allow countries with more experience and resources in the field of environmental accounting to report more detailed RM variables. This will allow calculating more accurate EU aggregates.

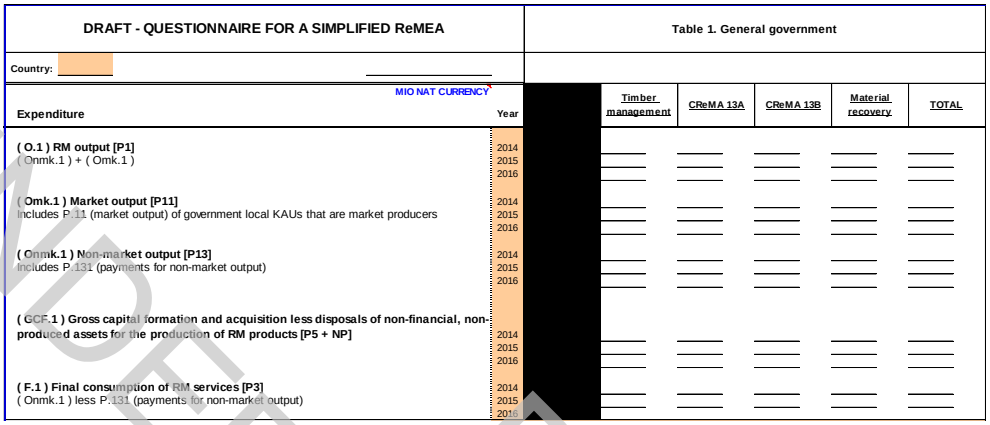
TABLE 1: GENERAL GOVERNMENT

Table 1 allows for reporting data on the production of RM products, gross capital formation and acquisition less disposals of non-financial, non-produced assets (such as land) for RM production and final consumption of RM products by the general government. Table 1 should cover the expenditure of all units classified in the government sector (S.13) in the national accounts.

The institutional units classified in S.13 are non-market producers. However, they may have some secondary RM market output which is also to be reported in table 1. In countries where the national accounts data by industries and the supply and use tables are not based on institutional units but on the more detailed local kind-of-activity units (KAUs), it is possible that some units (KAUs) belonging to the general government sector are classified in NACE Rev. 2 divisions 36 (relevant for CReMA 10) or 38 (relevant for CReMA 11, 13C

and 14). In that case some care is needed when completing the tables 1 (general government) and 3 (corporations as market producers) to make sure that the data for all units belonging to the sector general government are recorded in table 1 and the data for all units recorded in table 3 are only for units that belong to the corporations sector.

Figure 1 : table 1 – General government



DRAFT - QUESTIONNAIRE FOR A SIMPLIFIED ReMEA

Table 1. General government

Country:

MIO NAT CURRENCY

Expenditure	Year	Timber management	CReMA 13A	CReMA 13B	Material recovery	TOTAL
(O.1) RM output [P1] (Onmk.1) + (Omk.1)	2014					
	2015					
	2016					
(Omk.1) Market output [P11] Includes P.11 (market output) of government local KAUs that are market producers	2014					
	2015					
	2016					
(Onmk.1) Non-market output [P13] Includes P.131 (payments for non-market output)	2014					
	2015					
	2016					
(GCF.1) Gross capital formation and acquisition less disposals of non-financial, non-produced assets for the production of RM products [P5 + NP]	2014					
	2015					
	2016					
(F.1) Final consumption of RM services [P3] (Onmk.1) less P.131 (payments for non-market output)	2014					
	2015					
	2016					

Net operating surplus of market producers belonging to the general government sector could be negative. This indicates that part of the production costs are not covered by sales. One reason for such a result may be that government units, when calculating the prices of RM products (e.g. the level of fees to be paid by consumers) are legally required to avoid a net profit and to base the depreciation allowances on historic costs rather than on replacement costs. This issue has been submitted to a National Accounts Working Party in 1999 which recommended compensating such negative net operating surplus by other subsidies on products in the accounts (i.e. an implicit subsidy by the government institutional unit to the local KAU which is market producer). Because market output at basic prices is the price receivable by the producer from the purchaser less taxes on products plus subsidies on products, the implicit subsidy increases the market output recorded in table 1. Such implicit subsidies should also be accounted for in the table 6.

Non market production is the production of RM products intended for individual or collective consumption, mainly financed by general taxes which are not linked to the use of the product.

A general government unit may recover part of its cost of production through revenues from actual users or beneficiaries, whatever the name given to these payments (fee, contribution, charge, etc.).

If the recovered part is less than 50% of the cost of production, the unit will be classified as non-market producer. Nonetheless that part of its cost of production which is compensated by partial payments of the actual users is recorded in Table 1 under the headings "market output". The ESA 2010 foresees a specific category of non-market output corresponding to these payments called P.131: payments for non-market output.

Table 1 allows also for the reporting of more detailed data for general government expenditure. Data can be reported for the full CReMA classes breakdown. Output can be broken down by total costs of production (intermediate consumption, intermediate consumption of RM products, compensation of employees, consumption of fixed capital, other taxes less subsidies on production, net operating surplus). Since these variables refer to the whole production of the units, the calculation of RM output eventually requires implicitly subtracting from the sums of costs the non RM output.

The uses (intermediate consumption and gross capital formation and acquisition less disposals of non-financial, non-produced assets) of connected and resource efficient products can also be reported in the complete accounting part of the table. For resource efficient products only extra costs should be reported.

Labour input used in production of RM products can be also recorded in the complete accounting part of the table, expressed in full time equivalents.

Main source of data for table 1 is national accounts – general government expenditure by function (COFOG) (Table 11 of ESA transmission programme). Analysis of financial budgets and accounts analysis is useful for detailing RM expenditure activities already recorded in a more aggregated way under COFOG statistics.

Also the national accounts production and generation of income accounts (Table 3 of ESA transmission programme) can provide useful information.

TABLE 2. CORPORATIONS - ANCILLARY PRODUCTION

Any production of resource management products for own use (an ancillary resource management activity) should be recorded under table 2. Ideally information on ancillary resource management activities should be broken down by industry (NACE) as follows: mining and quarrying, manufacturing (total and detailed), electricity, gas and steam supply and water supply, other sectors.

Figure 2 : table 2 – corporations - ancillary production

DRAFT - QUESTIONNAIRE FOR A SIMPLIFIED ReMEA		Table 2. Corporations: ancillary production (total)					
Country:							
Expenditure	MIO NAT CURRENCY Year		Timber management	CReMA 13A	CReMA 13B	Material recovery	TOTAL
(Oa.2) Output of ancillary activities	2014 2015 2016						
(GCF.2) Gross capital formation and acquisition less disposals of non-financial, non-produced assets for the production of RM products [P.5 + NP]	2014 2015 2016						

Please note that expenditure for secondary resource management activities should be reported in Table 3.

Table 2 allows for reporting data on the output of ancillary RM products and gross capital formation and acquisition less disposals of non-financial, non-produced assets for the production of RM ancillary products.

The output of an ancillary activity 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 can be carried out. Ancillary activities typically produce outputs that are commonly found as inputs into almost any kind of productive activity, small as well as large. Enterprises may have a choice between engaging in ancillary activities or purchasing RM products on the market from specialist producers.

It is accepted that the output of ancillary activities is approximated by the amount of in-house current expenditure, i.e. compensation of employees plus intermediate consumption for resource management other than intermediate consumption of RM products.

Table 2 allows also for the reporting of more detailed data for ancillary RM expenditure. Data can be reported for the full CReMA classes breakdown. A more comprehensive measure of output can be compiled with in particular includes the consumption of fixed capital. This output can be broken down by total costs of production (intermediate consumption, compensation of employees, consumption of fixed capital, other taxes less subsidies on production). Since these variables refer to the whole production of the units, the calculation of RM output eventually requires implicitly subtracting from the sums of costs the non RM output.

The uses (intermediate consumption and gross capital formation and acquisition less disposals of non-financial, non-produced assets) of connected and resource efficient products can also be reported in the complete accounting part of the table. For resource efficient products only extra costs should be reported.

Labour input used in production of RM ancillary products can be also recorded in the complete accounting part of the table, expressed in full time equivalents.

So far there are no available data sources for RM ancillary activities, which therefore need to be estimated.

TABLE 3. CORPORATIONS AS MARKET PRODUCERS

Producers of the corporations sector which produce RM products as their principal and secondary activity are to be reported in table 3. Their output is sold on the market for the use of other units, mainly financed by the users of these services. According to ESA principles, the output is considered as "market" because it is sold at prices that cover more than 50% of the cost of production.

Figure 3 : table 3 – Corporations as market producers

DRAFT - QUESTIONNAIRE FOR A SIMPLIFIED ReMEA		Table 3: Corporations as market producers				
Country:						
MIO NAT CURRENCY						
Expenditure	Year	Timber management	CReMA 13A	CReMA 13B	Material recovery	TOTAL
(Omk.3) Total RM market output of corporations [P11]	2014					
	2015					
	2016					
(Prm.3) Intermediate consumption of RM products by corporations' market producers	2014					
	2015					
	2016					
(GCF.3) Gross capital formation and acquisition less disposals of non-financial, non-produced assets for the production of RM products [P5 + NP]	2014					
	2015					
	2016					

Corporations' market producers include privately and publicly owned corporations and quasi-corporations. Quasi-corporations could for example be recycling departments of large municipalities which charge economically significant prices and are considered to have autonomy of decision and where the municipalities' book-keeping systems allow having a full set of accounts for these units.

The institutional units classified in S.13 are non-market producers. It is possible that some of these institutional units are classified in NACE divisions relevant for RM (for example 35, 36 or 38.3). Furthermore, in countries where the national accounts data by industries and the supply and use tables are not based on institutional units but on the more detailed local kind-of-activity units (KAUs), it is possible that some KAUs belonging to the general government sector are classified in NACE Rev. 2 relevant for RM. In principle these local KAUs of government could be either market producers or non-market producers. This type of producer has to be reported in table 1 (general government). Some care is needed when completing the tables 1 (general government) and 3 (corporations as market producers) to make sure that the data for all units belonging to the sector general government are recorded in table 1 and the data for all units recorded in table 3 belong to the corporations sector.

Table 3 allows for reporting data on the output of corporations market producer and their gross capital formation and acquisition less disposals of non-financial, non-produced assets (such as land).

Table 3 allows also for the reporting of more detailed data for corporations' market producers. Data can be reported for the full CReMA classes breakdown.

The uses (intermediate consumption and gross capital formation and acquisition less disposals of non-financial, non-produced assets) of connected and resource efficient products can also be reported in the complete accounting part of the table. For resource efficient products only extra costs should be reported.

Labour input used in production of RM can be also recorded in the complete account part of the table, expressed in full time equivalents.

Main data sources for table 3 are national accounts - production and generation of income accounts (Table 3 of the ESA transmission programme) and supply and use tables (Tables

15 and 16 of the ESA transmission programme). When information from supply and use tables is used, care is needed to establish which statistical units are the bases for compiling the supply and use tables. When institutional units are used, all the government units should be non-market producers.

The calculation of more detailed data for the voluntary part may require appropriate estimation techniques, for example in the case of consumption of fixed capital which could be estimated from either from data on investments either from more aggregated available data national accounts using appropriate ratios.

TABLE 4. TOTAL SUPPLY OF RM PRODUCTS

Table 4 describes the RM output, intermediate consumption of RM products by corporations' market producers, RM imports and exports, VAT and other taxes less subsidies on products on RM products. RM output is automatically calculated. IC of RM products is the sum of IC of RM products by corporations' market producer (to be reported in table 3) and general government market producer (to be reported in table 1, if any).

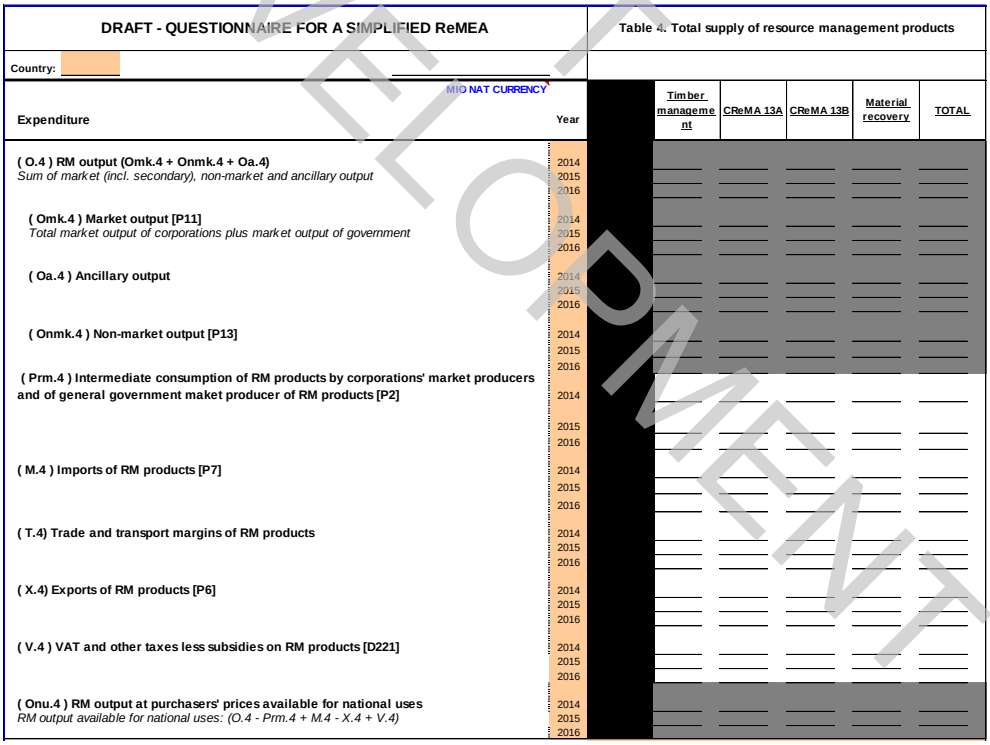
This information is required to calculate RM output at purchasers' prices available for national uses.

Table 4 allows also for the reporting of more detailed data for the full CReMA classes breakdown.

Main data sources for table 3 are national accounts - production and generation of income accounts (Table 3 of ESA transmission programme) and national accounts - supply and use tables (Tables 15 and 16 of ESA transmission programme).

The uses (intermediate consumption and gross capital formation and acquisition less disposals of non-financial, non-produced assets) of connected and resource efficient products can also be reported in the complete accounting part of the table. For resource efficient products only extra costs should be reported. These uses are to be sub-tracked for the calculation of RM expenditure.

Figure 4 : table 4 – Total supply of RM products



DRAFT - QUESTIONNAIRE FOR A SIMPLIFIED ReMEA		Table 4. Total supply of resource management products				
Country:						
	MIO NAT CURRENCY					
Expenditure	Year	Timber management	CReMA 13A	CReMA 13B	Material recovery	TOTAL
(O.4) RM output (Omk.4 + Onmk.4 + Oa.4) *Sum of market (incl. secondary), non-market and ancillary output*	2014 2015 2016					
(Omk.4) Market output [P11] *Total market output of corporations plus market output of government*	2014 2015 2016					
(Oa.4) Ancillary output	2014 2015 2016					
(Onmk.4) Non-market output [P13]	2014 2015 2016					
(Prm.4) Intermediate consumption of RM products by corporations' market producers and of general government maket producer of RM products [P2]	2014 2015 2016					
(M.4) Imports of RM products [P7]	2014 2015 2016					
(T.4) Trade and transport margins of RM products	2014 2015 2016					
(X.4) Exports of RM products [P6]	2014 2015 2016					
(V.4) VAT and other taxes less subsidies on RM products [D221]	2014 2015 2016					
(Onu.4) RM output at purchasers' prices available for national uses *RM output available for national uses: (O.4 - Prm.4 + M.4 - X.4 + V.4)*	2014 2015 2016					

TABLE 5: HOUSEHOLDS

In principle, the households 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 RM products by households is households' expenditure on RM products that are used for the direct satisfaction of individual needs (individual consumption).

Figure 5 : table 5 – Households

DRAFT - QUESTIONNAIRE FOR A SIMPLIFIED ReMEA		Table 5. Households					
Country:							
Expenditure (MIO NAT CURRENCY)	Year		Timber management	CReMA 13A	CReMA 13B	Material recovery	TOTAL
(F.5) Final consumption of RM products	2014						
	2015						
	2016						

Household expenditure includes all payments and fees for RM products purchased from the public sector (e.g. municipalities) or corporations of RM products.

Table 5 (full approach section) allows reporting the final consumption of connected and resource efficient goods. Only extra costs related to resource efficient goods are to be reported.

Table 5 allows also for the reporting of household RM expenditure for the full CReMA classes breakdown.

Main data sources for table 5 are supply and use tables which may provide final consumption expenditure of households for some RM products identified through CPA codes and household expenditure surveys. Depending on the country, items relating to the use of RM products may be separately provided by the source data or may be included in wider expenditure categories.

TABLE 6: RM TRANSFERS

Transfers allows for calculating national RM expenditure and for calculating the financing of RM expenditure. Table 6 allows for reporting transfers by institutional sectors. It asks for current and capital transfers paid and received by the general government and the rest of the world sectors. For households and corporations only current and capital transfers received are asked for.

Table 6 allows for the reporting of data for the transfers paid/received by the different institutional sectors for the full CReMA classes breakdown.

Table 6 allows also for the reporting of data for earmarked taxes paid by households and corporations in order to better understand the financing of RM expenditure.

Main source of data for transfers are COFOG figures included under national accounts – general government expenditure by function (COFOG) (Table 11 of ESA transmission programme).

Figure 6 : table 6 – RM transfers

DRAFT - QUESTIONNAIRE FOR A SIMPLIFIED ReMEA		Table 6. RM Transfers					
Country:							
Expenditure (MIO NAT CURRENCY)	Year		Timber management	CReMA 13A	CReMA 13B	Material recovery	TOTAL
(Tpg.6) General government: current and capital transfers paid *Paid to corporations, households and rest of the world*	2014 2015 2016						
(Trg.6) General government: current and capital transfers received *Received from rest of the world*	2014 2015 2016						
(Trc.6) Corporations: current and capital transfers received *Received from GG and rest of the world*	2014 2015 2016						
(Trh.6) Households: transfers received *Received from GG and rest of the world*	2014 2015 2016						
(Tpw.6) Rest of the world: current and capital transfers paid *Paid to GG, corporations and households*	2014 2015 2016						
(Trw.6) Rest of the world: current and capital transfers received *Received from GG*	2014 2015 2016						

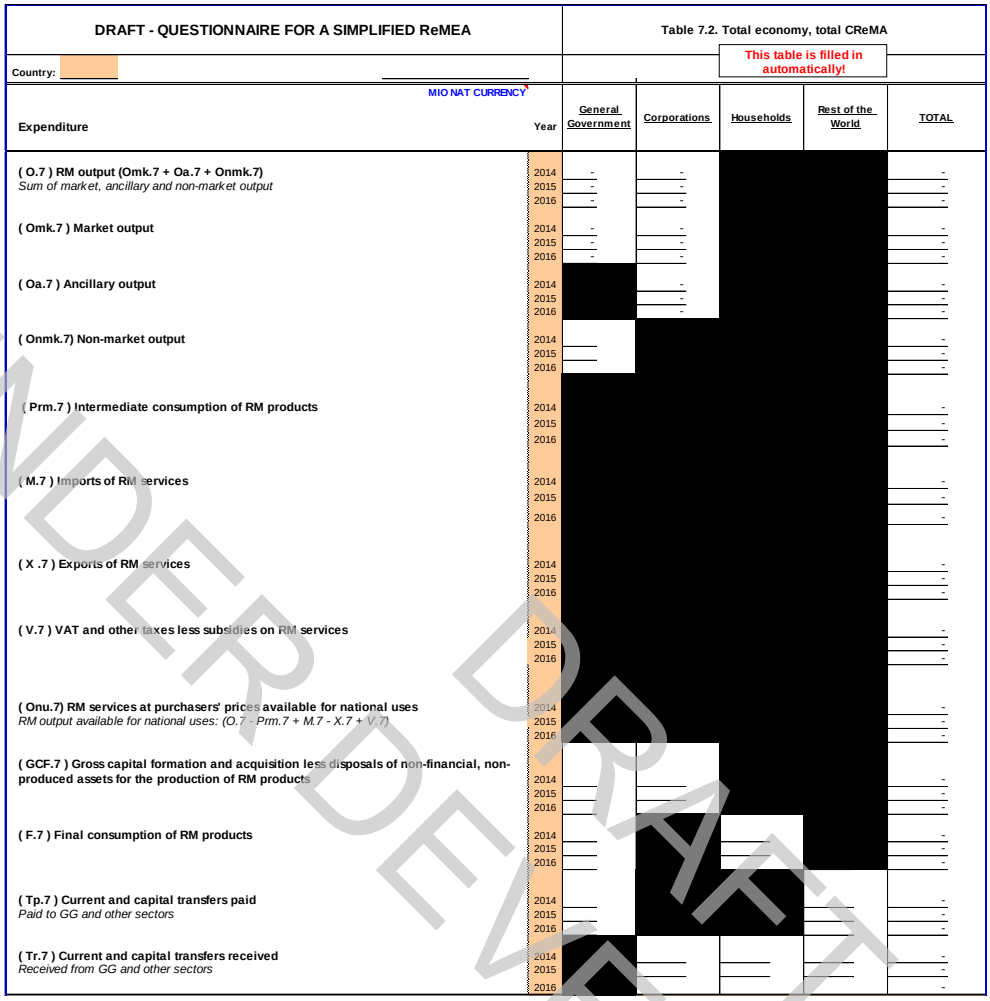
TABLE 7: TOTAL ECONOMY

Table 7 sums up the data filled in the mandatory tables. It is filled in automatically. Two versions of table 7 are currently available: table 7.1 sums up total economy by CReMA and table 7.2 sums up total economy by year (for the total of all resource domains).

Figure 7 : table 7.1 – Total economy by CReMA

DRAFT - QUESTIONNAIRE FOR A SIMPLIFIED ReMEA		Table 7.1 Total economy by CReMA				
Country:						
MIO NAT CURRENCY Expenditure	Year	Timber management	CReMA 13A	CReMA 13B	Material recovery	TOTAL
(O.7) RM output (Omk.7 + Oa.7 + Onmk.7) *Sum of market, ancillary and non-market output*	2014 2015 2016					
(Omk.7) Market output	2014 2015 2016					
(Oa.7) Ancillary output	2014 2015 2016					
(Onmk.7) Non-market output	2014 2015 2016					
(Prm.7) Intermediate consumption of RM products	2014 2015 2016					
(M.7) Imports of RM services	2014 2015 2016					
(X .7) Exports of RM services	2014 2015 2016					
(V.7) VAT and other taxes less subsidies on RM services	2014 2015 2016					
(Onu.7) RM services at purchasers' prices available for national uses *RM output available for national uses: (O.7 - Prm.7 + M.7 - X.7 + V.7)*	2014 2015 2016					
(GCF.7) Gross capital formation and acquisition less disposals of non-financial, non-produced assets for the production of RM products *(A) Investment expenditure*	2014 2015 2016					
(F.7) Final consumption of RM products	2014 2015 2016					
(Tp.7) Current and capital transfers paid *Paid to GG and other sectors*	2014 2015 2016					
(Tr.7) Current and capital transfers received *Received from GG and other sectors*	2014 2015 2016					

Figure 8 : table 7.2 – Total economy by institutional sector



DRAFT - QUESTIONNAIRE FOR A SIMPLIFIED ReMEA

Table 7.2. Total economy, total CReMA

This table is filled in automatically!

Country:

MIO NAT CURRENCY

Expenditure	Year	General Government	Corporations	Households	Rest of the World	TOTAL
(O.7) RM output (Omk.7 + Oa.7 + Onmk.7) *Sum of market, ancillary and non-market output*	2014	-	-			-
	2015	-	-			-
	2016	-	-			-
(Omk.7) Market output	2014	-	-			-
	2015	-	-			-
	2016	-	-			-
(Oa.7) Ancillary output	2014		-			-
	2015		-			-
	2016		-			-
(Onmk.7) Non-market output	2014					-
	2015					-
	2016					-
(Prm.7) Intermediate consumption of RM products	2014					-
	2015					-
	2016					-
(M.7) Imports of RM services	2014					-
	2015					-
	2016					-
(X .7) Exports of RM services	2014					-
	2015					-
	2016					-
(V.7) VAT and other taxes less subsidies on RM services	2014					-
	2015					-
	2016					-
(Onu.7) RM services at purchasers' prices available for national uses *RM output available for national uses: (O.7 - Prm.7 + M.7 - X.7 + V.7)*	2014					-
	2015					-
	2016					-
(GCF.7) Gross capital formation and acquisition less disposals of non-financial, non-produced assets for the production of RM products	2014					-
	2015					-
	2016					-
(F.7) Final consumption of RM products	2014					-
	2015					-
	2016					-
(Tp.7) Current and capital transfers paid *Paid to GG and other sectors*	2014					-
	2015					-
	2016					-
(Tr.7) Current and capital transfers received *Received from GG and other sectors*	2014					-
	2015					-
	2016					-

3.1. Possible sources for data compilation

Data needed for compiling the ReMEA simplified tables can be extracted from the following sources:

- Production and generation of income account, by branch and institutional sector;
- Supply and use tables, by branch and product;
- Investments, by branch and institutional sector;
- Full time equivalent job, by branch and institutional sector;
- COFOG statistics.

When these kinds of sources are available the tables can be easily filled in for those resource management producers which correspond entirely to a unique NACE category (or national sub-category) or to a specific and known share of a NACE category (or national sub-category). When this is not the case or the share of RM producers in a NACE is unknown, ad-hoc estimations methods are needed.

No direct data source is currently available for ancillary producers.

More detailed practical guidance on the compilation of data including sources of data, estimations methods and example of accounts compilation is presented in Part B of the statistical guide by resource domain.

PART B – COMPILATION GUIDE

This part of the statistical guide provides guidelines for the actual compilation of ReMEA. It gives a detailed description (taking into account priority domains) and an overview of the most important resource management activities including the main data sources.

For each resource domain, the description covers the following:

- purpose of the account
- data demand in the context of EU policy,
- physical data,
- concepts and definitions,
- producers and transactions
- data sources and compilation methods

As concerns the last aspect, only references to the ReMEA's framework are made, the framework itself is not presented. Therefore, readers are advised to refer to the framework and the tables in Chapter 3 of the draft statistical guide for a general view of the accounting approach.

This part of the statistical guide covers the resource domains which should be investigated with priority (timber management, renewable energy production, energy savings, and material recovery). Also water management is discussed. Nevertheless given the difficulties of establishing estimation methods for calculating the share of water management in the water supply industry, and also of separating water management from water related activities aimed at e.g. natural hazards management, the TF concluded that this area should be a low priority domain.

Table 2 below shows the relationship between the priority domains and CReMA classes and highlights differences.

Table 2 : Priority domains and CReMA

CReMA	Priority domains for ReMEA
10 Management of water	Not a priority domain
11A Management of forest areas	Management of timber resources
11B Minimisation of forest areas resources	Included in the material recovery account
12 Management of wild flora and fauna	Not a priority domain
13A Production of energy from renewable resources	Renewable energy account
13B Heat/energy saving and management	Energy saving account
13C Minimisation of the use of fossil energy as raw materials	Included in the material recovery account
14 Management of minerals	Included in the material recovery account
15 Research and development activities for RM	Not a priority domain
16 Other resource management activities	Not a priority domain

Management of water resources

Purpose of water management account

The purpose of the management of water resources account is to describe monetary flows related to water management within the ReMEA framework. In particular, the account provides a valuation of the production of water management related services in the economy and the national expenditure for the management of water resources (which can be compared to national accounts aggregates such as the GDP). It can also describe components of expenditure and financing and can link them for further analysis with corresponding physical data on water.

Being part of the ReMEA, the water management expenditure account excludes expenditure primarily aimed at preserving and/or restoring the quality of water. These expenditures are accounted for in the Environmental Protection Expenditure Accounts, in particular in the expenditure accounts on wastewater management, protection of soil and groundwater and protection of biodiversity and landscapes (e.g. restoration of water bodies, SERIEE 1994 § 4006). Expenditure related to distribution, collection and potabilisation of water should in theory not be accounted for in the water management account.

The separation between use of water, management of water, management of land and of natural hazards (flooding) and management of wastewater is practically difficult in a certain number of cases. In fact the units responsible for these activities often are the same (for example, agencies for water extraction, distribution and sewerage of wastewater) and outlays of these units often aim at and affect both management and use of water (for example investments of water supply units are directed to both reducing water mains losses and expanding the water mains).

Given the difficulties of establishing estimation methods for calculating the share of water management in the water supply industry and also of separating water management from water related activities aimed at e.g. natural hazards management (flooding), this area should be a low priority domain.

Data demand in the context of EU water policy

Water is an element with manifold and often competing functions posing the most acute management problems.

These problems are due both:

- to the increasing scarcity of this resource whose uses, while constantly augmenting, are also undergoing large-scale redistribution because of changes in life styles,
- to the deterioration of the quality of this resource due to pollution resulting from output and consumption activities.

It should be noted that in most cases water is not in the strict sense of the term consumed but is simply used for certain of its qualities and then discharged in the environment; theoretically it then becomes available again for other uses. However this occurs in the more or less long term and not always in the same point in space (and furthermore often water use generates a deterioration of its quality and can make it unfit for further use).

Water scarcity problems occur when the demand for water exceeds the amount available during a certain period. They occur frequently in areas with low rainfall and high population density, and in areas with intensive agricultural or industrial activity. Apart from water supply problems, overexploitation of water can lead to the drying out of natural areas particularly dependent on water, and to salt-water intrusion in aquifers.

The overall objective of the EU water policy is to ensure access to good quality water in sufficient quantity for all Europeans, and to ensure the good status of all water bodies across Europe. Policies and actions are set up in order to prevent and to mitigate water scarcity and drought situations, with the priority to move towards a water-efficient and water-saving economy.

All Member States have committed to achieving the Europe 2020 targets and have translated them into national targets and growth-enhancing policies. The Roadmap to a Resource Efficient Europe (COM (2011) 571) sets out a target concerning water abstraction: ‘by 2020, water abstraction stays, as a rule, below 20% of available renewable water resources’.

The document 'Analysis associated with the Roadmap to a Resource Efficient Europe' (European Commission Staff Working Paper, SEC (2011) 1067) mentions that water efficiency may be improved by nearly 40% through technological improvements alone.

The same document identifies a great potential for increasing the availability of water in basins through reuse and recycling of water through land use changes that restore water cycles. Leakage reduction programs and setting cost-effective targets for leakage reduction are also listed as potentially directing investment to where the costs/benefit ratio is strong.

The EU policy response to challenges on water resources and the water related milestone of the Resource efficiency Roadmap is the 'Blueprint to Safeguard Europe's Water Resources 'Resources'. It outlines actions that concentrate on better implementation of current water legislation and integration of water policy objectives into other policies.

Physical data on water resources

The OECD/Eurostat Joint Questionnaire on Inland Waters[16] constitutes the main source of data on water resources, water pollution as well as on treatment and disposal facilities.

Among the data collected, three tables are particularly interesting for water management accounts, as they deal with water resources. They are:

- Estimate of renewable water resources (Table 1)
- Annual abstraction of water by source and by sector (Table 2)
- Water consumption by supply type and by sector (Table 3)

A description of water statistics as well as links to data sources is available through the Statistics Explained article on water statistics[17].

Concepts and definitions of water management

The management of water resources covers all the activities and actions aiming at minimising the intake of water resources through in-process modifications as well as reuse, recycling, savings and the use of substitutes of water. Activities aiming at the replenishment of water stocks are included. All the activities and actions concerning measurement, control, laboratories and the like are also included as well as education, training and information and administration and regulation activities.

All the activities related to water pollution, water use and distribution, protection against flooding are not included in the management of water resources.

Water resources designate inland water, including both groundwater bodies and surface water such as lakes, rivers, artificial reservoirs, snow, and ice.

The distinctions generally made for the natural element water are:

- surface inland water or superficial water: watercourses, lakes and ponds, artificial reservoirs, etc.,
- subsurface inland water: ground water, deep water,
- sea water, including brackish water.

Water management characteristic activities designate any activity whose purpose is the management of water. Characteristic activities are always executed by production units of the national economy, either as principal or secondary activity, or as ancillary. The characteristic activities of the management of water resources can be classified in 5 groups:

Reduction of the intake of water resources through in-process modifications. These activities are related to the reduction of the water used as an input in the production process. They include all the kinds of replacement or adjustment of production processes aiming at reducing the water input needed for producing a certain output.

Reduction of water losses and leaks, water re-use. These activities include all actions aimed at saving water through reducing leaks and losses of water transport infrastructure. They include also all the activities for implementing water re-use.

Replenishment of water stocks. This activity increases water available in water stocks. The following activities are included: recharge of groundwater bodies to increase/restore water stocks; land improvement, development of vegetal cover in order to increase water infiltration and recharge phreatic water bodies. The recharge of groundwater bodies to increase/restore water stocks in order to improve water quality or fight salinity is to be

[16] A description of the questionnaire can be found at this address: http://rod.eionet.europa.eu/obligations/645 Available data can be accessed via the Eurostat's database using the code « env_nwat ».
[17] Available at : http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Water_statistics

included in the EPEA under CEPA 4.4. The activities of land improvement, development of vegetal cover in order to increase water infiltration and recharge phreatic water bodies for the protection of soil against erosion are classified in EPEA under the CEPA 4.3.

Measurement, control, laboratories and the like related to water resources. This group includes the measuring, controlling and monitoring of the level of water stocks. The following activities are excluded: measurement, monitor and control of the concentration of pollutants in wastewater and the quality of the inland water and marine water which are included in EPEA under CEPA 2.5; the measurement, monitor and control of the quality of surface and ground water which are included in EPEA under CEPA 4.5

Other activities for the management of water resources include regulation, administration, education, training and information activities specific to water management when they can be separated from other activities related to the same class and from similar activities related other classes. It includes for example: information campaigns to encourage water savings; release of licences for water abstraction; etc.

Producers and transactions related to water management

Producers of water management services execute a characteristic activity as their principal activity[18], as well as secondary or ancillary. They can be found in many NACE classes (as no NACE class exists for this kind of activities). So far the current experience of Member Countries (gathered by the work of the TF ReMEA) shows that producers of water management services can be found in the following NACE Rev. 2 divisions (some examples of characteristic activities are also given for each NACE):

01.61 –Agricultural support activities for crop production: e.g. installation of water efficient irrigation systems, maintenance of agricultural irrigation equipment and facilities (reservoirs, canals, etc.).

36 – Water supply and distribution: the reduction of water leaks in water mains, e.g. maintenance of water mains activities.

37 – Wastewater management: wastewater management units could have some water supply secondary output. Thus they could perform the same water management services as NACE 36. Furthermore they could be engaged in some specific water management services, e.g. provision of recycled water from the treatment of wastewater.

71.12 - Engineering activities and related technical consultancy: e.g. water management projects, hydrologic surveying activities.

71.20 - Technical testing and analysis: activities related to monitoring water resources.

72.19 - Other research and experimental development on natural sciences and engineering: research and development services in the area of water management.

73 - Advertising and market research: advertising services for water saving.

74.90 - Other professional, scientific and technical activities n.e.c: consultancy in the field of water management.

84.12 - Regulation of the activities of providing health care, education, cultural services and other social services, excluding social security: public administration and regulation activities related to water (related to water management and not to water quality).

85.42 - Tertiary education: education services related to the management of water.

85.59 - Other education n.e.c.: education services related to the management of water.

94.99 - Activities of other membership organisations n.e.c: membership organisations in the field of water management.

Water is used as an input of production in many industrial sectors. Thus ancillary production of water management services can occur in many sectors. Nevertheless some sectors using large quantities of water should be also the most important in term of water management ancillary activities. The NACE categories where ancillary production of water management activities could be more important are the following:

A – Agriculture. Irrigation involves ancillary activities for the reduction of intake of water resources, reduction of losses, and reuse of water.

[18] The principal (or main) activity is identified as the activity which contributes most to the total value added of a unit under consideration. The principal activity so identified does not necessarily account for 50% or more of the unit's total value added.

B – Mining. Water is used in the production processes: these activities involve ancillary activities for the reduction of intake of water resources, reduction of losses, and reuse of water.

C - Manufacturing. Large quantities of water can be used the production processes (e.g. in the food, textile and chemical industries): these activities involve ancillary activities for the reduction of intake of water resources, reduction of losses, and reuse of water.

D - 35.1 -Production of electricity. Water is used in the production processes for cooling. These activities involve ancillary activities for the reduction of intake of water resources, reduction of losses, and reuse of water.

The description of the transactions related to water management fits into the general framework of the ReMEA. These transactions consist of transactions in products (supply and uses of water management services resulting from characteristic activities and gross capital formation for characteristic activities) and transfers.

The supply of water management consists of market output, non-market output and ancillary output:

- **Market output** mainly corresponds to that part of the water supply and distribution services related to water management which is not provided free by general government units to the community as a whole. Partial payments by beneficiaries of the water management products are also classified as market output. The fact that water management services are often integrated with water supply services and sewage-treatment services, in particular for billing, can pose problems for the identification of water management services. Also if taxes and charges are levied simultaneously (which occurs in a certain number of cases) valuation problems can arise.
- **Non-market output** consists mainly of management, administration services by general government units is valued by the cost (intermediate consumption, compensation of employees, fixed capital consumption and taxes on production) less any receipts (i.e. partial payments) related to the services rendered. This output is assumed to be collective consumption of general government. If any, non-market output of NPISHs is valued in the same way, but assumed to be actual final consumption of households.
- **Ancillary output** is the result of characteristic activities undertaken mainly by agriculture and industries in order to reduce the use of water. This output is valued by the cost that the unit which executes the activity bears in respect to the water management measures it takes: intermediate consumption, compensation of employees, consumption of fixed capital and taxes on production less subsidies. In order to avoid double counting, intermediate consumption of resource efficient and connected products, or intermediate consumption of market services for water management must be treated specifically. Ancillary output is assumed to be own intermediate consumption of units which produce it.

Gross capital formation related with water management activities corresponds to gross fixed capital formation and acquisitions less disposals of non-produced non-financial assets for characteristic activities: equipment for reducing the use of cooling water etc. The whole gross capital formation of producers whose principal activity is water management, as well as acquisitions less disposals of non-produced non-financial assets is considered. For producers whose water management activity is a secondary or ancillary activity, that part of gross capital formation for characteristic activities is considered.

Transfers in the water management domain either consist of specific taxes or subsidies, investment grants, other current or capital transfers in favour of water management. An analysis of transfers linked to water management is therefore required. A source for subsidies, investment grants, other current or capital transfers for water management will be the module on environmental subsidies and similar transfers which aims at providing data on a wide range of transfers for environmental protection and resource management.

Data sources and compilation methods for water management expenditure account

Data sources and compilation methods for water management expenditure account are described thereafter with a special focus on the variable and the breakdown of the ReMEA simplified tables described in chapter 3 of the draft statistical guide.

General government (table 1)

The first step is to identify the units of the general government institutional sector which execute water management characteristic activity as principal activity.

They mainly consist of specialised agencies, central or local services related to water management, i.e. responsible for administration and monitoring in this field (elaboration of regulations, issuance of permits, management of taxes, charges, grants, etc., measurement of water levels).

An economic analysis of the expenditure of these units as ascertained in the public accounts (general and local government budgets) has to be made. The nature of these units should be almost entirely non-market, which implies that one needs to calculate output from production costs.

In order to provide the data required for the establishment of the account, it is necessary to identify, or calculate:

- intermediate consumption, compensation of employees, taxes on production,
- consumption of fixed capital,
- gross capital formation,
- final consumption expenditure,
- and transfers made or received (table 6).

Intermediate consumption, compensation of employees, taxes on production, capital expenditure, final consumption expenditure and net taxes on production for water management can be derived from general government expenditure data (COFOG 06.3 water supply).

The separation of water management from water extraction and distribution could either be done through a detailed budget analysis either through appropriate estimations techniques (see the example of Italy thereafter). These estimations techniques should use as a starting point COFOG statistics and in particular COFOG 06.3 (water supply).

The estimation of the consumption of fixed capital implies an assessment of the fixed capital stock used for water management activities. Different estimation methods can be used (see Eurostat (2002), EPEA compilation guide, p. 63[19]).

Although not required in the simplified ReMEA accounting framework, taxes related with water management, if available, are used in order to establish the financing table and to calculate environment-related financial burden by institutional sector and industry.

Water management charges, or taxes related with water management (if any/if available) are collected by general government units (central government, local governments or specialised agencies). An analysis of these receipts is necessary to ascertain which units (corporations, households) pay these taxes and charges and to which uses the funds are allocated to (subsidies, investment grants by industries, etc.). Environmental taxes by economic activities (as defined by the Regulation 691/2011[20]) could provide useful information on such taxes, which are recorded under resource taxes.

Although the institutional units classified in the general government (S.13) are non-market producers, they may have some secondary market output of water management services which is also to be reported in table 1. In countries where the national accounts data by industries and the supply and use tables are not based on institutional units but on the more detailed local kind-of-activity units (KAUs), it is possible that some units (KAUs) belonging to the general government sector are classified in NACE Rev. 2 division 36. In that case some care is needed when completing the tables 1 (general government) and 3 (corporations) to make sure that the data for all units belonging to the sector general government are recorded in table 1.

Corporations

Most of the transactions of corporations concern either the production of market products, generally as secondary producers, or water management activities executed as ancillary.

Secondary output

Since most secondary production are done by water supply (NACE 36) and wastewater management producers (NACE 37), data about this category are generally to be estimated from data on corporations available in existing statistics.

[19] http://epp.eurostat.ec.europa.eu/portal/page/portal/environmental_accounts/documents/6.pdf
[20] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2011:192:0001:0016:EN:PDF

NACE 36

The ideal option would be to establish estimation methods for the separation of water management activities from water use activities (extraction and distribution). These methods could be based on detailed information from:

- water resource efficiency policies review. These sources often offer data on current and capital expenditure needed or spent during a certain period of time for reducing water losses and/or reducing water abstraction;
- detailed studies of the water supply sector. These sources offer a detailed overview of the financial structure of enterprises in the water supply sector. They could offer also data on the length of new water mains as well as the length of mains which have gone some maintenance works;
- analysis of water use efficiency (e.g. leakages of water mains) data. These sources give the amount of water which is lost during the distribution phase.

Estimation methods could be based also on available data on the water supply sector from the national accounts. Water management could be for example approximated by the consumption of fixed capital of water supply activities. Representing the amount of fixed assets used up, during the period under consideration, as a result of normal wear and tear and foreseeable obsolescence, consumption of fixed capital could be an approximation of the (capital) expenditure for maintenance of water mains.

Relationship between NACE 36 and management of water

Estimations for France (Greffet, Mauroux, Ralle, & Randriambololona, 2012) show that, in terms of employment, the production and distribution is five times higher than the water resource management domain[21].

NACE 37

NACE 37 includes all the units producing wastewater management services. Some of the units recorded under NACE 37 have water supply as secondary output. According to the experience gathered so far by the TF ReMEA, water supply of NACE 37 units is mainly related to the provision of non-potable water, i.e. water from the operation of wastewater treatment units[22]. Thus this secondary water management output could be considered entirely a water management activity.

Ancillary activities (table 2)

As concerns the current and capital expenditure for water management deriving from ancillary activities, they can be valued by estimations based on studies on water efficiency measures in industry or by means of specific surveys or through estimations technique based on physical data (e.g. the water used as input, wastewater produced, etc.).

Households (table 5)

Unfortunately no direct source of data on final expenditure of households for water management services exists. Thus two ways for estimating it can be followed. The first one is the derivation of final expenditure of households for water management from existing data on household expenditure (for example COICOP). Statistical surveys on household expenditure for final consumption provide data about consumption of water supply services either aggregated or not with waste water sewerage and treatment services. Estimation techniques are needed for calculating the part of this expenditure related to water management.

The second one is the derivation of final consumption for water management from output. This method implies to estimate the uses of water management output. For example, if one assumes that all non-market output is used for collective consumption and that secondary output from NACE 37 is used by corporations, water management output from NACE 36 could be allocated to uses using supply and use table (i.e. the uses of NACE 36 output). More precise estimation could be obtained using specific surveys and studies on the use of water and from physical statistics on water.

[21] See Eurostat (2013), Practical guide towards compiling EGSS statistics, pp. 27-29.
[22] Furthermore it is unlikely that this water supply service refers to the extraction of water, since if data are based on LKAUs, extraction activities are likely to be treated as separate statistical units (given the different technical processes behind wastewater treatment and water extraction).

Transfers (table 6)

The main source of data for transfers is COFOG 06.3 (water supply) figures included under national accounts – general government expenditure by function (COFOG) (Table 11 of ESA transmission programme). Unfortunately COFOG figures do not distinguish the sector receiving the transfers and do not give details on the part of COFOG 06.3 for water management. Thus detailed budget analysis or appropriate estimations methods are needed (see the case of general government's non market output above).

An example of water management account compilation

Italy compiles regularly the resource use and management account for water resources. The following paragraphs describe Italy's methodology.

The production of water management activities

General government

Some producers of water management services are found in NACE rev.1.1[23] division 75, in particular national NACE subcategory 75.12.3 - Regulation of the activities of agencies that provide management of projects related to housing, land use and environmental protection. Since not all units classified in this NACE subcategory are producers with principal activity of water management services, an estimation method is used to calculate the share of water management producers.

A coefficient derived from national account COFOG data classified by ESA95 code and national NACE subcategory (5-digit) has been adopted. The coefficient has been calculated as the share of compensation of employees (D1) and intermediate consumption (P2) expenditures devoted by central and local general government units classified in national NACE subcategory 75.12.3 to function 06.3.1 (water supply). This estimation method assumes that all water related activities in NACE 75.12.3 are related to water management.

Other general government producers of water management services are found in in the NACE rev. 1.1 division 41 (collection purification and distribution of water). Then a breakdown between water management and water use is done in the following way:

- production costs related to non-market production are attributed to water management services (no estimation procedure is needed). The rationale behind this choice is the fact that most administrative activities in the water supply domain are related to e.g. release of licences for water abstraction, controlling and monitoring of the activity of water supply units and thus can be labelled as water management activities[24].
- production costs related to market production are distributed between water use and water management services on the basis of a coefficient derived from general government expenditure data (in particular transfers) cross-classified by ESA95 code and by CEPA and CRUMA (which distinguishes between water management and water use) through budget analysis.

NPISH

Producers (and production costs) of the NPISH sector in NACE rev. 1.1 division 41 are entirely attributed to water management services.

Corporations

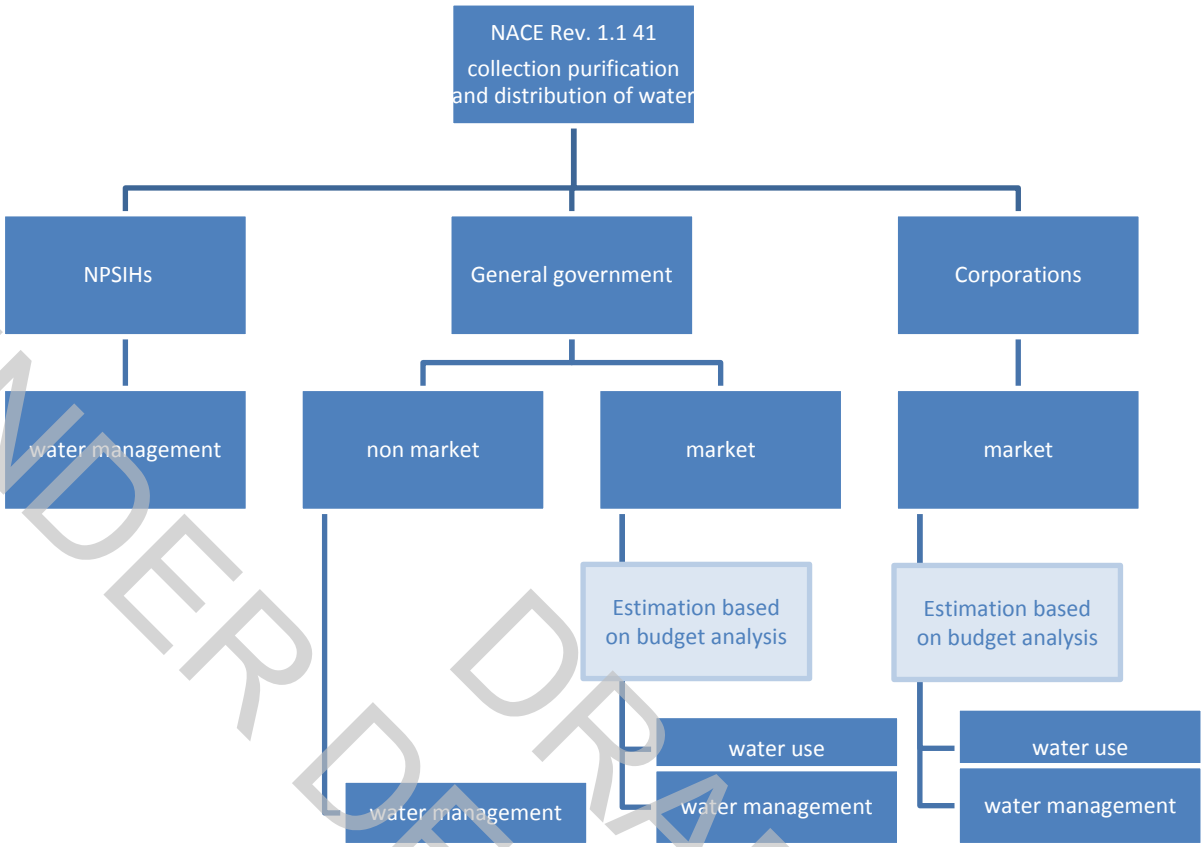
With regards to corporations sector, production costs of unit in NACE rev. 1.1 division 41 need to be allocated to water management or water resources. A coefficient derived from general government expenditures data cross-classified by ESA95 code and by CEPA and CRUMA through budget analysis is used.

Secondary production of collected and purified water, distribution services of water are mainly found under NACE rev. 1.1 01 (agriculture) and 90 (sewerage). On the basis of qualitative knowledge of the Italian context, this production is entirely considered as water management.

With regards to gross fixed capital formation (GFCF), the main source are National accounts basic data related to GFCF broken down by NACE division and institutional sector (general government and corporations).

[23] All the examples below from Italy are based on the NACE rev. 1.1 classification.
[24] Furthermore since capital expenditure is not very important for administrative activities, the magnitude of the error when including all administrative activities of water supply in water management should be small.

Figure 9: Estimation of water management output of NACE rev. 1.1 41 producers



With regards to labour inputs, the main source of data are National accounts basic data related to labour inputs (in full time equivalent) broken down by national NACE sub-category (5-digit) and institutional sector (general government, NPISHs and corporations).

For NACE 41 units and secondary production from NACE 01 and 90 total values of GFCF and labour inputs available for each institutional sector are broken down between water management and water use on the basis of the distribution of output.

For NACE 75.12.3 the share of GFCF and labour inputs to be attributed to water management is calculated on the basis of the coefficient used for estimation of production costs (i.e. coefficient derived from national account COFOG data classified by ESA95 code and national NACE subcategory (5-digit)).

No data for ancillary production of water management activities are available in Italy so far.

Supply and use of water management activities

Total values of import and export related to NACE 41 derived from supply and use tables are distributed between water management and water use on the basis of the coefficient used for the distribution of production cost (i.e. coefficient derived from general government expenditures data cross-classified by ESA95 code and by CEPA and CRUMA through budget analysis). Imports for water resources and management services are negligible.

Net taxes values related to water resource services are distributed to water management and water use according to uses of these services.

National expenditure for water management

Italy developed a simplified version of SERIEE table A, which is filled in by using figures calculated in SERIEE table B and SERIEE table B1. Implicit subsidies are allocated to users according to the uses of output of general government, following the treatment suggested by the 2002 EPEA Compilation guide.

Italy does not collect data for connected and resource efficient products.

Management of timber resources

Purpose of timber resources management account

The purpose of the management of timber resources account is to describe monetary flows related to timber resources management within the ReMEA framework. In particular, the account provides a valuation of the production of timber management related services in the economy and the national expenditure for the management of timber resources (which can be compared to national accounts aggregates like GDP). It can also describe components of expenditure and financing and can link them for further analysis with corresponding physical data on timber.

The scope of this account has been restricted with respect to the definition given in the CReMA as it was decided to restrict focus on timber resources management and not all the forest area.

Traditionally, sustainable forest management meant to secure the supply of timber i.e. to maintain the quantitative balance between natural growth and timber. However, increasingly the focus has turned to issues of sustainable forest ecosystem management. This implies the protection of forest ecosystems so as to preserve different functions.

Being part of the ReMEA, the timber management expenditure account excludes expenditure primarily aimed to air emissions reduction (e.g. forests as carbon sinks), soil protection against erosion and the protection of biodiversity. In fact the activities of land improvement, development of vegetal cover in order to increase water infiltration and recharge phreatic water bodies if they are for the protection of soil against erosion they are accounted for in the Environmental Protection Expenditure Accounts, in particular in the expenditure accounts on soil and groundwater protection (CEPA 4). Activities to protect forest habitats or the biodiversity of flora and fauna species living in forest areas and measurement, controlling and monitoring activities related to the protection of biodiversity and landscape like e.g. inventories of flora and fauna species living in natural forest areas are excluded from ReMEA and fall under protection of biodiversity expenditure account (CEPA 6).

Data demand in the context of EU forest policy

The management of timber account is one of the parts of the larger system of economic and environmental accounting developed for forests. Aimed at producing data on the expenditure for the minimisation of the intake of forest resources, the management of timber account is well suited for monitoring the efforts society puts in reducing its pressures on forests and allowing for a more sustainable use of forests.

For a long time, nations have recognized the important roles of their forests as a vital economic, environmental, social and cultural asset.

Although the Treaties for the European Union make no provision for a common forest policy, there is a long history of EU measures supporting certain forest-related activities, coordinated with Member States mainly through the Standing Forestry Committee.

The EU Forestry Strategy adopted in 1998 puts forward as its overall principles the application of sustainable forest management and the multifunctional role of forests. The Strategy was reviewed in 2005, and the Commission presented an EU Forest Action Plan in 2006. The Action Plan focuses on four main objectives:

- to improve long-term competitiveness
- to improve and protect the environment
- to contribute to the quality of life; and
- to foster coordination and communication.

Forests are affected by a broad array of EU policies and initiatives arising from diverse EU sectoral policies. For several decades now, environmental forest functions have attracted increasing attention mainly in relation to the protection of biodiversity and, more recently, in the context of climate change impacts, energy policies and resource efficiency. In public perception, apart from the traditional production of wood and other forest products, forests are increasingly valued for their role as public amenities, biodiversity reservoirs, regulators of climate and local weather, sources of clean water, protection against natural disasters and renewable energy sources.

In March 2010 the European Commission adopted a Green paper 'on forest protection and information in the EU: preparing forests for climate change' (COM (2010) 66 final)[25] as part of a broader discussion about adapting

[25] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:0066:FIN:EN:PDF

to climate change. The paper aimed to stimulate debate concerning the way climate change modifies the terms of forest management and protection, and how EU policy should develop as a consequence.

In April 2011 a decision was taken to organise a review of the forestry strategy; an ex-post evaluation of the strategy was conducted in 2012. The review may lead to the establishment of targets and indicators to measure progress in the forestry sector. Equally, the common agricultural policy (CAP) is due to be reformed by 2013; this review may also have consequences for forestry policy in terms of changes to rural development policy.

Physical data on timber resources

Eurostat produces yearly timber related data using two questionnaires:

- The Joint Forest Sector Questionnaire (JFSQ)[26] on production and trade in wood and wood products. The JFSQ is part of a worldwide exercise in which Eurostat is responsible for the EU and EFTA countries.
- Integrated environmental and economic accounting for forests (IEEAF)[27]; countries are currently providing data on economic accounts for forestry and logging. IEEAF is part of a Eurostat environmental satellite accounts initiative that started in the late 1990s.

The JFSQ is the main source of classical supply balances for wood products. Data are available in the forestry section of Eurostat online database.

Eurostat pocketbook "Forestry in the EU and the world"[28] presents the forest related available data which cover various aspects of forests, including the activities of forestry, logging and wood-based manufacturing, as well as trade in wood and wood products, and finally the use of wood as a renewable source of energy.

Concepts and definitions of timber management

Forest supply the economy with wood, a wide range of forest related products and a large array of ecosystem (regulating water supplies, buffering floods and droughts, mitigating the adverse effects of GHG emissions, and harbouring biodiversity) and recreational services. Forests are a renewable resource, subject to depletion and degradation if the use or extraction of goods and services is above the sustainable yield.

The following definitions and classifications of forest land of the FAO Forest Resource Assessment (2010)[29] have been adopted by the SEEA (2012).

Forest land is defined as land spanning more than 0.5 hectares with trees higher than 5 metres and a canopy cover of more than 10 per cent, or trees able to reach these thresholds in situ.

Forest land is classified according to different types of forest. The primary distinction is between naturally regenerated forest and planted forest:

- Naturally regenerated forest is forest predominantly[30] composed of trees established through natural regeneration. Two broad types of naturally regenerated forest are distinguished:
    - Primary forest is naturally regenerated forest of native species, where there are no clearly visible indications of human activities and the ecological processes are not significantly disturbed. Key characteristics of primary forests are that (a) they show natural forest dynamics, such as natural tree species composition, occurrence of dead wood, natural age structure and natural regeneration processes; (b) the area is large enough to maintain its natural characteristics; and (c) there has been no known significant human intervention or the last significant human intervention was long enough ago to have allowed the natural species composition and processes to have become re-established.
    - Other naturally regenerated forest is naturally regenerated forest with clearly visible indications of human activities. These include (a) selectively logged-over areas, areas

[26] https://circabc.europa.eu/w/browse/8128a279-9c86-4750-a82a-54c160fed6cc
[27] http://epp.eurostat.ec.europa.eu/portal/page/portal/product_details/publication?p_product_code=KS-BE-02-003
[28] http://epp.eurostat.ec.europa.eu/portal/page/portal/product_details/publication?p_product_code=KS-31-11-137
[29] The FAO working paper 144/E, Global forest resources assessment 2010, Terms and definitions, 2010 contains a detailed description of definitions used in the forest related domains.
[30] In this context, predominantly means that the trees established through natural regeneration are expected to constitute more than 50% of the growing stock at maturity.

regenerating following agricultural land use and areas recovering from human-induced fires, etc.; (b) forests where it is not possible to distinguish whether they are planted or naturally regenerated; (c) forests with a mix of naturally regenerated trees and planted/seeded trees and where the naturally regenerated trees are expected to constitute more than 50% of the growing stock at stand maturity; (d) coppice from trees established through natural regeneration; and (e) naturally regenerated trees of introduced species.

- Planted forests are predominantly[31] composed of trees established through planting and/or deliberate seeding.

Based to the experience gathered so far by the TF ReMEA, it seems practical:

1. to focus on timber resources and not on the products/functions of forest areas and
2. not to reduce the scope of timber management activities to e.g. only naturally regenerated forest. Thus the scope of the timber management account will include naturally regenerated forest and planted forest.

Timber management characteristic activities are any activities whose purpose is the reduction of the intake of timber resources. In principle, this covers all the activities and actions aiming at minimising the intake of timber through in-process modifications as well as recovery, reuse, recycling, savings and the use of substitutes of timber. Also replenishment activities like reforestation and afforestation and all the activities and actions concerning measurement, control, laboratories and the like as well as education, training, information, administration and regulation activities are included. For practical reasons, however, the scope of the account has been restricted to the characteristic activities covered by CReMA 11A (management of forest areas). Activities related the recycling and reuse of timber products (including paper) are taken into account in the recycling account. They can be added to timber management account when they can be singled out from the recycling and reuse activities.

Characteristic activities are always executed by production units of the national economy, either as principal or secondary activity, or as ancillary.

The characteristic activities of the management of timber resources can be classified in 6 groups:

Reduction of the intake of timber resources through in-process modifications. These activities are related to the reduction of the timber materials used as an input in the production process. They include all the kinds of replacement or adjustment of production processes aiming at reducing the timber materials input needed for producing a certain output. These activities are mainly carried on as ancillary activities.

Recycling/reuse. These activities are related to the production of secondary raw materials from wood and paper waste. For more information please refer to the recycling account. Whenever is possible to single out from the recycling account, the data on recycling of timber materials (wood and paper), these data should be moved to the timber management account.

Forest fires. Prevention and control of forest fires. It includes for example: development of fireballs, mobilisation of fire fighting means or measures aimed at the prevention of fires in forest areas[32].

Reforestation and afforestation. This activity increases timber resources. It consists of replenishment of existing wooded areas or development of new wooded areas.

Measurement, control, laboratories and the like related to timber resources. This group includes activities aimed at measuring, controlling and monitoring the use and the consistency of timber resource stocks. It includes for example inventories and assessments. It includes also control of pest and disease which might cause forest to die off. Measurement, controlling and monitoring activities related to the protection of biodiversity and landscape are excluded like e.g. inventories of flora and fauna species living in natural forest areas which are included in the EPEA (CEPA 6.1) and census of natural forest protected areas, included in EPEA (CEPA 6.2).

Other activities for the management of timber resources include all other activities and measures aimed at the use and management of timber resources. It includes regulation, administration, education, training and information activities specific to the class when they can be separated from other activities related to the same class and from similar activities related other classes. It includes for example: the release of logging licences;

[31] Planted/seeded trees are expected to constitute more than 50% of the growing stock at maturity, including coppice from trees that were originally planted or seeded.

[32] Prevention and control of forest fires is included because it is aimed at maintaining the stock of the resource, which is not the case of most of natural hazard expenditures.

general government units or part thereof which administrate and regulate the use of timber resources or are responsible for forest management policies.

Producers and transactions related to timber management

Producers of timber management services execute a characteristic activity as their principal activity[33], as well as secondary or ancillary.

Producers of timber management services which execute a characteristic activity as their principal activity are in the following NACE Rev. 02 divisions (some examples of characteristic activities are also given for each NACE):

02.1 – Silviculture and other forestry activities: planting, replanting, transplanting, thinning and conserving of forests.

02.4 - Support services to forestry: forestry inventories, forest management consulting services; timber evaluation; forest fire fighting and protection; forest pest control.

Producers of forest management activities can be found also in the following NACE divisions:

01 – Agriculture

72.19 - Other research and experimental development on natural sciences and engineering: research and development services in the area of timber management.

84.12 - Regulation of the activities of providing health care, education, cultural services and other social services, excluding social security: public administration and regulation activities related to forests.

85.42 - Tertiary education: education services related to the management of timber.

85.59 - Other education n.e.c.: education services related to the management of timber.

94.99 - Activities of other membership organisations n.e.c: membership organisations in the field of timber management.

Wood is used as an input of production in some industrial sectors. The NACE category where ancillary production of management of timber activities (activities are related to the reduction of the forest related materials used as an input in the production process) could be more important are NACE 02.2 – Logging, NACE 16 – Manufacture of wood products, NACE 17- Manufacture of paper, NACE 35.11 – Electricity production, in particular electricity produced from biomass (wood).

The description of the transactions related to timber management fits into the general framework of the ReMEA. These transactions consist of transactions in products (the supply and uses of timber management services resulting from characteristic activities and the gross capital formation for characteristic activities) and transfers.

The supply of timber management consists of market output, non-market output and ancillary output:

- **Market output** mainly corresponds to that part of the timber management which is not provided free by general government units to the community as a whole. Partial payments by beneficiaries of the timber management products are classified as market output.
- **Non market output** consists mainly of management, administration services by general government units is valued by the cost (intermediate consumption, compensation of employees, fixed capital consumption and taxes on production) less any receipts (i.e. partial payments) related to the services rendered. This output is assumed to be collective consumption of general government. If any, non-market output of NPISHs is valued in the same way, but assumed to be actual final consumption of households.
- **Ancillary output** is the result of characteristic activities undertaken mainly by industries in order to reduce the use of wood and wood related products as input to production. Examples of ancillary activities include the use of small-scale equipment and low-impact practices in logging operations, wood-saving manufacturing equipment (thin blades) and technologies (laser guides) and product developments that utilise smaller, lower-quality trees while improving the performance of engineered wood products, such as laminated beams and flooring. Ancillary output is valued by the cost that the

[33] The principal (or main) activity is identified as the activity which contributes most to the total value added of a unit under consideration. The principal activity so identified does not necessarily account for 50% or more of the unit's total value added.

unit which executes the activity bears in respect to the timber management measures it takes: intermediate consumption, compensation of employees, fixed capital consumption and taxes on production less subsidies. In order to avoid double counting, intermediate consumption of market services for timber management must be treated specifically. Ancillary output is assumed to be own intermediate consumption of units which produce it.

Gross capital formation related with timber management activities corresponds to gross fixed capital formation and acquisitions less disposals of non-produced non-financial assets for characteristic activities. The whole gross capital formation of producers whose principal activity is timber management, as well as acquisitions less disposals of non-produced non-financial assets is considered. For producers whose timber management activity is a secondary or ancillary activity, that part of gross capital formation for characteristic activities is considered.

Transfers in the timber management domain either consist of specific taxes or subsidies, investment grants, other current or capital transfers in favour of timber management. An analysis of transfers linked to timber management is therefore required. A source for subsidies, investment grants, other current or capital transfers for timber management will be the module on environmental subsidies and similar transfers which aims at providing data on a wide range of transfers for environmental protection and resource management.

Data sources and compilation methods for timber management expenditure account

Data sources and compilation methods for timber management expenditure account are described thereafter with a special focus on the variable and the breakdown of the ReMEA simplified tables described in chapter 3 of the draft statistical guide.

General government (table 1)

The first step is to identify the units of the general government institutional sector, i.e. those units which execute timber management characteristic activity as principal activity.

They mainly consist of specialised agencies, central or local services related to timber management, i.e. responsible for administration and monitoring in this field (elaboration of regulations, issuance of permits, management of taxes, charges, grants, etc., inventories, controlling, monitoring).

An economic analysis of the expenditure of these units as ascertained in the public accounts (general and local government budgets) has to be made. The nature of these units should be almost entirely non-market, which implies that one needs to calculate output from production costs.

In order to provide the data required for the establishment of the account, it is necessary to identify, or calculate:

- intermediate consumption, compensation of employees, taxes on production,
- consumption of fixed capital,
- gross capital formation,
- final consumption expenditure,
- the transfers they may pay out or benefit from (table 6).

Intermediate consumption, compensation of employees, taxes on production, gross capital formation final consumption expenditure and net taxes on production for timber management can be derived from general government expenditure data (COFOG 04.22 forestry).

COFOG 04.22 Forestry includes:

Administration of forestry affairs and services; conservation, extension and rationalized exploitation of forest reserves; supervision and regulation of forest operations and issuance of tree-felling licenses; operation or support of reforestation work, pest and disease control, forest fire-fighting and fire prevention services and extension services to forest operators; production and dissemination of general information, technical documentation and statistics on forestry affairs and services; grants, loans or subsidies to support commercial forest activities.

It can be assumed that all COFOG 04.22 activities are relevant for the timber management account.

The valuation of fixed capital consumption implies an assessment of the fixed capital stock used for timber management activities. Different estimation methods can be used (see Eurostat (2002), EPEA compilation guide, p. 63[34]).

Although not required in the simplified ReMEA accounting framework, taxes related with timber management, if available, are used to establish the financing table and to calculate environment-related financial burden by institutional sector and industry.

Timber management charges, or taxes related with timber management (if any/if available) are collected by general government units (central government, local governments or specialised agencies). An analysis of these receipts is necessary to ascertain which units (corporations, households) pay these taxes and charges and to which uses the funds are allocated to (subsidies, investment grants by industries, etc.). Environmental taxes by economic activities (as defined by the Regulation 691/2011[35]) could provide useful information on such taxes, which are recorded under resource taxes.

Although the institutional units classified in the general government (S.13) are non-market producers, they may have some secondary market output of timber management services which is also to be reported in table 1.

Corporations

Most of the transactions of corporations concern either the production of market products, or timber management activities executed as ancillary (e.g. replacement or adjustment of production processes aiming at reducing the timber related materials input needed for producing a certain output).

Market producers (table 3)

NACE 02.1 and 02.4 can be considered entirely in the scope of RM.

NACE 02.1 - Silviculture and other forestry activities includes afforestation and reforestation activities (planting, replanting, transplanting of forests). It includes also operations related to thinning and conserving of timber resources. Although these operations are not directly reducing the intake of timber resources, they allow for correct management of forests: for example thinning of forests allow for having a better quality of timber, which in turn reduce the need for more wood.

NACE 02.4 - Support services to forestry includes forestry inventories, forest management consulting services; timber evaluation; forest fire fighting and protection; forest pest control. All these activities are included in the management of timber account.

Data on NACE 02 are available through the national accounts database.

Secondary production could occur in NACE 01 – Agriculture, and NACE 15 – manufacturing of food products. Supply and use tables can give the total for CPA 02 – forestry products supplied by these NACEs and then a ratio based to NACE 02 detailed data could be used to separate silviculture and other forestry activities and support services to forestry from logging.

When no data from NACE 4 digits divisions are available from the National Accounts, other sources as the employment statistics can be useful to build ratios for estimating the part of NACEs 02.1 and 02.4 from NA data. In fact enterprises in the forestry sector are often involved in all the activities described in NACE 02 (including logging which is not a characteristic activity) and the separation of NACE 02.1 and 02.4 activities is only possible by analysing e.g. the costs of forestry producers. Integrated Environmental and Economic Accounting for Forests (IEEAF) data can also be used as a source for estimation of timber management output.

Ancillary activities (table 2)

As concerns the current and capital expenditure for timber management deriving from ancillary activities, they can be valued by estimations based on studies on resource efficiency of e.g. NACE 16 or by means of specific surveys or through estimations technique based on physical data (e.g. the wooden materials used as input, etc.).

Households (table 5)

Households can be owners of forests and then buy timber management services.

Transfers (table 6)

[34] http://epp.eurostat.ec.europa.eu/portal/page/portal/environmental_accounts/documents/6.pdf
[35] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2011:192:0001:0016:EN:PDF

The main source of data for transfers is government's budgets. If there is no possibility of a detailed analysis of budget lines related to timber management, one could use COFOG 04.22 (forestry) figures included under national accounts – general government expenditure by function (COFOG) (Table 11 of ESA transmission programme). COFOG figures do not distinguish the sector receiving the transfers; therefore detailed budget analysis is needed or appropriate estimations methods are to be used.

An example of timber management account compilation

Using available data on the Eurostat's database (Eurobase), the following paragraphs describes the way existing statistics can be used for compiling the timber management account.

The example refers to Germany and to the year 2008[36].

The main sources of data are national accounts' supply and use tables (NACE rev. 2) and data collected as part of Integrated Environmental and Economic Accounting for Forests (IEEAF). These data are in current basic prices and are compatible with National Accounts.

From the IEEAF the part of forestry output from other forestry services including tree planting for wood (which can be considered as a proxy for NACE 02.1 and NACE 02.4) has been calculated (13.4 %) and has been used to find the share of NACE 02 which can be considered as forest management.

Another way to calculate this share would be to use employment data broken down by NACE 4 digits.

From the supply table the total supply of forest management has been calculated as CPA 02 times the share from IEEAF. It amounted to 506 M euro in 2008.

Final consumption expenditure has been set equal to final consumption of CPA 02 times the IEEAF share.

Fixed capital formation is reported in the supply and use tables. Only fixed capital formation of NACE 02 (from the use table) times the IEEAF share has been taken into account (230 M euro). No attempt was made to estimate/calculate gross fixed capital formation.

Intermediate consumption of RM products by corporations' market producers has been approximated by the intermediate consumption of CPA 84 by NACE 02.

Supply and use tables report imports and exports. The hypothesis is that forest management services are not traded. Taxes less subsides from supply and use tables can be used for calculating total supply at purchasers' price. No attempt to estimate VAT has been performed so far. Trade and transport margins were set to 0.

No data on transfers are available. Only transfers already included in the calculation of output are included. Further advancement on this expenditure item is expected from the environmental subsidies and similar transfers module of environmental accounts.

General government output (36 M euro) comes from the SUT. It has been set equal to the administrative services (CPA 84 to Public administration and defence services; compulsory social security services) which enter the production of NACE 02. The hypothesis is that this output consists of services of specialised agencies related to timber management, and it is considered as non-market output.

[36] Figures are available on demand in a separate excel file.

Renewable energy

Purpose of renewable energy account

The purpose of the renewable energy account is to describe monetary flows related to renewable energy within the ReMEA framework (which is consistent with national accounts). In particular, the account provides a valuation of the production of renewable energy related activities in the economy and the national expenditure for renewable energy (which can be compared to national accounts aggregates like GDP). It can also describe components of expenditure and financing and can link them for further analysis with corresponding physical data on energy.

Renewable energy related activities could in principle be classified either as resource management activities either as part of environmental protection activities, CEPA 1 (Air protection) depending on their main purpose. Nevertheless for the purpose of the ReMEA, there is no need to separate between activities whose primary purpose is reducing the exploitation of non-renewable energy sources and activities mainly aimed at reducing air pollution. All renewable energy related activities should be accounted for in the renewable energy account. Attention should be paid when using data from the renewable energy account in combination with CEPA 1 data, which could include some renewable energy related expenditure, thus causing some double counting.

Data demand in the context of EU renewable energy policy

The Directive 2009/28/EC[37] on renewable energy, implemented by Member States by December 2010, sets ambitious targets for all Member States, such that the EU will reach a 20% share of energy from renewable sources by 2020 and a 10% share of renewable energy specifically in the transport sector[38].

More renewable energy will enable the EU to cut greenhouse emissions and make it less dependent on imported energy. And boosting the renewables industry will encourage technological innovation and employment in Europe.

The EU directive on the promotion of electricity produced from renewable energy sources (RES)[39] has established reference targets for the share of RES electricity in each EU Member State's power supply. To reach this goal every each EU country follows a different promotion strategy

The Directive 2009/28/EC also improves the legal framework for promoting renewable electricity, requires national action plans that establish pathways for the development of renewable energy sources including bioenergy, creates cooperation mechanisms to help achieve the targets cost effectively and establishes the sustainability criteria for biofuels.

On 31 January 2011, the European Commission (EC) presented its Communication (COM(2011) 31 final)[40] showing that the 2020 renewable energy policy goals are likely to be met and exceeded if Member States fully implement their national renewable energy action plans and if financing instruments are improved. It also stresses the need for further cooperation between Member States and a better integration of renewable energy into the single European market. Estimates indicate that such measures could lead to 10 billion Euros savings each year.

Article 4 of Directive 2009/28/EC on Renewable Energy requires Member States to submit national renewable energy Action Plans by 30 June 2010. These plans, to be prepared in accordance with the template published by the European Commission (EC), provide detailed roadmaps of how each Member State expects to reach its legally binding 2020 target for the share of renewable energy in their final energy consumption.

The primary production of renewable energy within the EU-27 in 2010 was 166.6 million tonnes of oil equivalent (toe) — a 20.1 % share of total primary energy production from all sources. The quantity of renewable energy produced within the EU-27 increased overall by 72.4 % between 2000 and 2010, equivalent to an average increase of 5.6 % per annum.

[37] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=Oj:L:2009:140:0016:0062:en:PDF

[38] On 17 October 2012, the Commission published a proposal to limit global land conversion for biofuel production, and raise the climate benefits of biofuels used in the EU. The use of food-based biofuels to meet the 10% renewable energy target of the Renewable Energy Directive will be limited to 5%

[39] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2001:283:0033:0040:EN:PDF

[40] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2011:0031:FIN:EN:PDF

The renewable energy account will allow for monitoring the efforts society puts in increasing the share of renewable energy in total primary energy production. This in turn contributes to the reduction of GHG emissions, thus mitigating the effects of climate change, but also encourages the development of one of the most important sector of the environmental industry.

Physical data on renewable energy

Eurostat produces regularly statistics on renewable energy (physical data).

In order to meet the increasing requirements of policy makers for energy monitoring, Eurostat has developed a coherent and harmonised system of energy statistics. Annual data collection covers the 28 Member States of the EU, the candidate countries of Turkey, and the European Economic Area countries of Iceland and Norway; time-series run back to 1985 for some countries, but are more generally available from 1990. As of October 2008, monthly and annual energy data collections are governed by Regulation (EC) No 1099/2008 on energy statistics[41].

Eurostat's energy statistics are available in the Energy ('nrg') section of Eurostat's online database[42].

The publication "Panorama of energy: energy statistics to support EU policies and solutions"[43] gives a detailed overview of available statistics on energy for the EU and its Members.

Concepts and definitions of renewable energy

Renewable energy refers to the production of energy from renewable sources but includes also general administration activities as well as R&D activities related to renewable energy.

All kinds of renewable sources of energy are included according to the International Energy Agency definition of renewable, i.e. hydropower (no matter of the scale), solar, wind, tidal, biogas, geothermal or biomass sources as well as the production of energy from the combustion of any kind of waste (the incineration of waste carried out for the main purpose of waste treatment and disposal is excluded as they are classified under CEPA 3.3 or 3.4)[44].

With regard to the production boundary of the ReMEA, biofuel production should be included since production of all sorts of final forms of energy should be accounted for. The production of biomass (wood etc.) for energy use should be excluded as this is not the final energy form.

Renewable energy characteristic activity designates any activity whose purpose is the management of renewable energy. Characteristic activities are always executed by production units of the national economy, either as principal or secondary activity, or as ancillary activity.

The characteristic activities of the renewable energy account can be classified in 4 groups:

Production of electricity and heat from renewable sources, as for example production of electricity from wind, production of heat from geothermal sources (either for industrial uses or for heating of dwellings), etc. With regards to biomass the renewable energy account focuses on the production of electricity and heat from biomass, as for example the production of electricity from biogas and wood, and the production of biofuels to be used for transport. The production of biomass (wood etc.) for energy use should be excluded.

Measurement, control, laboratories and the like related to renewable energy. This group includes activities aimed at measuring, controlling and monitoring the production of renewable energy. It includes for example inventories and assessments of renewable energy potentials.

Other activities for renewable energy management include all other activities and measures aimed at the management of renewable energy. It includes regulation, administration, education, training and information activities specific to renewable energy when they can be separated from other activities related to the same RM class and from similar activities related other RM classes. It includes for example administration activities of the

[41] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:304:0001:0001:EN:PDF
[42] http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database
[43] http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-GH-09-001/EN/KS-GH-09-001-EN.PDF
[44] The definition of the Directive Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources is coherent with the IEA's definition. The directive states that: « "energy from renewable sources" means energy from renewable non-fossil sources, namely wind, solar, aero thermal, geothermal, hydrothermal and ocean energy, hydropower, biomass, landfill gas, sewage treatment plant gas and biogases ». http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:140:0016:01:EN:HTML

government related to renewable energy, as for example planning of sites for windmills implantation, release of licences for building solar plants, etc.

Research and development activities for renewable energy.

Producers and transactions related to renewable energy

Most of the characteristic activities for renewable energy management are carried on by producers of energy, producers of consulting, education and administrative services.

Producers of renewable energy management can be found mainly in the following NACE Rev. 2 divisions (some examples of characteristic activities are also given for each NACE):

35.11 – Production of electricity: production of electricity from renewable sources.

35.30 – Steam and air conditioning supply: production of steam from renewable sources.

72.19 - Other research and experimental development on natural sciences and engineering: research and development services in the area of renewable energy.

84.12 - Regulation of the activities of providing health care, education, cultural services and other social services, excluding social security: public administration and regulation activities related to renewable energy which could be included under protection of the environment.

84.13 - Regulation of and contribution to more efficient operation of businesses: public administration and regulation activities related to renewable energy.

85.42 - Tertiary education: education services related to renewable energy management.

85.59 - Other education n.e.c.: education services related to renewable energy management.

Renewable energy production is largely decentralised. This means that most of the renewable energy is produced by many producers at many locations, which is not the case for fossil energy production where key parts of the production (e.g. conventional power stations) are localised.

This is reflected by the fact that producers of renewable energy could be found in principle in many NACEs sections.

Secondary and ancillary production of renewable energy

TF members were asked to investigate with their national accountants the issue of the implementation of NACE Rev. 2 guidelines in national accounts for the treatment of secondary production of energy from renewable sources, in particular electricity, gas, steam and hot water from renewable sources (within CPA 35). The result showed mixed results as there are some countries recording secondary production of CPA 35 in NACE divisions other than NACE 35. In the Netherlands, energy from renewable sources (as part of CPA 35) is mainly produced by wind turbines and biogas plants. Production of energy from renewable sources is carried out by agriculture, horticulture and waste treatment activities as a secondary activity.

According to the guidelines of NACE, renewable energy production of enterprises for auto consumption (ancillary activity) should be accounted for in NACE 35 when there is enough information for splitting this activity from the principal activity. It is not clear to what extent this rule is followed in the countries. It is likely to be the case for large power plants of e.g. chemical companies. However, there are also many companies, etc. which generate electricity from photovoltaic installations.

Household production of renewable energy

In contrast with fossil energy production, households can play a major role in renewable energy production.

Household production of renewable electricity should be treated following the national accounts rules. In principle, when the household is connected to the grid, it should be treated as unincorporated enterprise and accounted for in NACE 35. According to this rule, the production of households for own use (electricity for own use, solar heat, but also the heat produced from fossil fuels for own use) would be excluded from the production boundary. In fact ESA 2010 (§ 3.08) states that the only own-account production of goods of households is construction of dwelling and the processing and storage of agricultural products.

However it is not entirely clear how national accountants are dealing with the issue of households' production of renewable energy. National accountants should be enquired to be sure of accounting households expenditure for renewable energy consistently with NA.

In all countries, the production of energy from renewable sources by households is to be recorded if it is sold. The production is to be recorded under the relevant industry (e.g. NACE 35 for electricity from photovoltaic panels installed on roofs) if separate data allow the activity to be recognised and classified accordingly. Household production of energy not sold to the grid (e.g. solar thermal energy for own consumption or the burning of wood pellets for heating and hot water) is not (explicitly) recorded in the national accounts.

The way countries organise the support for renewable energy production has a significant impact here. For example, in the Netherlands only the excess production of electricity from solar panels is sold to the grid (i.e. a part of the production is for own consumption) whereas in Canada or Luxembourg the entire production is sold. In the second case both the amounts sold to the grid and the amounts of electricity purchased by households are therefore higher.

Accordingly, the household investments in installation and equipment for the production of energy from renewable sources should be recorded as investments by the relevant industries. If, for example, photovoltaic electricity is sold, the related investment should be an investment by NACE 35. If the energy is not delivered to the grid (and hence there is no energy production recorded in national accounts) the related expenditure for the installation and equipment cannot be recorded as investment by NACE 35. Most likely these expenditures are then part of the gross fixed capital formation for the dwellings recorded under NACE 68 (real estate activities).

In addition, it has to be noted that in many countries photovoltaic and solar panels investments are now part of the construction of new buildings so they would tend to be part of the overall costs of new dwellings. If such panels are installed on existing houses through renovation work, they should also be recorded as gross capital formation.

If owner-occupier households replace the heating systems of their dwellings, the investment should also be part of the gross fixed capital formation. These investments in heating systems should be recorded as gross fixed capital formation in industry NACE 68 under the category for owner occupiers. This means that the investment in renewable energy production equipment is recorded but no corresponding production of energy products. Depending on the exact way the rental payments are imputed in the case of owner occupiers, some of the value of this production may be recorded as a part of the rental, i.e. as output of the housing industry.

In all these cases, the renewable energy part of the investment should be identified and isolated.

The TF agreed on extending the production boundary for the environmental monetary accounts to take into account the generation of energy from renewable sources for own account. When the source is energy statistics, this extended production boundary would be automatically applied.

The description of the transactions related to renewable energy management fits into the general framework of the ReMEA. These transactions consist of transactions in products (supply and uses of renewable energy products resulting from characteristic activities as well gross capital formation for characteristic activities) and transfers.

The supply of renewable energy products consists of market output, non-market output and ancillary output:

- **Market output** mainly corresponds to that part of the renewable energy management which is not provided free by general government units to the community as a whole. This is mainly the production of electricity and heat from renewable sources but it includes also e.g. consulting services. Partial payments by beneficiaries of the renewable energy management products are classified as market output.
- **Non-market output** which consists mainly of management, administration services by general government units is valued by the cost (intermediate consumption, compensation of employees, consumption of fixed capital and taxes on production) less any receipts (i.e. partial payments) related to the services rendered. This output is assumed to be collective consumption of general government. If any, non-market output of NPISHs is valued in the same way, but assumed to be actual final consumption of households.
- **Ancillary output** is the result of characteristic activities undertaken mainly by industries in order to produce renewable energy. This output is valued by the cost that the unit which executes the activity bears in respect to the production of renewable energy: intermediate consumption, compensation of employees, consumption of fixed capital and taxes on production less subsidies. Ancillary output is assumed to be own intermediate consumption of units which produce it.

Gross capital formation corresponds to gross fixed capital formation and acquisitions less disposals of non-produced non-financial assets for renewable energy activities, mainly renewable energy plants.

Transfers in the renewable energy management domain either consist of specific taxes or subsidies, investment grants, other current or capital transfers in favour of renewable energy management. An analysis of transfers linked to renewable energy management is therefore required. A source for subsidies, investment grants, other current or capital transfers for renewable energy will be the module on environmental subsidies and similar transfers which aims at providing data on a wide range of transfers for environmental protection and resource management.

Data sources and compilation methods for renewable energy expenditure account

Data sources and compilation methods for renewable energy management expenditure are described thereafter with a special focus on the variable and the breakdown of the ReMEA simplified tables described in chapter 3 of the draft statistical guide.

General government (table 1)

The first step is to identify the units of the general government institutional sector which execute renewable energy management characteristic activities as principal activity.

They mainly consist of specialised agencies, central or local services related to renewable energy, i.e. responsible for administration and monitoring in this field (elaboration of regulations, issuance of permits, management of taxes, charges, grants, etc., inventories, controlling, monitoring).

An economic analysis of the expenditure of these units as ascertained in the public accounts (general and local government budgets) has to be made. The nature of these units should be almost entirely non-market, which implies that one needs to calculate output from production costs.

In order to provide the data required for the establishment of the account, it is necessary to identify, or calculate:

- intermediate consumption, compensation of employees, taxes on production,
- consumption of fixed capital,
- gross capital formation,
- final consumption expenditure,
- and transfers made or received (table 6).

Intermediate consumption, compensation of employees, taxes on production, gross capital formation, final consumption expenditure and net taxes on production for renewable energy related activities can be derived either from budget analysis either from a detailed analysis of general government expenditure (COFOG) data.

Government activities related to energy should be classified in COFOG 04.3 - Fuel and energy

COFOG 04.3 classes relevant for renewable energy are the following:

COFOG 04.34: Other fuels

Administration of affairs and services involving fuels such as alcohol, wood and wood wastes, biogases and other non-commercial fuels; production and dissemination of general information, technical documentation and statistics on availability, production and utilization of such fuels; grants, loans or subsidies to promote the use of such fuels for the production of energy.

COFOG 04.35 Electricity

This class covers both traditional sources of electricity such as thermal or hydro supplies and newer sources such as wind or solar heat. Administration of electricity affairs and services; conservation, development and rationalized exploitation of electricity supplies; supervision and regulation of the generation, transmission and distribution of electricity; construction or operation of non-enterprise-type electricity supply systems; production and dissemination of general information, technical documentation and statistics on electricity affairs and services; grants, loans or subsidies to support the electricity supply industry, including such outlays for the construction of dams and other works designed chiefly to provide electricity.

COFOG 04.36 Non electric energy

Administration of non-electric energy affairs and services which chiefly concern the production, distribution and utilization of heat in the form of steam, hot water or hot air; construction or operation of non-enterprise-type systems supplying non-electric energy; production and dissemination of general information, technical documentation and statistics on availability, production and utilization of non-electric energy; grants, loans or subsidies to promote the use of non-electric energy.

With regards to public R&D, COFOG 4.83 R&D Fuel and energy is relevant:

Administration and operation of government agencies engaged in applied research and experimental development related to fuel and energy; grants, loans or subsidies to support applied research and experimental development related to fuel and energy undertaken by non-government bodies such as research institutes and universities.

When such COFOG detailed data exist, estimation methods to separate renewable energy related activities from conventional energy activities should be implemented. These methods could be based on physical energy data, e.g. share of renewable energy installed capacity, production, new installed capacity, etc. A detailed analysis of COFOG 05 (Environmental protection) should be also undergone to find any expenditure related to renewable energy and classified in this COFOG class.

Specific data sources and estimation methods to isolate renewable from total energy R&D would be needed.

The valuation of consumption of fixed capital implies an assessment of the fixed capital stock used for renewable energy management activities. Different estimation methods can be used (see Eurostat (2002), EPEA compilation guide, pp. 70-74[45]).

Although not required in the simplified ReMEA account, taxes related with renewable energy management, if available, are used in order to establish the financing table and to calculate environment-related financial burden by institutional sector and industry.

Renewable energy management charges, or taxes related with renewable energy management (if any/if available) are collected by general government units (central government, local governments or specialised agencies). An analysis of these receipts is necessary to ascertain which units (corporations, households) pay these taxes and charges and to which uses the funds are allocated to (subsidies, investment grants by industries, etc.). Environmental taxes by economic activities (as defined by the Regulation 691/2011[46]) could provide useful information on such taxes, which are recorded under resource taxes.

Although the institutional units classified in the general government (S.13) are non-market producers, they may have some secondary market output of renewable energy management (e.g. production of renewable energy) which is also to be reported in table 1.

Corporations

Most of the transactions of corporations concern either the production of market products (renewable electricity and heat, biofuels, consulting services), or renewable energy production executed as ancillary (when this is not accounted for as principal production in NACE 35, see the remark above).

With regards to R&D activities, R&D expenditure data are available by sectors of performance and socio-economic objectives according to NABS 2007. R&D expenditure by economic activity is also available. Specific data sources and estimation methods to isolate renewable from total energy R&D would be needed.

Market producers (table 3)

The production of renewable energy should be concentrated in the NACEs 35.11 and 35.30.

NACE 35.11 – Production of electricity. Starting from national accounts (and eventually SBS) data on NACE 35, renewable electricity production can be estimated though the use of ratios based on physical energy production. Depending on the organisation and functioning of a country's electricity market it may be necessary to adjust these physical ratios in order to take into account price and cost differences between electricity produced from conventional sources and electricity produced from renewable sources. Price times quantity methods can also be used.

[45] http://epp.eurostat.ec.europa.eu/portal/page/portal/environmental_accounts/documents/6.pdf
[46] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2011:192:0001:0016:EN:PDF

NACE 35.30 – Steam and air conditioning supply. Starting from national accounts (and eventually SBS) data on NACE 35, renewable steam production can be estimated though the use of ratios based on physical energy production. Price times quantity methods can also be used.

Biofuel and biogas producers may be found in the food industry, chemical industry or in agriculture. Price times quantity methods can be used as first approximations. The physical production of biofuels is reported for example in Eurostat's energy statistics. Price data may be collected from specific market studies.

Secondary production could occur in many NACEs, mainly in NACE 35, NACE 01 – Agriculture, many manufacturing sectors producing energy from biomass waste (for example manufacturing of woods, pulp and paper, etc.), NACE 37 and 38 wastewater and waste services, which could produce energy from waste.

Examples of estimations methods for the output of producers of renewable energy is given in the Practical EGSS guide (pp. 48-54).

Ancillary activities (table 2)

As concerns the current expenditure and gross capital formation for renewable energy production deriving from ancillary activities, they can be valued by estimations based on physical energy data or by means of specific surveys.

Import, exports (Table 4)

Supply and use tables and physical energy statistics are the main sources of data for trade in renewable energy. Price times quantity methods can also be used.

Households (table 5)

Households' final consumption of renewable energy can be estimated from data on final expenditure for energy and data on energy consumption of households.

Transfers (table 6)

The main source of data for transfers is government's budgets. Detailed budget analysis or appropriate estimations methods to retrieve information from COFOG (see above) data are needed.

Concerning government support of renewable energy, as a general rule the COFOG Manual proposes to record the amounts of energy conservation and renewable energy sources (i.e. hydro, solar…) under pollution abatement (COFOG 05.3). This will be most applicable for investment grants or subsidies. To a lesser extent, environmental protection n.e.c. (COFOG 05.5) could be used.

The allocation to some other functions could also be possible depending on the final purpose of providing a subsidy. Possible coding would be Fuel and energy (COFOG 04.3) (Electricity: thermal or hydro supplies and wind COFOG 04.35 or solar heat non-electric energy produced by wind or heat COFOG 04.36).

An example of renewable energy account compilation

The following example which describes a simple estimation procedure for accounting for renewable energy production was presented at the TF 2012 meeting (see annex of the document ENV/RM/TF/5 (2012)[47]).

ICEDD has tried to develop a simple methodology for accounting for renewable energy expenditure and filling in the ReMEA tables (see picture 1 below). The method is focused on estimating renewable energy production based on already available data (NA, SBS, energy statistics) and some specific data on renewable energy investments. The methodology was applied to Belgium (2007)[48]; the following paragraphs detail the method and present the results.

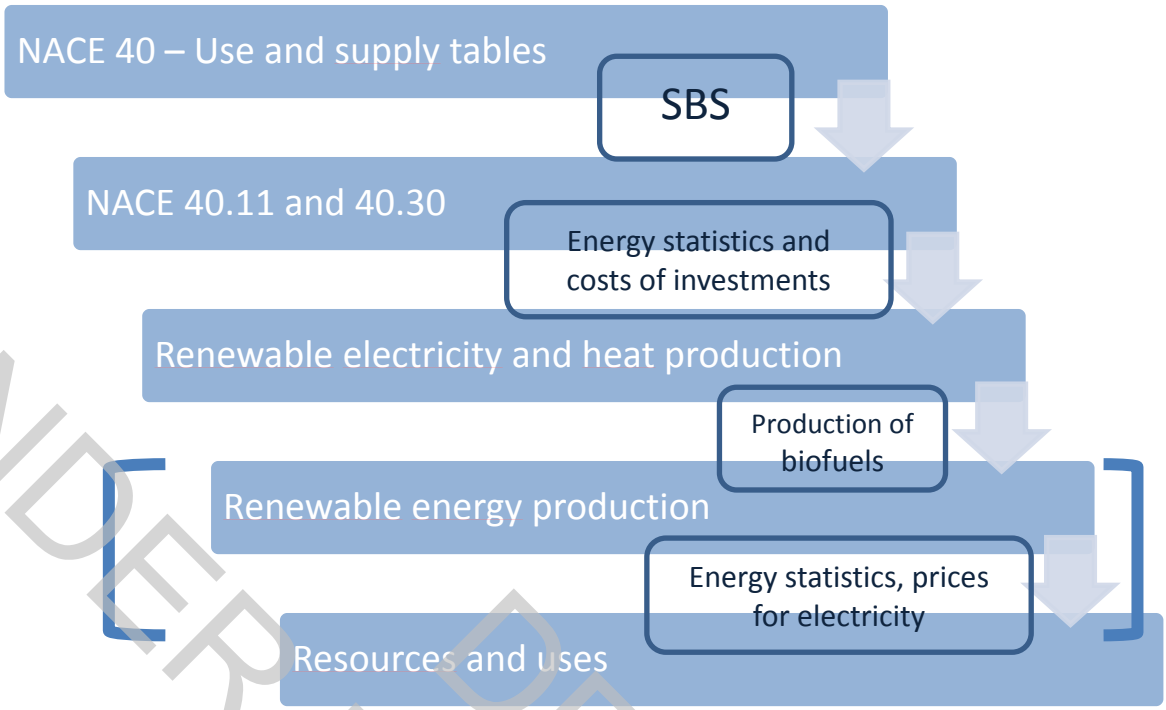
The first step was to shed some light on the renewable energy related activities to be accounted for. Three sets of activities seem to be most relevant for renewable energy expenditure:

- Renewable energy production
- General administration activities of the government related to renewable energy
- Research and development activities for renewable energy.

[47] https://circabc.europa.eu/w/browse/d3d269ca-f8cb-4810-8602-db04de345470

[48] The example below from Belgium is based on the NACE rev. 1.1 classification

Figure 1: the methodology for deriving renewable energy expenditure



Furthermore transfers from the general government to producers and users of renewable energy are of great importance for calculating expenditure for renewable energy.

Given the difficulties encountered in finding data sources for general government expenditure related to renewable energy (both administration activities and transfers to the producers and users of renewable energy) and for R&D for renewable energy, it was decided to focus for the moment mainly on renewable energy production.

Which are the activities included under renewable energy production? The activities producing energy using as input renewable sources (renewable source of energy are: wind, solar, biomass (including a fraction of waste), geothermal, tidal/ocean).

The range of activities which could be included in the boundaries of renewable energy production comprises the production of biomass, transformation of biomass into fuels, production of electricity from renewable sources, production of heat (hot water) from renewable sources.

Biomass differs from the rest of renewable sources as it has be harvested and eventually transformed into fuels before being transformed again into electricity, and heat or used (e.g. in transport). Furthermore it can be directly used by final users (for example households heating their dwellings with wood).

In most European countries biomass is mainly used for producing electricity/heat and for transport fuels. Thus taking into account the production of electricity/heat and transport fuels from biomass could be sufficient for having a picture of the renewable energy sector. This is in accordance of what is usually done for the energy production sector in general: mining and quarrying activities (e.g. gas and oil) are not accounted for together with electricity and heat production.

Taking into account also the harvesting of biomass would enlarge the scope of the sector: it would be as including gas extraction in the energy sector (which is not wrong, but it enlarges the boundaries of the energy sector).

Therefore it was decided to focus on the following activities:

1. Production of electricity from renewable sources
2. Production of heat (hot water) from renewable sources
3. Production of fuels from biomass

Since no specific source of data on the production of renewable energy exists a top-down approach was used: from NA account data to output of the renewable part of production of electricity (NACE 40.11) and heat (NACE 40.30) using energy statistics and costs figures for renewable production technologies.

All data refers to 2007 because of non-availability of most recent data for Belgium from NA due to confidentiality.

In order to use existing information we should know where the producers of renewable electricity and heat are classified. Producers of electricity are classified in NACE 40.11 and the producers of heat are classified in NACE 40.30. Following NACE guidelines one should be aware that energy from waste incineration is classified together with waste management activities. Electricity/heat can also be auto-produced (i.e. ancillary production). Nevertheless production of electricity and heat cannot be considered as an ancillary activity (see NACE guidelines).

Table 1: Electricity, gas, steam and hot water supply, BE, 2007, m EUR

NACE 40, m EUR	2007
Intermediate consumption	5393.6
Compensation of employees	1952.1
Consumption of fixed capital	1745.8
Net operating surplus and net mixed income	1860.5
Other taxes less other subsidies on production	130.3
Output	10989.8
Gross Fixed capital formation	1816.8
Labour inputs (1000 persons)	18.3

Source: National Accounts by 60 branches - aggregates at current prices [nama_nace60_c] and use table

The starting point of the analysis is NA (use and supply table) figures for NACE 40 (see table 1) from which it is possible to derive output for NACE 40.11 and 40.30. This step can be skipped if statistical offices can obtain detailed national accounts data for NACE 40.11 and 40.30.

NACE 40 includes the supply of gas, the production distribution and transmission of electricity and heat. For estimating the output of NACE 40.11 and 40.30 one could use SBS indicators as indicated in table 2.

Table 2: SBS indicators for estimation of NACE 40.11 and 40.30 output from NA data for NACE 40

SBS indicator for estimation of NACE 40.11 and 40.30 output from NA NACE 40	
NA	SBS
Intermediate consumption (P2)	Total purchases of goods and services
Compensation of employees (D1)	Personnel costs
Consumption of fixed capital (K1)	Production value
Other net taxes on production (D29-D39)	Production value
Net operating surplus	Gross operating surplus
Gross fixed capital formation (P51)	Gross investments
Acquisitions less disposals of non-produced non-financial assets (K2)	*Not estimated*
Investment grants received (D92)	*Not estimated*
Labour inputs	Number of employees in full time equivalent units

The results of the estimation are given in table 3 below.

Table 3: Production of electricity, BE, 2007

M EUR	(1) Electricity, gas, steam and hot water supply (NACE 40)	(2) Production and distribution of electricity	(3) Steam and hot water supply	(4) Distribution and trade of electricity	(4) Production of electricity [(2)-(4)]
Intermediate consumption (P2)	5393.6	4269.4	13.2	1739.5	2529.8
Compensation of employees (D1)	1952.1	1815.1	0.7	698.7	1116.4
Consumption of fixed capital (K1)	1745.8	1410.7	3.7	585.7	824.9
Other net taxes on production (D29-D39)	32.0	25.9	0.1	10.7	15.1
Net operating surplus	1860.5	1443.5	0.1	689.2	754.3
OUTPUT (P1)	10984.0	8964.4	17.8	3723.9	5240.5
Gross fixed capital formation (P51)	1816.8	1685.3	3.9	1113.1	572.1
Acquisitions less disposals of non-produced non-financial assets (K2)					0.0
Investment grants received (D92)					0.0
Labour inputs	18.3	16.7	0.0	6.4	10.3

Source: (2), (3) and (4) estimated using data from Annual detailed enterprise statistics on electricity, gas and water supply (NACE Rev.1.1 E) [sbs_na_2a_el]. For (3) estimation based on 2009 data (for confidentiality reasons no data available for 2007)

For the estimation of the renewable part of electricity production the following steps were performed:

1) Estimation of GFCF using either the share of renewable electrical production capacity in new installed capacity either the investments costs of the renewable part of new installed capacity
2) Estimation of intermediate consumption using the share of renewables in total electricity production plus renewable fuels used to produce electricity (e.g. biomass)
3) Estimation of the other variables using the share of renewables in total electricity production

The variables used for estimating the renewable part of the electricity production output are listed in table 4.

Table 4: Variables used for the estimation of the renewable part of the electricity production output

Variables	Estimation of renewable part based on:
Intermediate consumption (P2)	Renewable electricity production, % + use of biomass inputs (CPA codes 01, 02)
Compensation of employees (D1)	Renewable electricity production, %
Consumption of fixed capital (K1)	Renewable electricity production, %
Other net taxes on production (D29-D39)	Renewable electricity production, %
Net operating surplus	Renewable electricity production, %
Gross fixed capital formation (P51)	New installed capacity, % renewable or New installed capacity * cost per MW
Acquisitions less disposals of non-produced non-financial assets (K2)	
Investment grants received (D92)	
Labour inputs	Renewable electricity production, %

The variables used for the estimation (installed capacity, new installed capacity in 2007 and the costs per MW installed) are shown in table 5 below. In Belgium only 14 % of installed capacity for electricity production was for renewable energy but 46 % of new installed capacity was for renewable in 2007.

Table 5: Renewable electricity production installed capacity, new installed capacity in 2007 and the costs per MW installed, BE, 2007

Renewables, 2007	Installed capacity (MW)	New installed capacity (MW)	Investments costs (EUR2007 per kW)
Wood/Wood Wastes/Other Solid Wastes	329	113	4000
Municipal Wastes	177	8	4000
Landfill Gas	35	3	4000
Sewage Sludge Gas	4	0	4000
Other Biogas	29	17	4000
Liquid Biofuels	97	0	4000
Hydro	1417	1	3500
Wind	272	48	2000
Solar	0	10	2500
Total RENEWABLES	2360	176	
% of total renewables + non renewables	14.3	46.3	

Source: Installed capacity: Infrastructure - electricity - annual data [nrg_113a]. Costs: Literature review

The results of the estimation of the production of renewable electricity are given below in table 6.

Table 6: Estimation of the renewable part of electricity generation output

M EUR	(4) Production of electricity	(7a) Production of renewable electricity - M EUR *using share of new installed capacity*	(7b) Production of renewable electricity - M EUR *using costs of new installed capacity*	(8) Production of renewable electricity - % of (4)
intermediate consumption (P2)	2529.8	129.15	:	5
compensation of employees (D1)	1116.4	43.82		4
consumption of fixed capital (K1)	824.9	32.38		4
other net taxes on production (D29-D39)	15.1	0.59		4
net operating surplus	754.3	29.60		4
OUTPUT (P1)	5240.5	235.54		4
gross fixed capital formation (P51)	572.1	264.99	282.5	46 - 49
other capital uses (K2)				
investment grants received (D92)				
Labour inputs (1000 FTE)	10.3	0.41		4
Part of renewable production in electricity production %	3.92			
Part of electricity capacity for renewables %	14.3			
Part of new electricity capacity for renew. %	46.3			

Once estimated the part of renewable energy production in the renewable electricity production, also the renewable part of the production of heat (steam and hot water) should be estimated. For BE in 2007 this is assumed to be not relevant since only 0.8 % of heat production is from renewable sources (see table 7 below).

Table 7: Renewable heat production, BE, 2007

Heat	GWh
Total gross production	29211
of which auto producers	2657
Geothermal	61
Solar	0
Municipal waste (Renewable)	13
Wood	56
Biogas	99
Liquid biofuels	3
Total renewable	232
Total gross production / renewable, %	0.79

Source: Supply, transformation, consumption - heat - annual data [nrg_106a]

Biofuels are a small but growing part of the renewable energy sector. They are mainly used in transport applications mixed with traditional transport fuels. Although we can have a good picture of the physical production and uses of biofuels (see table 8 below) from energy statistics, producers of biofuels are scattered over different NACEs, which makes impossible to use an approach similar to the one used for renewable electricity. The only way to obtain a rough estimation for the output of the biofuels industry seems to be a price times quantity approach, which has not been yet applied for BE.

Table 8: Production, import, export and consumption of biofuels, BE, 2007

Biofuels 2007	GWh
Primary production	1873.056
Imports	203.611
Exports	469.722
Gross inland Consumption	1606.944
Final Energy Consumption - Transport	1011.944

Source: Supply, transformation, consumption - renewables (biofuels) - annual data [nrg_1073a]

Summing up the information gathered to fill in table B:

- Renewable part of electricity production: this is ok a part from the data for capital/current transfers (lower part of table B)
- Renewable part of heat production is assumed to be 0. Nonetheless the same approach used for electricity can be followed.
- Biofuels production: only quantities, one needs at least prices for having a rough estimation of production
- General government: no data found on administrative activities and transfers so far
- Research and development: no data found on R&D so far

This gives the following table B for BE in 2007.

Table B: BE, 2007, only renewable electricity production

TRANSACTIONS (all figures are in EUR but labour inputs are in 1000 FTE)	**CHARACTERISTIC PRODUCERS**		
			Total
	GG/NPISHs	Other (corporations)	
1. **CURRENT TRANSACTIONS**			
1.1 CURRENT USES		395	395
intermediate consumption (P2)		129.15	129
- of which characteristic products			
- of which adapted and connected products			
compensation of employees (D1)		43.82	44
consumption of fixed capital (K1)		32.38	32
other taxes on production (D29)		0.59	1
other subsidies on production (D39)			
net operating surplus		29.60	30
1.2 OUTPUT (P1)		236	236
non-RUM output		0	
RUM output			
- *non-market (P13)*		-	
- *market (P11)*			
- ancillary (P12)			
1.3 RESOURCES			
market output (sales, including partial payments*)			
current transfers including implicit subsidies** (D3, D7)		-	
2. **CAPITAL TRANSACTIONS (balance)**		283	283
gross fixed capital formation (P51)		282.50	283
Acquisitions less disposals of non-produced non-financial assets (K2)			
investment grants received (D92)			
other capital transfers received (D99)		-	
3. **FINANCING BY PRODUCERS = output (1.2) + balance of capital operations (2) - resources (1.3)**		283	283
Labour inputs		0.41	0
Stock of fixed assets			

Once table B has been completed, the analysis focused on how to fill table B1.

The following sources of data were used to estimate variables for table B1:

- Final energy consumption statistics
- Import / exports of energy statistics

Since one needs average electricity price for estimating imports; exports; uses, the following sources provided useful information:

- Eurostat energy prices
- Balance of payments of Belgium
- Household budget survey (HBS) of Belgium

Table 9 and 10 provide the details for the estimation of international trade in electricity (heat trade is assumed to be not relevant). Since it was not possible to find the exact figures from the trade balance we estimated imports and exports on the base on an average price from the electricity market exchange (Belpex).

Table 9: Imports of renewable electricity, BE, 2007

Calculation of imports		**Sources**
Imports of electricity - GWh	15.81	Supply, transformation, consumption - electricity - annual data [nrg_105a]
Price of imports - EUR per Kwh	0.08	Belpex
Imports of electricity - M EUR	1265.28	
% of renewable electricity imported - %	9.4	based on the share of renewables in the country where imported electricity is produced
Renewable imports - M EUR	119.36	

Table 10: Exports of renewable electricity, BE, 2007

Calculation for exports		**Sources**
Exports of electricity - GWh	9.037	Supply, transformation, consumption - electricity - annual data [nrg_105a]
Price of exports - EUR per Kwh	0.08	Belpex
Exports of electricity - M EUR	722.96	
% of renewable electricity exported - %	3.927	based on the share of renewables in the electricity production of BE
Renewable exports - M EUR	28.37	

Table 11 and 12 detail the calculation of uses and VAT. Since the use of energy for GFCF are 0 only final consumption, imports and intermediate consumption should be calculated. This is done using data from the energy statistics and prices which are derived for households from the Households expenditure survey which gives the total amount of households' expenditure for electricity (renewable electricity is assumed to be as expensive as normal electricity). The price for enterprises (intermediate consumption) is estimated from Eurostat's survey on electricity price.

Table 11: Calculation of uses, BE, 2007

Calculation of uses	Total	Renewable	% renewable
	GWh		
(Exports)	9.037	354.68	3.92
Final consumption (HH)	21.856	1087.52	4.97
Imports	15.816	1492.03	9.43
Intermediate consumption	52.005	2587.68	4.97
Total consumption	82.898	4029.88	4.97
Total national production	76.119	2987.51	3.92
Price (for final consumption and intermediate cons.) EUR	0.135	0.09	
Final consumption M EUR	2404.16	147.48	6.13
Intermediate consumption M EUR	5720.55	232.89	4.07

Source: Supply, transformation, consumption - electricity - annual data [nrg_105a]

VAT is assumed to be paid only by households and is calculated on the total expenditure of households for renewable electricity at the 21% rate.

Table 12: Calculation of VAT for renewable electricity, BE 2007

Calculation of non-deductible VAT		
rate = 21%	30.97	assumed to be paid only by residential users of electricity

Summing up the information we gathered, it was possible to fill in table B1. Total uses almost equal to resources. Difference could be due to:

- VAT is overestimated as it is calculated on households' expenditure for electricity which includes taxes.
- Taxes less subsidies are probably negative given the large subsides given to renewable energy production(e.g. green certificates)
- Small differences in the prices can partially offset the difference between uses and resources.

Table B1: BE, 2007

	Non-market	*Market*	**Total**
1. Uses of resident units (purchasers' prices)		*380*	380
Intermediate consumption (P2)	-	*232.89*	233
- Specialised producers	-		
- Other producers	-	*233*	233
Final consumption (P3)		*147.48*	147
Gross fixed capital formation (P51)		*0*	
2. Exports	-	*28.37*	28
Total uses (1+2)		*409*	409
Total resources (3+4+5+6)		*386*	386
3. Output (P1) (basic prices)		*236*	236
4 Imports	-	*119.36*	119
5. Non-deductible VAT		*30.97*	31
6. Other taxes less subsidies on products (D29 - D39)		*0.59*	1

Tables A and C have been also automatically calculated but are not presented as for table A the main limitation is the non-availability of transfers data which does not allow for the calculation of expenditure and a proper analysis of financing.

Energy saving

Purpose of the energy saving account

The purpose of the energy savings account is to describe within the framework of the ReMEA the monetary flows related to energy savings, which is the reduction of the use of energy through the minimisation of heat and energy losses and the increase of energy efficiency. In particular, the account provides a valuation of the production of goods and services for energy savings in the economy and the national expenditure for these products (which can be compared to national accounts aggregates like GDP). It can also describe components of expenditure and financing and can link them for further analysis with corresponding physical data on energy savings. This account covers all the activities and actions aiming at energy savings whatever the source of energy/energy carrier is. It includes heat and electricity saving as well as transport fuels savings.

Being part of ReMEA, the energy saving expenditure account excludes expenditure primarily aimed to air emissions reduction although some activities taken for reducing air emissions increase energy efficiency. Monetary flows related to ambient air and climate protection are accounted for by the Environmental Protection Expenditure Accounts in particular in the expenditure accounts on air and climate protection (CEPA 1).

Data demand in the context of EU energy saving policy

Energy savings are widely recognised as a means to contribute to security of energy supply, greenhouse gas (GHG) emissions reductions, the fast and cheap achievement of a sustainable energy supply, and last but not least, significant job creation.

Currently, Europe has a set of three combined climate and energy targets for 2020: 20% GHG reduction, 20% renewable energy sources (RES) and 20% energy savings. Whereas the GHG and RES targets are binding, the energy savings target is not. Recent insights indicate that the energy savings potential is not being realised fast enough and falls short of what is needed to meet the 2020 target (e.g. COM(2008) 772 final[49]). This would mean that more comprehensive and costly measures would have to be taken to meet the GHG and RES targets by 2020, and that employment opportunities will be lost. It would also mean that achievement of deeper GHG reduction targets beyond 2020, in line with scientific recommendations and political commitments, will become increasingly difficult

The European Union (EU) recognises the importance of energy savings and has set a policy target of achieving 20% energy savings by 2020, as compared to business as usual energy use. This target translates into an absolute reduction of primary energy use from 1800 Million tons oil equivalent (Mtoe) in 2005 to around 1600 Mtoe in 2020. The EU, however, remains ambivalent with respect to this target. For example, the Presidency conclusions of the European Council (25 and 26 March 2010) re-formulate the target as “moving towards a 20% increase in energy efficiency”.

Also, the interpretation of the energy savings target in EU law is much weaker than for the other two pillars of the EU climate package: greenhouse gases (GHG) and renewable energy. As a result, recent evidence suggests that the energy savings target will be missed by a wide margin.

The European Commission has set a directive on energy efficiency (Directive 2012/27/EU[50]). The directive aims to help member states step up efforts to use energy more efficiently at all stages: from the generation and transformation of energy to its distribution and consumption.

Physical data on energy saving

The legislative requirements in Directive 2012/27/EU refer to two aspects of EU energy data, the measured energy consumption and the consumption which would take place in the year 2020 on a business-as-usual scenario (projections). The difference between the two should amount to 20 % for the objective to be reached.

The target values for 2020 are fixed in Article 3 of Directive 2012/27/EU: the Union’s 2020 energy consumption has to be no more than 1474 Mtoe of primary energy or no more than 1078 Mtoe of final energy.

[49] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2008:0772:FIN:EN:PDF
[50] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2012:315:0001:0056:EN:PDF

Energy statistics collected by Eurostat (based on Regulation (EC) No 1099/2008 on energy statistics[51]) allow for estimating energy saving from energy consumption data (see for example the energy efficiency chapter in the "Energy in the EU" pocketbook of the European Commission.

Concepts and definitions related to energy saving

In most studies and national energy efficiency action plans, the different contributors to the energy savings are grouped in the following aggregated categories:

- Residential buildings (split by new and existing buildings, considering heating systems and sanitary hot water, including water heating with solar technology).
- Residential sector appliances (includes consumer appliances such as refrigerators, freezers, washing machines, dishwashers and dryers; lighting and TVs and IT appliances such as set top boxes, desk tops, lap tops, modem routers and IT screens).
- Tertiary sector buildings (similar split as for the residential building; further split by small and larger tertiary buildings).
- Tertiary sector appliances (includes street lighting, office lighting, computers and monitors, copying and printing, servers, commercial refrigeration and freezing, fans, air conditioning (central), other motor appliances).
- The transport sector, which considers three large categories of energy savings activities: modal shift and behavioural/organisational savings for passenger transport by cars, goods transport by road as well as other transport means (rail, aviation, public road transport and motorcycles).
- The industry sector, in which the main distinction is between savings on industrial processes, electric cross-cutting technologies (mainly electric motor applications and lighting) and industrial space heating.

At a most aggregated level, households/residential and services/tertiary sectors can be grouped in a category called "built environment" as they share the same kind of energy savings activities.

The built environment includes fuel and electricity use in buildings, households and offices, for heating, cooling and the use of appliances. Energy savings activities can be categorised in:

- Reducing the heating and cooling demand of new and existing buildings. This can be achieved through heat insulation, double/triple glazing windows… and increased implementation of passive houses.
- Improving energy conversion in buildings. The energy savings are driven by substitution of the less efficient products by more efficient ones. Here, the most prominent growth of market share occurs for solar heating and heat pumps.
- Reducing the electricity demand in buildings (electric appliances, lighting, sanitary hot water and electric space heating).

The transport sector includes fuel use from road transport, rail transport, inland transport by ships and (national) air transport. Energy savings activities can be categorised in improving the fuel efficiency of e.g. cars, behavioural measures such as eco-driving and modal shift measures. In transport, main energy savings can be achieved by shifting transport from road to other modes and through improved fuel efficiency (e.g. light vehicles).

In the industrial sector, the three main categories of energy savings activities are electricity savings using electric motors and motor applications (compressed-air pumps), heat savings through the use of steam boilers, space heating generators and combined heat and power (CHP) and process specific energy saving equipment. These might include anything from new lighting to new industrial processes and process controls that reduce the amount of energy needed.

Attention should be paid when recording expenditures related to heat pumps and CHP. CHP fuelled by biomass produce renewable energy and increase the efficiency of the energy transformation process. In principle one could split the expenditure for CHP between the renewable and energy saving accounts. In practice this could be very difficult. Thus CHP fuelled by biomass should be accounted for in the renewable energy account. CHP fuelled by fossil energy improve the energy efficiency of energy process applications. They are to be accounted for in the energy saving account.

With regards to heat pumps, although treatment of energy from heat pumps (and the energy used to drive the pumps) is not yet fully developed, their production of energy is recorded as being renewable (after deducting the

[51] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:304:0001:0001:EN:PDF

electricity sued as input to drive the pumps). Thus they are already recorded in the renewable energy account (also when their primary aim is energy saving).

Energy saving characteristic activity designates any activity whose purpose is the minimisation of the use of energy.

The characteristic activities of the energy saving can be classified in 4 groups:

Energy savings through in-process modifications. This includes all the kinds of replacement or adjustment of production processes aiming at reducing the use of energy for producing a certain output. These activities are mainly carried on as ancillary (own account) activities.

Insulation activities. They include all activities aimed at reducing the losses of heat in buildings and the energy needed for cooling buildings.

Measurement, control, laboratories and the like related to energy saving. This group includes activities aimed at measuring, controlling and monitoring the reduction in the use of energy. It includes for example audit, production of energy performance certificates and assessments of energy savings potentials.

Other activities for energy savings include all other activities and measures aimed at the reduction of the use of energy such as regulation, administration, education, training and information activities specific to the class when they can be separated from other activities related to the same class and from similar activities related other classes. This includes also actions and activities aimed at reducing energy consumption though modal shift and transport behavioural/organisational changes.

Energy saving can also be achieved by the use of connected (for example thermostatic valves) and resource efficient products (e.g. more efficient consumer appliances such as refrigerators, dishwashers, washing and dryers and lighting equipment, electric motors, more efficient cars, passive or low energy buildings). The production of these products is not detailed in the ReMEA (these products are in the scope of the EGSS). The use of these products is part of the ReMEA's expenditure concept. However, in the simplified ReMEA the use of connected and resource efficient products is not taken into account. Given the importance of connected and resource efficient products, this simplification implies that energy saving expenditure recorded by the simplified ReMEA will be much smaller than it would have been taking into account connected and resource efficient products.

Producers and transactions related to energy savings

Producers of energy saving execute a characteristic activity as their principal activity[52], as well as secondary or ancillary. They can be found in the following NACE rev. 2 positions:

43.29: Other construction installation, which includes thermal, sound or vibration insulation

43.32: Joinery installation, which includes the installation of windows

71.1: Architectural and engineering activities and related technical consultancy

71.2 - Technical testing and analysis: activities related to monitoring the reduction of energy consumption.

72.19 - Other research and experimental development on natural sciences and engineering: research and development services in the area of energy saving.

73 - Advertising and market research: advertising services for energy saving.

74.90 - Other professional, scientific and technical activities n.e.c: consultancy in the field of energy saving.

84.12 - Regulation of the activities of providing health care, education, cultural services and other social services, excluding social security: public administration and regulation activities related to energy saving.

84.13 - Regulation of and contribution to more efficient operation of businesses.

85.42 - Tertiary education: education services related to energy saving.

85.59 - Other education n.e.c.: education services related to energy saving.

94.99 - Activities of other membership organisations n.e.c: membership organisations in the field of energy saving.

[52] The principal (or main) activity is identified as the activity which contributes most to the total value added of a unit under consideration. The principal activity so identified does not necessarily account for 50% or more of the unit's total value added.

Ancillary activities aimed at energy savings could be executed by all producer units of the economy.

The description of the transactions related to energy saving fits into the general framework of the ReMEA. These transactions consist of transactions in products (supply and uses of energy saving services resulting from characteristic activities and gross capital formation for energy savings) and transfers.

The supply of products of energy savings consists of market output, non-market output and ancillary output:

- **Market output** mainly corresponds to that part of the energy saving which is not provided free by general government units to the community as a whole. Partial payments by beneficiaries of the energy saving products are classified as market output.
- **Non-market output** consists mainly of management, administration services by general government units is valued by the cost (intermediate consumption, compensation of employees, consumption of fixed capital and taxes on production) less any receipts (i.e. partial payments) related to the services rendered. This output is assumed to be collective consumption of general government. If any, non-market output of NPISHs is valued in the same way, but assumed to be actual final consumption of households.
- **Ancillary output** is the result of characteristic activities undertaken mainly by industries in order to reduce the use of energy as input to production. This output is valued by the cost that the unit which executes the activity bears in respect to the energy saving measures it takes: intermediate consumption, compensation of employees, consumption of fixed capital and taxes on production less subsidies. In order to avoid double counting, intermediate consumption of market services for energy saving must be treated specifically. Ancillary output is assumed to be own intermediate consumption of units which produce it.

Gross capital formation corresponds to gross fixed capital formation and acquisitions less disposals of non-produced non-financial assets for energy saving activities.

Governments offer a wide spectrum of financial incentives aiming at promoting energy saving activities through the reduction of the additional costs for products or components compared to standard investments. **Transfers** in the energy saving domain either consist of specific taxes or subsidies, investment grants, other current or capital transfers in favour of energy saving. An analysis of transfers linked to energy saving is therefore required. A source for subsidies, investment grants, other current or capital transfers for energy saving will be the module on environmental subsidies and similar transfers which aims at providing data on a wide range of transfers for environmental protection and resource management.

Data sources and compilation methods for energy saving expenditure account

Data sources and compilation methods for energy saving expenditure account are described thereafter with a special focus on the variable and the breakdown of the ReMEA simplified tables described in chapter 3 of the draft statistical guide.

General government (table 1)

The first step is to identify the units of the general government institutional sector, i.e. those units which execute energy saving characteristic activity as principal activity.

They mainly consist of specialised agencies, central or local services related to energy saving, i.e. responsible for administration and monitoring in this field (elaboration of regulations, management of taxes, charges, grants, etc., inventories, controlling, monitoring).

An economic analysis of the expenditure of these units as ascertained in the public accounts (general and local government budgets) has to be made. The nature of these units should be almost entirely non-market, which implies that one needs to calculate output from production costs.

In order to provide the data required for the establishment of the account, it is necessary to identify, or calculate:

- intermediate consumption, compensation of employees, taxes on production,
- consumption of fixed capital,

- gross capital formation,
- final consumption expenditure,
- and transfers made and received (table 6).

Intermediate consumption, compensation of employees, taxes on production, gross capital formation, final consumption expenditure and net taxes on production for forest management can be derived from general government expenditure (COFOG) data: COFOG 04 (economic affairs), in particular 04.3 (fuel and energy) and 04.5 (transport) and COFOG 06 (Housing and community amenities), in particular 06.1 (housing development).

The valuation of the consumption of fixed capital implies an assessment of the stock of fixed capital used for forest management activities. Different estimation methods can be used (see Eurostat (2002), EPEA compilation guide, p. 63[53]).

Although the institutional units classified in the general government (S.13) are non-market producers, they may have some secondary market output of energy saving services (as for example consultancy and auditing) which is also to be reported in table 1.

Corporations

Transactions of corporations concern either the production of market products, insulation and consultancy activities either energy saving activities executed as ancillary (e.g. replacement or adjustment of production processes aiming at reducing the use of energy for producing a certain output).

Corporations as market producers (table 3)

Market producers are mainly units producing insulation materials, doing insulation work and carrying out consultancy activities. National accounts and other economic statistics (as for example structural business statistics) are not detailed enough to give information on thermal insulation activities and consultancy related to energy saving. Thus either other sources are investigated either methods for estimation should be developed.

Eurostat's Practical Guide towards Compiling EGSS Statistics[54] offers a method based on a share of heat and energy saving investment for existing buildings in total building investments (pp. 54-55). Another method suggested in the guide is to use information on the production or use of certain energy saving building materials (e.g. isolation material) that could be used to develop a proxy for insulation activities. As indicated in this guide (p. 56) 'refined estimation approaches may be based on data on subsidies paid by governments for energetic renovation. Using subsidy data may, however, underestimate energetic renovation for those parts of renovation for which investors have – for various reasons – not received or asked for subsidies'.

Ancillary activities (table 2)

Current expenditure and gross capital formation due to ancillary energy saving activities can be estimated using studies on energy efficiency of economic sectors (focusing in particular on the sectors with higher energy efficiency gains), by means of specific surveys or through estimations technique. For example the energy efficiency gain in one sector can be calculated using energy physical data (i.e. the difference in the use of energy per unit of product in two periods) and could be valued in monetary terms (i.e; multiplied by a price for the energy saved).

Households (table 5)

Households can buy energy saving services (e.g. consultancy services) which form their final consumption expenditure for energy savings.

Transfers (table 6)

The main source of data for transfers is government's budgets. When using figures included under national accounts – general government expenditure by function (COFOG) (Table 11 of ESA transmission programme), energy saving transfers should mainly be found in COFOG 04 (economic affairs), in particular 04.3 (fuel and energy) and 04.5 (transport) and COFOG 06 (Housing and community amenities), in particular 06.1 (housing development). Unfortunately COFOG figures do not distinguish the sector receiving the transfers. Thus detailed budget analysis or appropriate estimations methods are needed.

[53] http://epp.eurostat.ec.europa.eu/portal/page/portal/environmental_accounts/documents/6.pdf
[54] Unpublished first draft of 9 July 2013 (publication forthcoming in 2014)

Materials recovery

Purpose of material recovery account

The purpose of the material recovery account is to describe monetary flows related to material recovery within the ReMEA framework. In particular, the account provides a valuation of the production of material recovery services in the economy and the national expenditure for material recovery (which can be compared to national accounts aggregates such as GDP). It can also describe components of expenditure and financing and can link them for further analysis with corresponding physical data.

Being part of ReMEA, the material recovery expenditure account excludes expenditure primarily aimed to waste management. These expenditures are accounted for in the Environmental Protection Expenditure Accounts, in particular in the expenditure accounts on the waste management (SERIEE 1994 §§ 5003, 5033 and 5056 to 5060).

In practice the separation between waste management (collection, treatment of waste) and material recovery activities might be difficult in a certain number of cases. In fact the units responsible for these activities could be vertically integrated and outlays of these units often aim at and affect both waste management and material recovery activities (for example investments of waste management services units could be directed towards sorting collected waste which affects in turn the production of secondary raw materials).

For a producer unit of both waste management and material recovery services, the market EP output of the unit is only that part of the output which corresponds to the payments made by the holders of waste in order to get rid of their waste, that is to say to waste collection, transport, treatment or disposal services executed by material recovery units.

Data demand in the context of EU material recovery policy

ReMEA contributes to the description of the effort of an economy to reduce natural resource use and manage them in a sustainable way. In particular the material recovery account can be used for monitoring the response of society to the challenges of dematerialisation. In particular they help in the appraisal of policies targeted to resource efficiency and the reduction of natural resource consumption.

In the context of reducing consumption of natural resources, material recovery is a central activity towards a sustainable management of natural resources. Furthermore it reduces waste going to disposal and improve energy efficiency, which are essential for moving towards sustainable consumption and production. Material recovery is central also for the development of the EU's economy.

The EU has put in place a strong legislative context to favour a resource efficient economy which put material recovery at the centre of the stage. The EU has a range of regulatory measures dealing with waste: a strategic approach to waste and resources; legislation regulating waste treatment; and management of specific waste streams such as end-of-life vehicles, and electrical and electronic equipment which strongly affect material recovery.

Already in 2005 the EU formulated a vision: "the EU as a recycling society"[55] which highlighted the necessity of a more sustainable use of natural resources and its advantages in terms of reduced use of virgin materials, reduced energy use and GHG emissions and less polluting emissions to soil, water and air.

The overall objective of EU material resources policy as set in the Europe 2020 strategy is 'to allow the economy to create more with less, delivering greater value with less input, using resources in a sustainable way and minimising their impacts on the environment'. In

[55] "A Thematic Strategy on the prevention and recycling of waste"; COM (2005), 666 final

practice, this requires that the stocks of all environmental assets from which the EU benefits or sources its global supplies are secure and managed within their maximum sustainable yields to ensure access.

All Member States have committed to achieving the Europe 2020 targets and have translated them into national targets and growth-enhancing policies. The Roadmap to a Resource Efficient Europe (COM(2011) 571) sets out a target concerning recycling: 'by 2020, recycling and re-use are economically attractive options for public and private actors due to widespread separate collection and the development of functional markets for secondary raw materials. More materials, including materials having a significant impact on the environment and critical raw materials, are recycled'.

The document 'Analysis associated with the Roadmap to a Resource Efficient Europe ' (European Commission Staff Working Paper, SEC(2011) 1067) mentions that recycling rates are above 50% for 18 of 60 metals and the share of old scrap in the total flow is above 50% only for thirteen metals. End-of-life recycling rates are still globally low due to the relative abundance of primary material and due to the absence of performing collection and processing of old metals.

While recycling cannot meet all of European industry's demand for raw materials, there is still further potential for greater recycling. This is the case especially for materials used in relatively low quantities and for those contained in complex products. For example, most critical raw materials have a recycling rate below 20%. Apart from recycling, resource efficiency and substitution also play a part in easing the dependence on primary raw materials and import dependency.

Improved efficiency of natural resources such as metals and minerals are essential aspects of resource efficiency. Their specific risks, including security of supply, are addressed in the Raw Materials Initiative, as well as the climate and energy policies under the Resource Efficiency Flagship.

The study 'Analysis of the key contributions to resource efficiency' estimated that 7 - 18% of all non-energy material consumption is saved or avoided due to current recycling, waste prevention and eco-design policies and practices. Recycling has by far the largest contribution (accounts for over 75% of total contributions) compared to waste prevention and product design. The future feasible potential for material savings from recycling, waste prevention and eco-design are estimated to be from 15% to 28% of all non-energy material consumption.

Physical data on material use and material recovery

Several types of physical data on material use and material recovery exist. These data might be used for estimations of some components of the material recovery account and as well for an integrated physical and monetary analysis.

Physical data on material use and waste are particularly useful for estimating e.g. the different types of recovered materials.

Waste statistics offer an overview of the different types of waste streams and their treatment modes. Waste statistics can be accessed through the Environmental data centre on waste[56].

The Environmental Data Centre on Natural Resources and on Products[57] is the gateway to information related to the environmental thematic areas of sustainable use of natural resources and products which includes data on material use.

Concepts and definitions of material recovery

[56] http://epp.eurostat.ec.europa.eu/portal/page/portal/waste/introduction/
[57] https://webgate.ec.europa.eu/fpfis/mwikis/edcnrp/

Material recovery refers to:

- the processing of metal and non-metal waste and scrap and other articles into secondary raw materials involving a transformation process;
- the activities to obtain reusable parts from waste and scrap but without a real transformation process[58].

The production of new products from secondary raw materials is not included among material recovery activities. Pure distribution activities (e.g. second hand shops) are also out of the scope of the account.

The following materials are taken into account for the material recovery account: wooden materials, including paper, non-energy materials produced from fossil energy resources (e.g. plastics), materials from non-metallic minerals (e.g. glass) and metallic minerals. Material recovery is a relevant activity of several CReMA domains: CReMA 11B (for wooden materials, including paper), CReMA 13C (for non-energy materials produced from fossil energy resources), and CReMA 14 (for minerals). Estimations techniques based of supplementary information (e.g. surveys of the material recovery industry, treatment of waste streams statistics) would be needed to obtain such a breakdown of material recovery which is not a priority for the simplified ReMEA. The simplified ReMEA calls for a practical approach of first calculating expenditure for material recovery activities relevant for the 3 CReMA domains as a whole.

Material recovery activities can be executed by production units of the national economy, either as principal or secondary activity, or as ancillary activity.

Producers and transactions related to material recovery

Producers dealing with material recovery execute a characteristic activity as their principal activity[59], as well as secondary or ancillary.

Current experience of Member Countries (gathered by the work of the TF ReMEA) shows that producers executing material recovery activities as their principal activity can be found in the following NACE Rev. 2 positions:

38.3 – Materials recovery: this group includes the processing of metal and non-metal waste and scrap and other articles into secondary raw materials, usually involving a mechanical or chemical transformation process.

46.77 – Wholesale of waste and scrap: this class includes the wholesale of recoverable materials and activities to obtain reusable parts but without a real transformation process.

Administrative activities related to material recovery could be found in NACE 84.12 - Regulation of the activities of providing health care, education, cultural services and other social services, excluding social security and in NACE 84.13 - Regulation of and contribution to more efficient operation of businesses.

[58] Retreading of tyres could be included in the material recovery account as well. The preparation for re-using products (reusing glass bottles, refilling toner cartridges, etc.) could be included in the material recovery account. Physical data is available in the implementation reports of the Member States concerning several Directives on different waste streams as in these Directives there are targets for re-use (e.g. packaging, electronic and electrical equipment, etc.). These data sources will be assessed in the future for potential use as proxies to estimate the expenditure incurred. For practical reasons this point is left out of scope, but flagged for future research.

[59] The principal (or main) activity is identified as the activity which contributes most to the total value added of a unit under consideration. The principal activity so identified does not necessarily account for 50% or more of the unit's total value added.

Given the fact that material recovery is strictly linked to waste management, secondary producers of material recovery can be found in the following NACEs (some examples of characteristic activities are also given for each NACE):

38.1 and 38.2 – Waste collection, treatment and disposal: waste management services could sell secondary raw materials which come from the treatment of waste, this output being material recovery secondary output

39 – Remediation activities and other waste management services: these activities could sell secondary raw materials, from example construction materials from the remediation of soil.

Substantial material recovery may also be carried out by enterprises as ancillary activities, without the involvement of enterprises in the material recovery sector. This is the case for example of transformation of waste paper into pulp in the paper industry.

The description of the transactions related to material recovery fits into the general framework of the ReMEA. These transactions consist of transactions in products (supply and uses of material recovery activities and gross capital formation for material recovery activities) and transfers.

The output of material recovery activities consists of market output, non-market output and ancillary output:

- Most of the output of material recovery activities is **market output**. It is sold to a large number of industrial sectors which use secondary raw material as an input of their production processes, thus it is mostly intermediate consumption of corporations. Although the fact that material recovery activities can be often integrated with waste management services activities, the output of the material recovery activities should be easily identifiable as revenues from secondary raw materials are well separated from the revenues of waste management services.
- **Non-market output** consists mainly of management, administration services by general government units is valued by the cost (intermediate consumption, compensation of employees, consumption of fixed capital and taxes on production) less any receipts (i.e. partial payments) related to the services rendered. This output is assumed to be collective consumption of general government. If any, non-market output of NPISHs is valued in the same way, but assumed to be actual final consumption of households.
- **Ancillary output** is the result of material recovery activities undertaken by several industrial sectors in order to reduce the use of virgin materials. This output is valued by the cost borne by the unit which executes the activity: intermediate consumption, compensation of employees, consumption of fixed capital and taxes on production less subsidies. Ancillary output is assumed to be own intermediate consumption of units which produce it.

Gross capital formation and acquisitions less disposals of non-produced non-financial assets for material recovery activities is related mainly to material recovery industrial equipment.

Transfers in the material recovery domain either consist of specific taxes or subsidies, investment grants, other current or capital transfers in favour of material recovery. An analysis of transfers linked to material recovery is therefore required. A source for subsidies, investment grants and other current or capital transfers for material recovery will be the module on environmental subsidies and similar transfers which aims at providing data on a wide range of transfers for environmental protection and resource management.

Data sources and compilation methods for material recovery expenditure account

Data sources and compilation methods for material recovery expenditure are described thereafter with a special focus on the variable and the breakdown of the ReMEA simplified tables described in chapter 3 of the draft statistical guide.

General government (table 1)

The first step is to identify the units of the general government institutional sector which execute material recovery activities as principal activity.

They mainly consist of specialised agencies, central or local services related to material recovery, i.e. responsible for administration, implementation and monitoring of material recovery related policies, and related to waste, i.e. responsible for administration and monitoring in this field (elaboration of regulations, issuance of permits, management of taxes, charges, grants, etc.,) when this has a specific impact on material recovery (setting and implementation of material recovery targets, etc.).

An economic analysis of the expenditure of these units as ascertained in the public accounts (general and local government budgets) has to be made. The nature of these units should be almost entirely non-market, which implies that one needs to calculate output from production costs.

In order to provide the data required for the establishment of the account, it is necessary to identify, or calculate:

- intermediate consumption, compensation of employees, taxes on production,
- consumption of fixed capital,
- gross capital formation,
- final consumption expenditure,
- and transfers made or received (table 6).

Intermediate consumption, compensation of employees, taxes on production, gross capital formation, final consumption expenditure and net taxes on production for material recovery can be either found through budget analysis either estimated from general government expenditure (COFOG) data, in particular COFOG 05.3 (waste management) since government expenditure for material recovery is often related to waste management, and COFOG 06 (economic affairs).

The valuation of consumption of fixed capital implies an assessment of the stock of fixed capital used for material recovery activities. Different estimation methods can be used (see Eurostat (2002), EPEA compilation guide[60], p. 63).

Although it is not required in the simplified ReMEA accounting framework, taxes related with material recovery, if available, are used in order to establish the financing table and to calculate environment-related financial burden by institutional sector and industry.

Material recovery related charges or taxes (if any/if available) are collected by general government units (central government, local governments or specialised agencies). They can be often associated to taxes and charges for waste management. An analysis of these receipts is necessary to ascertain which units (corporations, households) pay these taxes and charges and to which uses the funds are allocated to (subsidies, investment grants by industries, etc.). Environmental taxes by economic activities (as defined by the Regulation

60 http://epp.eurostat.ec.europa.eu/portal/page/portal/environmental_accounts/documents/6.pdf

691/2011[61]) could provide useful information on such taxes, which are recorded under resource taxes.

Although the institutional units classified in the general government (S.13) are non-market producers, they may have some secondary material recovery market output, which is also to be reported in table 1. In countries where the national accounts data by industries and the supply and use tables are not based on institutional units but on the more detailed local kind-of-activity units (KAUs), it is possible that some units (KAUs) belonging to the general government sector are classified in NACE Rev. 2 division 38.3. In that case some care is needed when completing the tables 1 (general government) and 3 (market producers) to make sure that the data for all units belonging to the sector general government are recorded in table 1.

Corporations

Most of the transactions of corporations concern either the production of market products or material recovery activities executed as ancillary.

Market producers (table 3)

Material recovery producers are found in NACE 38.3 (materials recovery) and NACE 46.77 (wholesale of waste and scrap). Data about these categories are generally to be found in the national accounts, in particular in the production and generation of income accounts.

Producers in NACE 38.1 (waste collection) and NACE 38.2 (waste treatment and disposal) can produce material recovery output as their secondary production. Data about this category are generally to be estimated from data on corporations available through the statistical system as for example supply and use tables.

When the national accounts and the supply and use tables are not detailed enough structural business statistics could provide useful information for the estimation through shares and ratios to be applied to the data of the larger NACE divisions or sections.

Ancillary activities (table 2)

As concerns the current expenditure and gross capital formation for material recovery deriving from ancillary activities, they can be valued by estimations based on studies on internal material recovery or by means of specific surveys or through estimations technique based on physical data (e.g. waste statistics).

Import, exports (table 4)

Supply and use tables and trade statistics are the main source of data for trade in secondary raw materials.

Households (table 5)

Households are unlikely to buy secondary raw materials. The output of material recovery activities is mainly used as intermediate consumptions of corporations or exported.

Transfers (table 6)

The main sources of data for transfers are supply and use tables which details the transfers to the material recovery industry. Budget analysis and COFOG data could be useful to find transfers to secondary producers and ancillary activities.

[61] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2011:192:0001:0016:EN:PDF

An example of material recovery account compilation

Using available data on the Eurostat's database (Eurobase), the following paragraphs describes the way existing statistics can be used for compiling the material recovery account.

The example refers to Germany and to the year 2007. NACE rev. 1.1 figures have been used since for this NACE revision the production of secondary raw materials was singled out in the supply and use tables (which is not the case for NACE rev. 2 supply and use tables where the material recovery industry is added up to waste and wastewater management industries).

Figures are available in a separate excel file.

From the supply table the total supply of recycled products (CPA 37 Secondary raw materials) can be calculated. It amounted to 6455 M euro in 2007. This product is mainly produced by NACE rev. 1.1 37 Secondary raw materials (6045 M euro) and by NACE rev. 1.1 51 Wholesale trade and commission trade, except of motor vehicles and motorcycles (203 M euro). The rest is either secondary or ancillary output of other NACE sections.

All production is considered to be market.

No secondary raw materials production from waste management services is accounted for in the supply table for Germany.

SBS statistics can be used to distinguish between metal and non-metal products material recovery.

Fixed capital formation is reported in the supply and use tables. Only fixed capital formation of NACE rev.1.1 37 (from the use table) has been taken into account (230 M euro). No attempt to calculate (gross) fixed capital formation for material recovery activities performed by other NACEs sections has been made.

Intermediate consumption of RM products by corporations' market producers has been approximated by the intermediate consumption of CPA 37 of from NACE rev. 1.1 37 Secondary raw materials and of NACE rev. 1.1 51 Wholesale trade and commission trade, except of motor vehicles and motorcycles plus intermediate consumption of administrative (material recovery related) services (see thereafter).

Supply and use table also contain data for labour input of NACE 37, which amounted to 26000 persons in 2007.

Supply and use tables report zero imports and exports. Trade and transport margins and taxes less subsides from supply and use tables can be used for calculating total supply at purchasers' price. No attempt to estimate VAT has been performed so far.

No data on transfers are available. Further advancement on this expenditure item is expected from the environmental subsidies and similar transfers module of environmental accounts.

General government output (75 M euro) has been set equal to the administrative services (CPA 75 to Public administration and defence services; compulsory social security services) which enter the production of recycled products and it is considered as non-market output.

Annex 1- SERIEE-style tables for ReMEA

The ReMEA SERIEE-style tables described thereafter are directly derived from the tables as described in the SERIEE 1994 manual and EPEA 2002 compilation guide. Some simplifications are proposed by highlighting the most important data to be entered in the tables and the way (or some ways) to proceed when compiling the tables.

These tables were developed and tested by the ReMEA TF in 2011 and 2012. The following text is identical to the text sent to TF Members for the pilot exercise.

Table B – Production of resource management services

General description

Table B describes the domestic production of characteristic products i.e. the output of the RM "characteristic activities", the related gross capital formation (i.e. investment) of the producers and employment.

The columns of Table B: categories of producers

Different categories of producers and output may be distinguished. The two main categories are:

- Specialist producers (with corresponding market and non-market output),

  Specialist producers are classified into two categories according to the institutional sector they belong to. The first category groups together specialist producers of the general government and NPISH sectors. The second category groups together the specialist producers of the corporations and households institutional sectors. It could be useful to separate government specialist producers by the level of government: central government, local government, with a specific category for municipalities. This separation could be also useful for presentation purposes, although it is not shown in the standard format of Table B. The way the government data are obtained allows making this breakdown without supplementary work as the categories typically correspond to separate data sources.

  Consistently with the EPEA Compilation guide (Eurostat, 2002, section 4.4), in the present context all characteristic activities carried out by general government units are classified as being produced by specialist producers.

- Non-specialist producers (with corresponding secondary and ancillary output).

  Non-specialist producers are classified by industry (according to NACE rev. 2 codes). Ancillary RM output is normally to be identified by a survey; therefore efforts should be focused first on identifying and reporting only secondary RM output.

The rows of Table B

The upper part of Table B presents current transactions in the rows, first inputs to production (the cost structure) and then the output according to its nature.

Then current RM resources rows show the receipts of RM producers corresponding to their production of RM services. This information is used later, when analysing financing.

The lower part of Table B presents capital transactions. This information includes gross capital formation and net acquisition of land and its financing (e.g., via investment grants).

The last rows of Table B present the stock of fixed assets and the labour inputs.

	TRANSACTIONS (euros, except for labour inputs which is in full time equivalent)	CHARACTERISTIC PRODUCERS				
		Specialist		Non-specialist (by industry)		Total
		GG/NPISHs	Other (corporations)	Secondary output	Ancillary output	
B.1	1. **CURRENT TRANSACTIONS**					
B.1.1	1.1 CURRENT USES					
B.1.1.1	intermediate consumption (P2)					
B.1.1.1.1	- of which characteristic products					
B.1.1.1.2	- of which adapted and connected products					
B.1.1.2	compensation of employees (D1)					
B.1.1.3	consumption of fixed capital (K1)					
B.1.1.4	other taxes on production (D29)					
B.1.1.5	other subsidies on production (D39)					
B.1.1.6	net operating surplus				-	
B.1.2	1.2 OUTPUT (P1)					
B.1.2.1	non-RUM output				-	
B.1.2.1.1	- related products				-	
B.1.2.1.2	- other non-RUM output				-	
B.1.2.2	RUM output					
B.1.2.2.1	- *non-market (P13)*		-	-	-	
B.1.2.2.1.1	principal		-	-		
B.1.2.2.1.2	secondary		-			
B.1.2.2.2	- *market (P11)*				-	
B.1.2.2.2.1	principal			-		
B.1.2.2.2.2	secondary					
B.1.2.2.3	- ancillary (P12)					
B.1.3	1.3 RESOURCES					

	market output (sales, including					-	
B.1.3.1	partial payments*)						
	current transfers including		-				
B.1.3.2	implicit subsidies** (D3, D7)						
	2. **CAPITAL TRANSACTIONS**						
B.2	**(balance)**						
	gross fixed capital formation						
B.2.1	(P51)						
	other capital						
B.2.2	uses (K2)						
	investment						
B.2.3	grants received (D92)						
	other capital transfers received		-				
B.2.4	(D99)						
	3. **FINANCING BY PRODUCERS** = **output (1.2) + balance of capital operations (2) -**						
B.3	**resources (1.3)**						
B.4	Labour inputs						
B.5	Stock of fixed assets						

Legend:

* payments which cover less than 50% of output; the part of output covered by these partial payments is deemed to be market, while the remaining part is considered as non-market output

** implicit subsidies compensate possible negative net operating surplus of GG specialist producers; then implicit subsidies consist of a positive amount which equal the amount of negative net operating surplus of GG specialist producers

	Item not shown (the transaction may exist but it is not shown because of the method of determining national expenditure and the conventions adopted in the system of evaluating the EPEA)
-	Item absent (no transaction)
-	Item absent (transaction may exist but no precedents have been found)
	Item calculated automatically (e.g. totals of rows or columns)
	Item calculated automatically (e.g. from other tables)
	Item is not a priority if data sources are not available

Data sources

The data sources for Table B differ according to the categories of producers and the nature of output. Output of specialist producers of the government sector can be available from the national accounts or can be calculated on the basis of finance statistics or budget analysis. Output of specialist producers of the corporations sector and secondary producers could be available from national accounts and production statistics.

Unfortunately, unless the national activity and/or product classifications (for example the national Prodcom and NACE classifications) include a specific code for water

management, renewable energy (electricity and/or heat), etc., it would be very difficult to find data from national accounts and production statistics.

In this case alternative data sources are business statistics for corporations, statistical registers or registers of specific business associations involved in renewable energy production activities. These data sources could provide extra information to estimate the RM share of some NACE codes (as for example NACE rev. 2 35).

When these data sources do not provide data it is necessary to resort to other sources (e.g. physical and price data) and estimate these data, e.g. using the price-times-quantity method. The price-times-quantity method is basically an estimation of the output based on multiplying the physical quantities by the unit price of the service. In the case of renewable energy this method could rely on the information on physical production of renewable energy from energy statistics.

Compilation

Current transactions

The most important information in the upper part of Table B is the value of output of RM services. Only if output is not directly available, the data on inputs are essential for calculating the output based on the cost of production.

Systematic data on inputs are however useful for assessing the effects of RM activities on the economy (wages and salaries, demand to other industries, estimation of associated employment, etc.).

For hints on the calculation of output (whenever output is not directly available) see the EPEA Compilation Guide pp.69 and 74 (Eurostat, 2002).

Current RM resources

Table B records also the current RM resources, i.e. the receipts of the RM producers. These receipts correspond to the market RM output (i.e. RM output which is sold, whatever the name given to the price and including the partial payments[62]) and current transfers (i.e. payments without counterpart by government units to other units: subsidies and other current transfers) for the production of RM services. The objective is to identify that part of total RM output that is financed by payments from other units, and, by difference, that part which has to be financed by the producers. This latter part refers to:

- the value of total non-market output less partial payments and current transfers to producers of the government sector,
- the value of ancillary output of other producers, less the subsidies received from government units.

When analysing the financing of current RM expenditure (in Table C), these items are entered as financing by the producers themselves.

Capital transactions

The lower part of Table B summarises supplementary information. This information includes gross capital formation and net acquisition of land and its financing (e.g., via investment grants).

[62] Partial payments are revenues from sales of output at prices that are not economically significant ("revenues from other non-market output"). In the ReMEA, partial payments are defined as the revenues from the sales of non-market output less any taxes on products (notably VAT - for non-market producers subsidies do not exist). Total output of non-market producers is valued by cost of production.

Data about gross fixed capital formation come from various sources. Whereas the gross fixed capital formation in general is a standard variable of industrial surveys, other capital uses, which correspond to changes in inventories and net acquisitions of non-produced non-financial assets (i.e. mainly net acquisitions of land) may be more difficult to assess.

Data on investment grants and other capital transfers come from financial statistics or budget analysis of government outlays. The recording of investment grants and other capital transfers as a way of financing the capital uses in Table B allows calculating the part of the capital uses that is financed by the producers themselves.

Stock of fixed assets and labour inputs

Data on labour inputs are either directly available e.g. from surveys or from the analysis of budgetary documents (number of civil servants) or can be estimated using average ratios on the basis of output (or operating expenditure) or using average labour costs on the basis of compensation of employees. Also national accounts data base includes labour data expressed in full time equivalent, by NACE activities.

Financing by producers

Table B includes a calculated item: the financing by producers. Calculation is the following: current and capital uses are added and all current and capital resources are subtracted. The balance represents the part of total RM expenditure financed by the producer.

STEPS FOR COMPILING TABLE B

UPPER PART OF TABLE B: CURRENT TRANSACTIONS (labels B.1-B.3)

1. **calculation of output of characteristic products (labels B.1.1-B.1.2)**

   - **specialist producers**

     a) **Identify NACE activities** (and possibly related national sub-categories) which include specialist producers. Some NACE codes could be entirely or only partially included in a RM characteristic activity. In the former case, data associated to NACE codes can be entirely used for ReMEA purposes; in the latter case, some extra information are needed in order to estimate the RM share of the selected NACE codes

     b) Once the NACE codes have been identified, the **first data source** to be analysed is national accounts data concerning Production and Generation of Income Account (PGIA) broken down by NACE and institutional sector. National accounts data bases of PGIA are usually detailed enough to provide all the figures to be accounted for in the upper part of Table B (output and related production costs), broken down by institutional sector. Such national accounts data should be entirely or partially accounted for in the upper part of Table B depending on whether the selected NACE codes are totally or partially included within the scope of RM specialist producers.

     Alternative data sources are: business statistics for corporations and data coming from budget analysis for GG and NPISHs. Also statistical registers or registers of specific business associations involved in RM activities can represent an alternative data source or can provide extra information possibly needed to estimate the RM share of some NACE codes.

     If these sources do not provide enough data and, at the same time, information on quantities (see for example energy statistics) and prices are available**, the third option** is to apply the "price-times-quantity method".

   - **non-specialist producers** with secondary RM output (basically only 2 cells to be filled in)

a) **Identify NACE activities** (and possibly related national sub-category) which include secondary producers. Extra information is always needed in order to isolate the secondary RM output. This extra information could come from energy statistics. Another source of data on renewable energy production from secondary producers (in the case of electricity) could come from the electric grid supervisor, which regulate the transmission of electricity and the balance of the electric network.

b) Once NACE codes have been identified, the **first data source** to be analysed is the system of supply and use tables of national accounts: depending on the degree of detail of these tables the secondary output of the selected NACE codes could be directly entered within the ReMEA. **Alternatively extra information are needed** in order to isolate the secondary RM output starting from national accounts data or business statistics; such extra information can be looked for e.g. in statistical registers or registers of specific business associations involved in RM activities

- **Non-specialist producers** with ancillary RM output. In principle all NACE activities can carry out ancillary RM activities. The most suitable way for collecting data is to conduct a direct survey as in the case of data on EP ancillary activities collected through the SBS regulation. Nevertheless, as this option would be too costly one could apply a price times quantity method based on energy statistics, where ancillary producers of energy could be identified.

2. **calculation of possible non-environmental output of specialist producers (label B.1.2.1**). The **first data source** to be analysed is the system of supply and use tables of national accounts: for NACE codes entirely included within the ReMEA scope, the secondary output possibly highlighted in the supply and use tables can be non-RM output. For NACE codes only partially included within the scope of specialist producers, once the RM share have been estimated by means of appropriate extra information, no further estimation of possible non-RM output is needed

3. **calculation of market, non-market and ancillary RM output (labels B.1.2.2.1-B.1.2.2.3, B.1.3).** First the market output has to be calculated. For market producers: sales or turnover (B.1.3) = market output (B.1.2.2.2). In general for each category of producer: sales = market output (B.1.2.2.2), i.e. RM output which is sold, whatever the name given to the price (including partial payments). The non-market output, if any, can be calculated by difference between the total RM output less the market output, or via costs of production

   Valuation of environmental output

   Market output is valued at basic prices, i.e. the price received by the producer from the purchaser less any tax on products plus any subsidy on products (in the SERIEE compilation practice this means that the basic price excludes VAT, whereas the price paid e.g. by households includes VAT).

   Non-market output (i.e. RM characteristic products that are provided free, or at prices that are not economically significant, to other units) is valued by the total costs of production, i.e. the sum of Intermediate consumption, Compensation of employees, Consumption of fixed capital, other taxes (less subsidies) on production

   Ancillary output, by analogy, is also valued by the total costs of production

4. **particular current transactions**

   - calculation of **intermediate consumption of characteristic products by specialist producers** (label B.1.1.1.1). This item has to be calculated and deducted from the uses of RM characteristic products in Table A in order to avoid double counting. As a matter of fact the amount of such intermediate consumption is already included in

the purchases of the output provided by the specialist producers. It can be estimated by starting from the national accounts supply and use tables: in particular, by considering the "cell" for the intra-industry consumption of a certain NACE code which includes (totally or partially) specialist producers and making assumptions on the extent to which such intra-industry consumption consists of intermediate consumption of characteristic products by specialist producers. The EPEA compilation guide (Eurostat, 2002) suggests calculating a ratio between intermediate consumption and compensation of employees for specialist producers which do not have intermediate consumption of characteristic products and then apply this ratio to specialist producers with intermediate consumption of characteristic products in order to estimate the intermediate consumption of products other than characteristic.

- estimation of the **consumption of fixed capital – CFC** (label B.1.1.3). In order to calculate the consumption of fixed capital (i.e. depreciation), capital stock accounts should be set up (see below – lower part of Table B). Alternatively, a rough method suggested by the EPEA compilation guide is to calculate CFC as percentage of the output (e.g. by applying a ratio derived from data available for a larger NACE sector which the analysed producers belong to). When for compiling the upper part of Table B detailed national accounts data are available concerning Production and Generation of Income Account (PGIA) broken down by NACE and institutional sector, usually also data on CFC are provided by this data source.
- how to account for a **negative net operating surplus of market producers belonging to the general government sector** (label B.1.1.6)

  Net Operating Surplus (NOS) = (the balancing item of the production and generation of income account – ESA95 §§ 8.09-8.20) = Output - Intermediate consumption (IC) - Compensation of Employees (CE = wages and salaries + social contributions) - Consumption of fixed capital (CFC) - Net taxes on production (= other taxes on production - other subsidies on production)

  NOS of market producers belonging to the general government sector could be negative. This indicates that part of the production costs are not covered by sales. One reason for such a result may be that government units, when calculating the prices of RM characteristic products (e.g., the level of fees to be paid for RM service) are legally required to avoid a net profit and to base the depreciation allowances on historic costs. This issue, with reference to EP services, has been submitted to a National Accounts Working Party the recommendations of which were to compensate such negative net operating surplus by other subsidies on products in the accounts (i.e. an implicit subsidy by the government).

  Rule: when for market producers belonging to the general government sector a negative value of net operating surplus is found this is offset in table B by recording an implicit subsidy in row labelled B.1.3.2

LOWER PART OF TABLE B: CAPITAL TRANSACTIONS AND OTHER INFORMATION (LABELS B.2-B.5)

5. **Calculation of gross fixed capital formation for RM characteristic activities** (other capital uses can be considered as negligible) (labels B.2.1-B.2.2). See above the calculation of output of characteristic products (point 1 from this border): the same approach should be followed with the aim of exploiting as much as possible national accounts data bases on investments broken down by NACE activities and institutional sector.
6. **Capital transfers (mainly investment grants)** (labels B.2.3-B.2.4). The **main source** is data on General Government RM expenditures by administrative source or budget analysis. If the choice is not to deal with table C, than this items should be ignored.
7. **Balancing item** (label B.3): **capital expenditure financed by characteristic producers** = capital uses (B.2.1+B.2.2) – capital resources (B.2.3+B.2.4). For specialist

producers, which contribute to national environmental expenditure only with their capital expenditures for RM activities, this balance represents the part of expenditure auto-financed by the specialist producers themselves and then can be directly entered in Table C. If the choice is not to deal with table C, than this items should be ignored.

8. Calculation of **labour inputs** (full time equivalent job) (label B.4). See above the calculation of output of characteristic products: the same approach should be followed with the aim of exploiting as much as possible national accounts data bases on full time equivalent job broken down by NACE activities and institutional sector.

9. Calculation of **stock of fixed capital** (label B.5). The calculation of this item is important especially for calculating in Table C1 the net cost borne by each institutional sector. A capital stock accounts should be set up. They can be based on long time series of investment using the perpetual inventory method. If long time series of environmental investment are not available, an initial estimate of the capital stock in place (and its age structure) can be based on other data (see Eurostat, 2002, EPEA compilation guide, pg. 70). Alternatively, the stock of fixed capital can be estimated as percentage of the national accounts data on capital stock for the NACE codes previously identified as those including characteristic producers; assumptions have to be made in order to estimate such percentage.

Table B1 – Supply-uses of characteristic RM services

General description

The upper part of Table B describes the output of RM services. Before describing the national uses of these services (in Table A), it is necessary to make the transition from total supply at basic prices to uses at purchasers' prices. This is the aim of Table B1.

There are two groups of transactions that explain the transition from output as described by Table B to uses:

- The first group is related to imports and exports of RM products. As the national expenditure describes the uses of economic resources by resident units, imports of RM products are to be added to the domestic supply, whereas exports have to be subtracted in order to arrive at national uses. Imports and exports of RM products are often very small (but attention to trade of renewable energy!) so that after verification of this assumption this type of adjustment may be ignored. Although the trade in energy (mainly electricity) could be relevant in some countries, knowing the share of renewable electricity imported/exported is almost impossible. A simple method for estimating the part of renewable electricity exported could be to apply to the export of electricity (in quantity or in value) the share of renewable electricity in the share of total electricity produced.

- The second group of transactions is related to the system of prices. As in the national accounts, the ReMEA records the uses of RM services at purchasers' prices, whereas the supply of these services is initially valued at basic prices or cost of production. Therefore, a revaluation of the supply to make it consistent with the prices in which uses are measured is made by adding non-deductible VAT and other taxes on products and deducting subsidies on products. Except for non-deductible VAT (paid mostly by households) these revaluation items are typically unimportant and may be ignored.

For the allocation of RM products to user categories you can follow the explanations in, EPEA compilation guide pg. 83-85 (Eurostat, 2002).

		Non-market	*Market*	Ancillary	Total
B1.1	1. Uses of resident units (purchasers' prices)				
B1.1.1	Intermediate consumption (P2)	-			
B1.1.1.1	- Specialist producers	-			
B1.1.1.2	- Other producers	-			
B1.1.2	Final consumption (P3)			-	
B1.1.3	Gross capital formation (P51)				
B1.2	2. Exports	-		-	
B1.3	Total uses (1+2)				
B1.4	Total resources (3+4+5+6)				
B1.5	3. Output (P1) (basic prices)				
B1.5.1	Specialist producers				
B1.5.2	Other producers				
B1.6	4 Imports	-		-	
B1.7	5. Non-deductible VAT			-	
B1.8	6. Other taxes less subsidies on products (D29 - D39)			-	

Legend:

	Item not shown (the transaction may exist but it is not shown because of the method of determining national expenditure and the conventions adopted in the system of evaluating the EPEA)
-	Item absent (no transaction)
-	Item absent (transaction may exist but no precedents have been found)
	Item calculated automatically (e.g. totals of rows or columns)
	Item calculated automatically (e.g. from other tables)
	Item is not a priority if data sources are not available

Compilation

STEPS FOR COMPILING TABLE B1

1. **To fill in the cells with data, that can be directly entered by Table B**, i.e. data on RM output (labels B1.5) and on intermediate consumption of RM output (labels B1.1.1). These cells are filled in automatically in the attached Excel file.
2. **To account for some transactions**:
   - transactions related to **imports and exports of characteristic products** in order to calculate the "national expenditure" in Table A. Main source: administrative data (e.g., the ministry of the environment), foreign trade statistics. National accountants usually process this kind of data in order to enter import and export figures within the supply and use tables. In the case of renewable energy (mainly electricity) simple estimation method based on the share of renewals in the national energy production can be used to find the share of renewals in total import/exports of electricity.
   - transactions related to the system of prices which allow the **transition from the output at basic prices to the uses at purchasers' prices (mainly VAT)**

Transition from basic price to purchaser's price in general:	*Transition from basic price to purchaser's price in the case of characteristic products:*
BASIC PRICE	BASIC PRICE
non-deductible taxes on products [+]	non-deductible taxes on products [+] (*Mainly VAT*)
subsidies on products [-]	subsidies on products [-] (*Anyone or very few*)
transport charges paid separately [+]	
trade margins [+]	
=	=
PURCHASER'S PRICE	PURCHASER'S PRICE
	Main source: legislation on VAT and tariffs, data on consumption of characteristic products

Data on VAT and other taxes and subsidies can be also derived by the national accounts system of supply and use tables

3. **To allocate the output of characteristic products to use categories** (final consumption, intermediate consumption, capital formation). A general scheme for the allocation of the environmental output to the use categories is shown in the table below. Main methods: according to physical data which are representative of the uses of RM products by households (which gives the final consumption part) and corporations (which gives the intermediate consumption parts); using data on the purchases as available from national accounts (supply-use tables) or from household surveys and from current expenditure surveys (when these provide separate data on purchases of RM products); according to data on the receipts of RM producers, when these are sufficiently detailed.

Table A – National RM expenditure by users/beneficiaries

General description

The objective of Table A is to derive the aggregate 'national expenditure for resource management' and describe it by its components (in the rows of Table A) and by the categories of units (in the columns of Table A) to which the expenditure is allocated.

The various components of Table A mainly consist in:

- uses of RM characteristic products (except by specialist producers)
- capital formation for RM characteristic activities (including net acquisition of land)
- uses of connected and adapted products
- specific transfers for resource management.

The categories of units to which the expenditure is allocated are:

- households as actual consumers of individual RM characteristic products and connected and adapted products, or as beneficiaries of specific transfers
- government in its capacity as consumer of collective services (i.e., as collective consumer of non-market output)
- specialist producers of RM characteristic products for their investment for RM characteristic activities
- other producers as they use RM services (including the use of RM services produced in-house, i.e. ancillary RM services) and connected and adapted products for their intermediate consumption, invest for their ancillary RM activities and benefit from specific transfers

- the rest of the world as it benefits from specific transfers.

The RM national expenditure gives the total of the economic resources that a nation uses for resource management. Table A presents the components of national expenditure by categories of users (of RM goods and services and of RM investment) or beneficiaries (of transfers).

Total domestic uses (i.e. the uses of economic resources for RM) constitute an intermediate aggregate from which the national expenditure aggregate is obtained by deducting the financing by the rest of the world.

	Components of national expenditure	USERS / BENEFICIARIES					
		PRODUCERS		CONSUMERS			
		Specialist	Other producers (by industry)	General Government (as collective consumer)	Households as actual consumers	Rest of the world	Total
A.1	1. Consumption of specific products					-	
A.1.1	1.1 Final consumption of characteristic products (P3)	-	-			-	
A.1.1.1	- *market*	-	-	-		-	
A.1.1.2	- *non-market*	-	-			-	
A.1.2	1.2 Intermediate consumption of characteristic products (P2)			-	-	-	
A.1.2.1	- *market*			-	-	-	
A.1.2.2	- *ancillary*			-	-	-	
A.1.3	1.3 Final consumption (P3) of	-	-	-		-	
A.1.3.1	- connected products	-	-	-		-	
A.1.3.2	- adapted products	-	-	-		-	
A.1.4	1.4 Intermediate consumption (P2) of			-	-	-	
A.1.4.1	- connected products			-	-	-	
A.1.4.2	- adapted products			-	-	-	
A.2	2.Gross capital formation for characteristic			-	-	-	

	activities (P51)						
A.3	3.Gross capital formation in specific products (P51):			-	-	-	
A.3.1	- in connected products			-	-	-	
A.3.2	- in adapted products			-	-	-	
A.3.3	- in characteristic products			-	-	-	
A.4	4. Specific transfers			-			
A.4.1	4.1 Subsidies (D31 and D39)			-			
A.4.1.1	- characteristic products			-			
A.4.1.2	- connected products			-			
A.4.1.3	- adapted products			-			
A.4.2	4.2 Other specific transfers			-			
A.4.2.1	- current (D7) including implicit subsidies*	-		-			
A.4.2.2	- capital (D92 and D99)	-	-	-	-		
A.5	5. Total uses of resident units (1+2+3+4)						
A.6	6.Financing by the rest of the world						
A.7	**National expenditure for resource use and management (5-6)**						

Legend:
* possible implicit subsidies recorded in Table B, in row B.1.3.2, column GG/NPISHs, can be distributed by user in Table A in proportion to uses of each kind of user (see Eurostat, 2002, EPEA Compilation guide)

	Item not shown (the transaction may exist but it is not shown because of the method of determining national expenditure and the conventions adopted in the system of evaluating the EPEA)
-	Item absent (no transaction)
-	Item absent (transaction may exist but no precedents have been found)
	Item calculated automatically (e.g. totals of rows or columns)
	Item calculated automatically (e.g. from other tables)
	Item is not a priority if data sources are not available

Compilation

STEPS FOR COMPILING TABLE A

1. **To fill in cells with data that can be directly entered by Table B and B1**, i.e. data on gross fixed capital formation o specialist producers (label A.2), on intermediate consumption of characteristic products by producers other than specialist (label A.1.2), total final consumption of non-market output of characteristic products and final consumption of market output of characteristic products by households (label A.1.1), gross fixed capital formations in characteristic products (transactions A.3.3). These cells are filled in automatically in the attached Excel file.
2. **To distribute the final consumption of the non-market output of characteristic products among consumers** (label A.1.1.2). Table B1 provides the total amount that has to be distributed between households and general government collective consumption. Usually the information that allows distributing the output by kind of use in Table B1 allows also allocating the output to users. This is the case, e.g., when for filling in previous tables the national accounts system of supply and use tables can be used.
3. To calculate the **uses of connected and adapted products** (final consumption, intermediate consumption, gross fixed capital formation) (label A.1.3, A.1.4, A.3.1, A.3.2). Additional information is required. A list of products could be help the provider; see also "The environmental goods and services sector" (Eurostat, 2009). For this pilot exercise on renewable energy, no information on connected and adapted products is required.
4. To calculate possible **specific transfers**, **i.e. transfers which are not the counterpart of other components of the national expenditure** (transactions A.4). Data on these transfers are normally available through administrative sources or budget analysis, except for implicit subsidies[63] that can be derived from previous tables (see below):
   - specific transfers which are not covered by the other components of national expenditure, i.e. which do not take the form of uses of goods and services (compensation for income or capital losses related with characteristic activities, transfers to other countries)
   - specific transfers which are not included in the prices of characteristic products and connected and adapted products (e.g., subsidies leading to lower prices paid by the

[63] Implicit subsidies are amounts used to offset the negative net operating surplus of non-market producers, or refer to tax exemptions or preferential tax treatment. SEEA 2012 does not include any estimation of the implicit subsidies due to the fact that no transaction is recorded in the standard national accounts.

purchasers)

- ‘open-ended’ transfers, i.e. transfers that would normally not be recorded in Table A because they only contribute to financing items already included (e.g., investment grants), but which are without a counterpart in the available basic data
- implicit subsidies (from table B) (part of transaction A.4.1): the total amount comes directly from table B; it can be distributed to users proportionally to uses of output of GG market specialist producers. Estimation of implicit subsidies is not a priority for this pilot exercise.

5. To calculate the **financing received by the rest of the world**. Main source: administrative data.

Table C – Financing of national RM expenditure

General description

The units that consume RM characteristic products or connected and adapted products or invest for RM activities are not necessarily the financing units, i.e. those actually bearing the expenditure from own resources because units may benefit from specific transfers. The SERIEE accounting framework allows determining the financing units, for the different components of the national expenditure. Table C is devoted to the presentation of financing by simply cross-tabulating the users or beneficiaries and the financing sectors.

The column headings of the table are the same as the headings of Table A so that the totals in each column (National and domestic expenditure) are the same as in Table A. The rows of the table distribute the financing units according to the institutional sectors of the national accounts.

Specialist producers

The expenditure recorded for specialist producers correspond to their capital formation. Entries therefore describe how capital formation by specialist producers is financed. In general specialist producers finance their capital formation themselves. However the government may finance, through investment grants, a part of the capital formation of specialist corporations. Moreover, when investment grants are funded through revenues from earmarked taxes it is assumed that those that pay the taxes (in general households and other producers) are the financing units.

Other producers

The expenditure recorded for these non-specialist and non-characteristic producers correspond to their intermediate consumption of RM characteristic products (including ancillary products) and connected and adapted products plus their capital formation for ancillary RM activities and specific transfers they benefit from. Entries in the column describe how this expenditure is financed. In general non-specialist and non-characteristic producers finance themselves their intermediate consumption and capital formation. However, specific transfers can exist that lower the price they pay for RM characteristic products or connected and adapted products. In this case the government finances a part of their expenditure. In the same way, investment grants can exist for their capital formation. When subsidies and investment grants are funded through revenues from earmarked taxes it is assumed that the units that pay the taxes (generally households and other producers) are the financing units.

Households

The expenditure recorded for households correspond to their actual final consumption of RM characteristic products and adapted and connected products as well as any transfers they benefited from. Entries in the column describe how this expenditure is financed. In

general households finance their final consumption themselves. However there are two exceptions:

- the part of the household consumption that takes the form of government expenditure on individual consumption good and services. Government finances this part.
- the subsidies that lower the price of the RM characteristic products or connected and adapted products (including implicit subsidies and tax subsidies on e.g. adapted products). Government finances these subsidies. However, when subsidies originate in earmarked taxes it is assumed that the units that pay the taxes (in general households and other producers) are the financing units.

Government

The expenditure of the government as a collective consumer corresponds to its expenditure on collective consumption RM characteristic products. In general this expenditure is financed by the government from the general budget. It may happen that receipts from earmarked taxes fund some of government's provision of collective consumption RM characteristic products. In this case the collective consumption is financed by the sectors that pay the earmarked taxes. Revenues from sales of non-market services (partial payments) are not accounted in the column of government as the part of non-market output covered by partial payments does not come under collective consumption in the first place.

Rest of the world

The expenditure of the rest of the world corresponds to the transfers paid for international co-operation in the field of resource management. These transfers can be financed either by the government or by households, through NGOs.

The table C is a summary, which means that it is constructed on the basis of the analysis of the financing of each component of the national expenditure. However, for the main components the analysis of the financing is rather simple, following the rules set forth in the SERIEE manual § 2212 seq.

Elaboration of the financing table requires that transfers not already included in national expenditure have to be identified and analysed (e.g. investment grants, current transfers between central and local government units, payments of taxes whose revenues are earmarked for environmental protection, etc.).

As explained, for the main components of national expenditure the analysis of financing is rather simple.

- final and intermediate consumption of RM characteristic products and connected and adapted products: in general the financing unit is the unit which uses the services and products,
- gross capital formation: in general the financing units are the units that make the capital formation, except for that part which is financed by investment grants or other capital transfers,
- subsidies: when subsidies are paid from earmarked resources, the units that pay the taxes are deemed to be the financing units.

FINANCING UNITS	USERS / BENEFICIARIES						
	PRODUCERS		CONSUMERS		Rest of the world	Total	*of which:* current expenditure
	Specialist	Other producers (by industry)	General Government (as collective consumer)	Households as actual consumers			
General government and NPISHs							
- Central government							
- Local government							
- NPISHs		-	-				
Corporations							
- Specialist producers*							
- Other producers*							
Households*							
National expenditure							
Rest of the world							
Uses of resident units							

Legend:

* financing (generally indirect) by means of specific earmarked taxes (or voluntary contributions) from households or producers

Item not shown (the transaction may exist but it is not shown because of the method of determining national expenditure and the conventions adopted in the system of evaluating the EPEA)

\- Item absent (no transaction)

\- Item absent (transaction may exist but no precedents have been found)

Item calculated automatically (e.g. totals of rows or columns)

Item calculated automatically (e.g. from other tables)

Item is not a priority if data sources are not available

Data sources

The main data sources are first the Table A which describes the national expenditure by component and user/beneficiary. Table B describes the financing of the gross capital formation: own financing by the producer for that part which is not financed by investment grants or other capital transfers.

Specific data sources that may be useful for the description of the financing of transfers include:

- earmarked taxes, which finance subsidies or other current transfers or investment grants: the tax payments must be disaggregated by institutional sectors

(households and corporations) using e.g. physical data on the tax base of the earmarked taxes (air pollution, energy use, etc.) or data provided by the institution that collects the tax,

- other transfers (not financed by earmarked taxes): for the general government sector a transfers table (see section 4.4.1 of EPEA Compilation guide) should be built which describes the transfers between the different levels of government and between government and other sectors. It allows determining which unit is the financing unit, the calculation of the 'transfer component' (cash grant equivalent) of soft loans (see section 5.7.1 of EPEA Compilation guide): data may be available from environmental funds or financial institutions charged with providing and administering the soft loans.

Aspects relating to specific transfers and financing by general government are more complicated and should be treated according to the following general rules:

- units which pay earmarked taxes, charges, etc. are considered the financing units of RM expenditure financed from the corresponding revenues,
- general government is only considered the financer of outlays made from general budgetary resources, except therefore outlays made from tax revenues earmarked for the environment,
- government units at a given level are only considered the financing units of outlays made from their own general resources, with the exception therefore of transfers received from other units (e.g. other levels of government or European Union institutions).

Compilation

STEPS FOR COMPILING TABLE C

1. **To fill in cells with data that can be directly entered by previous tables**, i.e. data on national expenditure, financing by the rest of the world and uses of resident units coming directly from Table A. These cells are filled in automatically in the attached Excel file.
2. **To distribute the national expenditure attributed to each kind of users/beneficiaries by financing sector**. General principle: usually, the users finance their consumption themselves; deviations from this principle are mostly due to government transfers (e.g. investment grants for characteristic activities, subsidies including implicit subsidies) or due to taxes earmarked for characteristic activities.
   - **Specialist producers – general government**: they contribute to the national expenditure through gross fixed capital formation (GFCF) for RM characteristic activities. Usually, unless of earmarked taxes, they finance their GFCF. The balance of capital transactions calculated in table B (label B.2) corresponds the auto-financed part of national expenditure (column 'Specialist producers'). General government (row 'General government and NPISHs') can also finance trough investment grants and other capital transfers private specialist producers (column 'Specialist producers') and other private characteristic producers (secondary and ancillary) (column 'Other producers'); furthermore General government (row 'General government and NPISHs') can finance through current transfers also households (column 'Households'). Possible implicit subsidies attributed to non-specialist/non characteristic producers and households in Table A (columns 'Specialist producers', 'Other producers', 'Households') should be accounted for in Table C as financing received by General Government (row 'General government and NPISHs'). General government can also finance the rest of the world
   - **Specialist producers – other (corporations)**: they contribute to the national expenditure through gross fixed capital formation (GFCF) for RM characteristic

activities. Usually they finance their GFCF unless of investment grants and other capital transfers received by General Government. The balance of capital transactions calculated in Table B (transactions B.2) corresponds the auto-financed part of national expenditure

- **Other characteristic producers (secondary and ancillary)**: they contribute to the national expenditure through the intermediate consumption of the output they produce for their own use as well as through their gross fixed capital formation (GFCF) for RM ancillary activities. Usually they finance their production costs and GFCF unless of investment grants, other capital transfers and current transfers received by General Government. Among current transfers, possible implicit subsidies attributed to these producers in Table A should be accounted for in Table C as financing received by General government
- **Consumer – general government**: they contribute to the national expenditure through collective consumption of non-market environmental output which is usually self-financed
- **Consumer – households**: they contribute to the national expenditure through the consumption of characteristic products as well as connected and adapted products. They usually self-finance their expenditures unless of current transfers by General government, including possible implicit subsidies attributed to these consumers in Table A

3. **To calculate the current part of the expenditure financed by each institutional sector ('of which'), for filling in the subsequent TableC1**. By means of information entered in previous tables

Table C1 - RM related financial burden

General description

Financing of the national expenditure may be extended in order to determine the net cost that burdens the different categories of resident units due to resource management.

Starting from current national expenditure (i.e. ignoring capital expenditure) some complementary items is first introduced. For producers, the imputed or actual interests on fixed capital less (in the case of specialist market producers) any net operating surplus is added to the financing of current national expenditure.

The burden of resource management only relates to current national expenditure because, from the units' point of view, it would have no meaning to consider gross capital formation (i.e. the acquisition of assets) as a burden. Only consumption of fixed capital, as included (directly or indirectly) in current national expenditure, is considered as a burden. Another approach could be to calculate the burden on the basis of net national expenditure (i.e. after deduction of consumption of fixed capital).

The net operating surplus is not an outlay but a resource from the unit's point of view. Conversely, computed interests on fixed assets may be considered as cost.

Reclassification of some transactions is then made. Receipts from taxes on production and taxes on environmental protection products (in particular non-deductible VAT) are deducted from financing of the general government.

For the corporation sector, the objective of this complementary analysis is to obtain the supplementary costs linked to the environment, ignoring that these costs are not on the whole finally supported by producers (they are part of the price the producers cover from the purchasers of their products). For households, the objective is to know how much they actually pay related to resource management. In the case of government, the objective is to compute the net result of financing and receipts related to RM expenditure.

	ELEMENTS OF ENVIRONMENT-RELATED FINANCIAL BURDEN ("Net cost")	SECTORS				
		Corporations		Households	GG and NPSIH	Total
		Specialist characteristic producers	Other producers			
C1.1	1. Financing of current national expenditure					
C1.2	2. Non-deductible VAT on current expenditure	-	-	-		
C1.3	3. Taxes on production	-	-	-		
C1.4	4. Net operating surplus		-	-		
C1.5	5. Any other profits	-			-	
C1.6	6. Interest on fixed capital*			-		
C1.7	A. Environmental financial burden ("Net cost") (1+2+3-4-5+6)					

Legend:

* Interest on fixed capital is calculated as stock of fixed capital times the interest rate

Item not shown (the transaction may exist but it is not shown because of the method of determining national expenditure and the conventions adopted in the system of evaluating the EPEA)

\- Item absent (no transaction)

\- Item absent (transaction may exist but no precedents have been found)

Item calculated automatically (e.g. totals of rows or columns)

Item calculated automatically (e.g. from other tables)

Item is not a priority if data sources are not available

Compilation

STEPS FOR COMPILING TABLE C1

1. **To fill in cells with data that can be directly entered by previous tables**, i.e. almost all data (except of any other profits (label C1.5) and Interest on fixed capital (label C1.6)). These cells are filled in automatically in the attached excel file.

   In practice to fill in Table C1 requires:

   To reclassify some current transactions already accounted for in previous tables in order to calculate the net cost burden on each institutional sector

   - The net operating surplus does not constitute outlays, but resources from the unit's point of view;

   - Receipts from taxes on production and taxes on characteristic products (in particular non-deductible VAT) are deducted from financing of the General government.

   To calculate additional transactions for getting a complete picture of the cost borne by each institutional sector (see point 2 below)

2. **To calculate additional transactions for getting a complete picture of the cost borne by each institutional sector**.

   - Computed interests on fixed assets (label C1.6) must be considered as cost; a quantification of the stock of fixed assets is needed (from Table B – label B.5) and an interest rate (from BCE or national central bank; the kind of interest rate applied should be pointed out)
   - Any other profit as a consequence of RM activities like e.g. cost savings or profit coming from the sale of related products

Annex 2- CReMA 2008, detailed description

This annex contains the detailed description of the CReMA 2008 and uses the same text of the EGSS (2009) Handbook. Please note that the examples of different types of environmental products (adapted, connected, etc.) were written for EGSS purposes.

CReMA 10 Management of water

Management of water comprises activities aimed at the minimisation of inland waters intake through in-process modifications as well as the reduction of water losses and leaks or reduction of the intake by substituting the resource with alternative resources, the installation and construction of facilities for water reuse and savings, shower heads and taps, etc. Restoration activities are included.

Examples:

Environmental specific services: Recharge of groundwater bodies to increase/restore water stocks (not to improve water quality or fight salinity, see CEPA 4.4); land improvement, development of vegetal cover in order to increase water infiltration and recharge phreatic water bodies (not for the protection of soil against erosion, see CEPA 4.3). Activities and products concerning measurement, control, laboratories and the like are also included as well as education, training and information and general administration activities linked to the management of inland waters and water saving.

Connected goods: Rainwater storage tanks.

Adapted goods: Tap filters, differentiate systems for flushing toilets, washing machines or dishwashers using less water than the average equivalent product, dry toilets, and desalinated water.

End-of-pipe technologies: Water restoration, measuring and monitoring equipment.

Integrated technologies: Reduction of the intake through in-process modification related to the reduction of the water input for the production process: closed-circuit cooling systems, drop irrigation system, de-salinisation of sea water plants, etc.

Recommendation:

Distribution, collection and potabilisation of water are not included in the EGSS.

CReMA 11 Management of forest resources

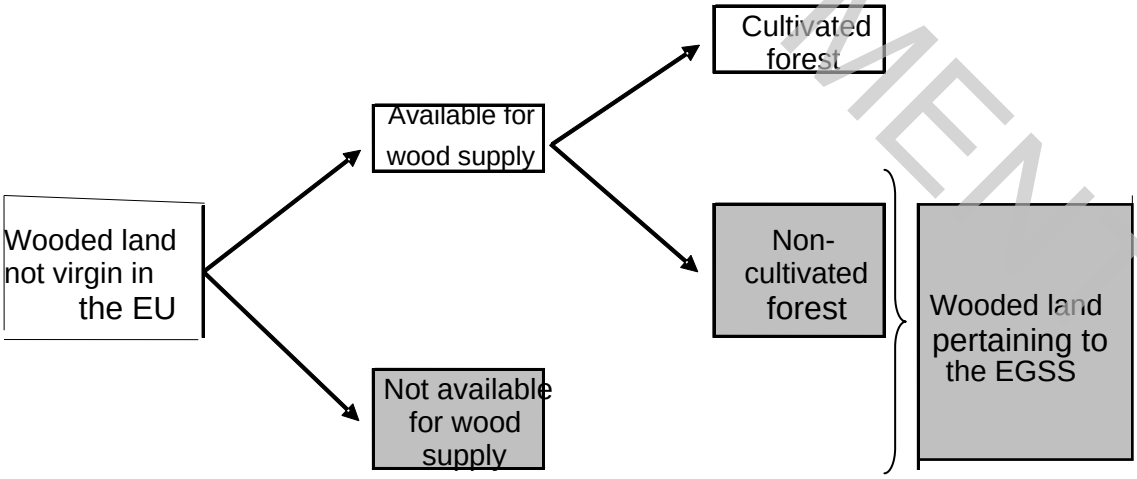


Figure A2.3: Definition and classification of forest activities

The management of forest resources deals with only a part of the wooded land. According to the SERIEE, only those natural resources corresponding to non-produced natural assets, the use of which takes the form of goods, are dealt with in the natural resource use and management account. Hence produced natural resources, i.e. produced wooded resources, are excluded.

The basic classification of forest and other wooded land refers to the availability of wooded land to supply wood (see IEEAF[64]). Hence, some wooded lands are available for wood supply and others are not. Both categories are defined as follows (IEEAF § 3.07).

- Forest not available for wood supply: "Forest where legal, economic or specific environmental restrictions prevent any significant supply of wood. It includes (a) forest with legal restrictions or restrictions resulting from other political decisions, which totally exclude or severely limit wood supply, *inter alia* for reasons of environmental or biodiversity conservation, e.g. protection forest, national parks, nature reserves and other protected areas such as those of special environmental, scientific, historical, cultural or spiritual interest; (b) forest where physical productivity or wood quality is too low or harvesting and transport costs are too high to warrant wood harvesting, apart from occasional cuttings for auto-consumption".
- Forest available for wood supply: "Forest and other wooded land where any legal, economic or specific environmental restrictions do not have a significant impact on the supply of wood. It includes areas, where although there are no such restrictions, harvesting is not taking place, for example, areas included in long-term utilisation plans or intentions".

Wooded land available for wood supply can be further split into cultivated and non-cultivated forests.

This means that forest not available for wood supply and forest available for wood supply classified as non-cultivated forest is the object of the activities described in CReMA 11.

Hence, forest land available for wood supply classified as cultivated forests does not fall within the scope of the natural resources covered by the EGSS. This means for example that certified ('sustainable') wood is not considered as an adapted good because it comes from and it substitutes mainly products from cultivated forests, i.e. a produced natural resource which is not included in the scope of the EGSS.

The management of forest resources can be further divided into management of forest areas and the minimisation of the intake of forest resources.

11A MANAGEMENT OF FOREST AREAS:

The focus of the class is on non-cultivated and non-available for wood supply forests and all the activities carried out for their maintenance and management. This includes restoration activities (reforestation and afforestation) as well as the prevention and control of forest fires. Activities and products concerning measurement, control, laboratories and the like are also included as well as education, training and information and general administration activities linked to the management of non-cultivated forest and forests not available for wood supply.

For example, reforestation of non-cultivated forests should be included, even if it is carried out for maintaining the function of providing the wood resource for forestry and logging purposes. What is relevant is that the forests concerned are non-cultivated or not available for wood supply and the activities are aimed mainly at maintaining the 'resource functions'

[64] Eurostat and European Commission, (2002), 'The European framework for integrated environmental and economic accounting for forests — IEEAF'.

of forests. The kind of activity (reforestation) in itself is not enough for including/excluding an activity: It must be cross-classified with the natural resource, i.e. non-cultivated or not available for wood supply forests.

Examples:

Environmental specific services: Restoration activities, education, training, information, sensibilisation and general administration activities linked to non-cultivated forest management.

Connected services: No example available of connected services.

Connected goods: Goods for restoring non-cultivated forests?

Adapted goods: No example available of adapted goods

End-of-pipe technologies: Forest restoration, measuring and monitoring equipment.

Integrated technologies: Certified management systems applied to non-cultivated forests.

11B MINIMISATION OF THE INTAKE OF FOREST RESOURCES

Activities aiming at the minimisation of the intake of forest resources through in-process modifications as well as the recycling, reuse or savings of forest products and by-products.

Examples:

Environmental specific services: Education, training, information, sensibilisation to the reduction of the intake of forest resources.

Connected services: No example available of connected services.

Connected goods: No example available of connected goods.

End-of-pipe technologies: No example available of end-of-pipe technologies.

Adapted goods: Recycled paper, products made of recycled wood.

Integrated technologies: Paper and wood recycling equipment.

CReMA 12 Management of wild flora and fauna

Management of wild flora and fauna comprises activities aimed at the minimisation of the intake of wild flora and fauna through in-process modifications as well as withdrawals reduction and regulation measures. Restoration activities are included (replenishment of wild flora and fauna stocks). Activities and products concerning measurement, control, laboratories and the like are also included as well as education, training and information and general administration activities linked to the management of wild flora and fauna.

The focus is on 'wild' flora and fauna and all the activities carried out for their maintenance and management. Often the management of game reserves, e.g. in the case of birds, has the purpose of maintaining the stock of 'wild' fauna, even if for hunting purposes. What is relevant is that the flora and fauna concerned are 'wild' and the activities are aiming mainly at maintaining the 'resource functions' (SEEA concept) of wild flora and fauna.

Examples:

Environmental specific services: General Government activities for preserving stocks through the enforcement of quotas, regulation, monitoring, control for e.g. fishing activities. Repopulation of stocks of wild fauna by introducing new individuals.

Connected services: No example available of connected services.

Connected goods: No example available of connected goods.

End-of-pipe technologies: Flora and fauna restoration, measuring and monitoring equipment.

Adapted goods: No example available of adapted goods

Integrated technologies: No example available of adapted technologies.

Recommendations:

CEPA 6 relates to the protection of biodiversity which concerns essentially threatened species. In the field of flora and fauna resources (CReMA 12), what is relevant is the stock of e.g. fish and wild animals.

CReMA 13 Management of energy Resources

Management of energy resources comprises activities aimed at the minimisation of the intake of fossil resources through the production of energy from renewable sources, heat/energy saving and management and the minimisation of the intake of fossil resources for raw materials for uses other than energy production.

Exploitation, management and maintenance of the stocks of non-renewable energy sources (including exploration and discovery of new reserves) are not included in the scope of the EGSS.

13A PRODUCTION OF ENERGY FROM RENEWABLE SOURCES

Reduction of the exploitation of non-renewable energy sources through the production of energy from renewable sources. The definition of renewable energy adopted in this handbook is the definition of the International Energy Agency (IEA).

Definition of 'renewable energy' used by the International Energy Agency (IEA)[65]

The International Energy Agency includes the following categories into its definition of renewables:

- *Hydropower*: Potential and kinetic energy of water converted into electricity in hydroelectric plants. It includes large as well as small hydro, regardless of the size of the plants.

- *Geothermal energy*: Energy available as heat emitted from within the earth's crust, usually in the form of hot water or steam. It is exploited at suitable sites for electricity generation after transformation, or directly as heat for district heating, agriculture, etc.

- *Solar energy*: Solar radiation exploited for hot water production and electricity generation. Does not account for passive solar energy for direct heating, cooling and lighting of dwellings or other.

- *Wind energy:* Kinetic energy of wind exploited for electricity generation via wind mills.

- *Tide/wave/ocean energy*: Mechanical energy derived from tidal movement, wave motion or ocean current, and exploited for electricity generation.

- *Solid biomass*: Covers organic, non-fossil material of biological origin which may be used as fuel for heat production or electricity generation.

- *Wood, wood waste, other solid waste*: Covers purpose-grown energy crops (poplar, willow etc.), a multitude of woody materials generated by an industrial process (wood/paper industry in particular) or provided directly by forestry and agriculture (firewood, wood chips, bark, sawdust, shavings, chips, black liquor, etc.) as well as waste such as straw, rice husks, nut shells, poultry litter, crushed grape dregs, etc.

[65] Source: OECD/IEA (2007), Renewables in global energy supply.

- *Charcoal*: Covers the solid residue of the destructive distillation and pyrolysis of wood and other vegetal material.

- *Biogas*: Gases composed principally of methane and carbon dioxide produced by anaerobic digestion of biomass and combusted to produce heat and/or power.

- *Liquid biofuels*: Bio-based liquid fuel from biomass transformation, mainly used in transport applications.

- *Municipal waste* (renewables): Municipal waste energy comprises waste produced by the residential, commercial and public services sectors and incinerated in specific installations to produce heat and/or power. The renewable energy portion is defined by the energy value of combusted biodegradable material.

- *Combustible renewables and waste* (CRW): Some of the waste (the non-biodegradable part of the waste) is not considered renewable as such. However, proper breakdown between renewables and non-renewables is not always available.

Examples:

Environmental specific services: No examples of environmental specific services.

Connected services: Installation of equipment for the production of renewable energy.

Connected goods: Components of solar panels, wind mills, hydropower equipment, etc.

End-of-pipe technologies: Monitoring equipment of renewable energy sources.

Adapted goods: Renewable energy.

Integrated technologies: Equipment for the production of renewable energy such as wind mills, solar panels, etc.

Recommendations:

By adopting the IEA definition of renewable energy sources, CReMA 13A includes the energy produced from burning biomass waste when the purpose is energy recovery. Nevertheless if the main purpose of waste incineration is the thermal treatment of waste in waste treatment facilities then it is included in CEPA 3 (see CEPA 3 and Figure A.2).

13B HEAT/ENERGY SAVING AND MANAGEMENT

Activities aiming at the minimisation of the intake of non-renewable energy sources through in-process modifications as well as the minimisation of heat and energy losses and through energy savings. Activities and products concerning measurement, control, laboratories and the like are also included as well as education, training and information and general administration activities linked to the management and saving of heat and energy.

Examples:

Environmental specific services: Insulation, bio-architecture, services, etc.

Connected services: Installation of equipment for combined heat and power production, etc.

Connected goods: No example available of connected goods.

End-of-pipe technologies: Equipment for monitoring and measurement of heat and energy consumption.

Adapted goods: Double glazed windows, low energy buildings, heat from solar panels and heat pumps, low-energy devices

Integrated technologies: Equipment for heat/energy saving, heat exchangers for the recycling of heat from air and wastewater, heat pumps for the production of heat, combined heat and power,.

13C MINIMISATION OF THE INTAKE OF FOSSIL RESOURCES FOR RAW MATERIALS FOR USES OTHER THAN ENERGY PRODUCTION:

Activities aiming at the minimisation of the intake of fossil resources for raw materials for uses other than energy production (e.g. the production of plastic, chemicals, rubber). Activities and products concerning measurement, control, laboratories and the like are also included as well as education, training and information and general administration activities linked to the management and saving of fossil resources used as input for productions other than energy production.

Examples:

Environmental specific services: No examples of environmental specific services.

Connected services: No example available of connected services.

Connected goods: Components of plastic recycling equipment.

End-of-pipe technologies: No example available of end-of-pipe technologies.

Adapted goods: Bio plastic bags, retreaded tyres, recycled plastic materials.

Integrated technologies: Plastic recycling equipment.

CReMA 14 Management of Minerals

Management of minerals comprises activities aimed at the minimisation of the intake of minerals through in-process modifications as well as the reduction of scraps and the production and consumption of recycled materials and products. Activities and products concerning measurement, control, laboratories and the like are also included as well as education, training and information and general administration activities linked to the management of minerals.

Examples:

Environmental specific services: No example available of environmental specific services

Connected services: No example available of connected services.

Connected goods: No example available of connected goods.

End-of-pipe technologies: No example available of end-of-pipe technologies.

Adapted goods: Recycled metals, recycled glass products, recycled ceramic products.

Integrated technologies: Metal recycling ovens (electric arc furnace), recycling glass equipment etc.

Recommendations:

The management of quarries as well as the exploitation, management and maintenance of minerals stocks (including research and exploration activities) are not included in the scope of the EGSS. Excluded from CReMA 14 are the collection, transportation and sorting of waste which is to be recorded in CEPA 3.

The production of energy from waste incinerators is to be recorded in CReMA 13A. The production of recycled paper and recycled wooden products is also excluded; it is included in CReMA 11.

CReMA 15 Research and development activities for natural Resource Management

Research and development activities for natural resource management comprises creative work undertaken on a systematic basis in order to increase the stock of knowledge and the use of this knowledge to devise new applications in the field of natural resource management and savings.

Examples:

Environmental specific services: Resource preservation R&D.

Connected services: No example available for connected services.

Connected goods: No example available for connected goods.

End-of-pipe technologies: No example available for end-of-pipe technologies.

Adapted goods: No example available for adapted goods.

Integrated technologies: No example available for integrated technologies.

Recommendations:

Excluded are R&D activities related mainly to environmental protection (see CEPA 8)

CReMA 16 Other natural Resource Management activities

Natural resource management activities not classified in the previous classes, i.e. general administration, education, training and information activities that relate to two natural resources or more, as well as other kinds of activities leading to indivisible output.

Examples:

Environmental specific services: Services – construction and installation of facilities for resource monitoring, analysis and assessment; multidisciplinary contracting, consulting, audit and engineering services (which include any activity that investigates feasibility, designs and manages resource preservation projects, engineering design and specifications, studies, depletion assessment, laboratory and field services, legal services/environmental, monitoring sites, operating both singly and in networks, and covering one or more natural resources, measuring and monitoring, sampling, process and control, data acquisition, management and analysis, etc.), etc. Also includes the regulation or administration and support of decisions taken in the context of resource preservation, supervision and analysis, education or training and disseminating information on resource management.

Connected goods: Equipment or specific materials for the sampling, measurement and subsequent recording, analysis and assessment of various characteristics of natural resources.

Adapted goods: No example available for adapted goods.

End-of-pipe technologies: No example available for end-of-pipe technologies.

Integrated technologies: No example available for integrated technologies.

Recommendations:

Excluded are general administration, education, training and information activities related mainly to environmental protection (see CEPA 9).

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Glossary

To be completed

Abbreviations and acronyms

CEPA: Classification of Environmental Protection Activities

COFOG: Classification of Functions of Government

CReMA: Classification of Resources management Activities

CRUMA: Classification of Resources Use and Management Accounts

ESA 95: European System of Account 1995

NA: National Accounts

NACE: statistical classification of economic activities in the European Community

NPISH: Non-Profit Institutions Serving Households

SEEA: System of Integrated Environmental and Economic Accounting

SERIEE: European System for the Collection of Economic Information on the Environment

VAT: Value Added Taxes