EUROPEAN COMMISSION
EUROSTAT

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

Progress on the classification of environmental functions

Meeting of the United Nations Committee of Experts on International Statistical Classifications

New York, 25-28 October 2022

1. Purpose and structure of the document

This document presents to the United Nations Committee of Experts on International Statistical Classifications the progress on the development of a classification of environmental functions ('CEF')[1]. The advancement of this work, led by Eurostat, has been discussed since 2018 in the London Group and were presented at SEEA CF Technical Committee (9 June 2022 meeting) and UN Committee of Experts on Environmental-Economic Accounting (27-28 September meeting 2022).

The work is moved forward mostly in Europe, with discussions in the Eurostat Working Group on Monetary Environmental Statistics and Accounts ('*MESA WG*') and a dedicated Eurostat task force on the classification of environmental activities (hereinafter referred to as Task Force or TF).

The current state of advancement is as follows: there is a fully developed version of the structure of a new integrated, resulting from analyses and discussions in the groups named above, plus a work-in-progress version of the explanatory notes.

The classification CEF is based on the pre-existing classifications CEPA and CReMA, the former covering environmental protection and the latter resource management. Only CEPA has the status of international classification. CEPA is annexed to the SEEA CF. CReMA is used at the European level for the mandatory reporting of the environmental goods and services sector account (EGSS), as set out in Regulation (EU) N° 691/2011[2]. Once adopted, CEF will overrule CEPA and CReMA.

Section 2 provides some background information; Section 3 presents next steps in the process.

The **Annexes** include:

- **Annex 1**: introductory guidelines containing the main concepts for understanding and applying the classification;
- **Annex 2:** last version of the proposal for the structure of the integrated classification of environmental functions;
- **Annex 3** *(word document 'CEF_explanatory_notes_draft_oct2022')***:** explanatory notes to the integrated classification**.**

2. Background information

The purpose of the review was to update a classification used in Europe in several environmental accounts data collections, clarifying descriptions of the concepts and providing operational rules on the recording of specific transactions, raise the status of the classification, or part of the classification, on resource management (CReMA) to the status of CEPA. In the long run, the purpose of the revision was to integrate environmental protection and resource management into an integrated classification of environmental functions, with up-to-date explanatory notes and guidance for the data compilers, to propose a comprehensive integrated

[1] Please note that this project has been called 'classification of environmental activities' until recently, when the name was proposed to be changed to 'classification of environmental functions'.
[2] See Regulation (EU) No 691/2011, Annex V as emended by Commission delegated regulation 2022/125.

functional classification for monetary environmental accounts, and also to move forward the items on classifications of environmental functions and development of resource management expenditure accounts of the System of Environmental Economic Accounting Central Framework research agenda[3], for which Eurostat has been the lead agency.

Eurostat established a task force of European countries to assist in the review of the classification of environmental functions (CEF) in 2017. In June 2018 meeting, the Task Force[4] discussed alternative versions of an integrated classification of environmental activities, products and expenditure: several proposals disregarded the environmental protection ('EP') and resource management ('RM') as a key distinguishing criterion in environmental classification activities, products and expenditures, and one proposal retained the split into environmental protection and resource management and envisaged only changes to resource management classification. In May 2020, Eurostat on behalf of the TF on environmental classification presented to the MESA WG two alternative versions of a possible new classification structure, seeking advice on which proposal should be further developed[5].

Eurostat presented progress to the London Group expert and discussed in meetings since 2018. In 2018 (Dublin meeting) the LG discussed strategic decisions for the review. In 2019 (Melbourne meeting) there were discussions about two possible structures and borderline cases (energy storage, construction of energy-efficient buildings). In the 2020 online meeting the LG provided input for two alternative structures and provided input on specific decisions about recording of management of energy resources, 'greening of brown activities' and measurement of green investments. In the 2021 online meeting, the LG provided comments on the draft structure of CEF and contribute to the process of the review of the list of environmental economic activities and environmental products. Resulting from this body of input, it was decided to establish a classification structure disregarding the split between EP and RM at the first level. This approach better satisfies the needs of:

- users, more and more oriented towards environmental theme in their whole aspect without making reference to a strict distinction between environmental protection and resource management;
- and compilers, given that in some cases it could be very difficult to establish clear borders between environmental protection and resource management.

It is also clear the need to secure a clear bridge between the integrated classification and the existing structure of classification of environmental protection activities (CEPA) and classification of resource management activities (CReMA), thus ensuring also consistency of data over time. This is particularly important in Europe to preserve data time series built over the last decade, in particular about products and activities of the environmental sector (EGSS

[3] https://seea.un.org/sites/seea.un.org/files/research_agenda_seea_cf_2018_2.pdf

[4] The first meeting of the Task Force took place in Luxembourg on 14-15 September 2017. The Task Force has 10 members (Eurostat + National statistical offices from 9 EU Member States) and since October 2019, the European Commission DG Environment participates too

[5] See doc "Integrated CEA classification – TF proposal for the structure of a future classification of environmental activities" available at Circabc (europa.eu)

account), environmental expenditure (EPEA account) and environmental subsidies (ESST account).

In 2022 the consolidated proposal of integrated classification presented by Eurostat, on behalf of the TF on environmental classification, received a large support from EU countries through the MESA WG. As follow up of MESA WG feedback and of written consultation within the TF on outstanding questions impacting on the structure of the classification, in July 2022, Eurostat fine-tuned the proposal of integrated classification and prepared an updated version of the associated explanatory notes: they are presented in **Annex 2** and **Annex 3** respectively.

3. Next steps

Eurostat and the Task Force made substantial progress on the integrated classification and the associated explanatory notes.

The updated version draft of the explanatory notes was presented at the Task Force meeting of 8-9 September 2022.

In the view of including in the discussion non-EU countries and the global community of environmental accountants, Eurostat presented this work in the London Group meeting to inform on the progress and will collect comments until the 14th of October 2022. TEurostat presented an introduction about the principles and use of the classification, the draft structure of CEF and draft explanatory notes.

The discussions has been also extended to reach the SEEA CF technical committee and the UN Committee of Experts on International Statistical Classifications.

The next steps are as follows:

- October 2022: first discussion in the UN Committee of Experts on International Statistical Classifications;
- November 2022: global consultation run by UNSD Environmental Economic Accounting Section as Secretariat of the UNCEEA;
- Winter 2022-2023: summary of the results of the global consultation are presented at the technical committee central framework (TC CF) and UN Committee on Classifications (or the Bureau);
- January/February 2023: submission to the UN Statistical Commission.

Annex 1

Introduction to classification of environmental functions (CEF)

1. Scope and characteristics

The Classification of Environmental Functions (CEF) is a generic, multi-purpose, functional classification used for classifying activities, products, expenditure and other transactions related to environmental protection and management of natural resource.

Environmental protection activities are defined as economic activities aimed at preventing, reducing and eliminating pollution or any other degradation of the environment. Also included are measures to restore the environment after it has been degraded. Resource management activities include the preservation, maintenance and enhancement of the stock of natural resources and therefore the safeguarding of those resources against depletion.

Environmental products include i) goods and services produced, designed and manufactured for purposes of environmental protection and management of natural resource (e.g. sewerage services and collection, treatment and disposal services for waste, equipment for renewable energy production), ii) cleaner and resource efficient products (e.g. electricity, gas and heat from renewable sources, the most efficient domestic appliances).

Environmental expenditure consists of the transactions related to environmental activities and products, e.g. inputs for environmental activities (energy, raw materials and other intermediate inputs, wages and salaries, taxes linked to production, consumption of fixed capital); investments; household expenditure on environmental products; transfers for environmental protection and management of natural resources (subsidies and other current transfers (e.g., regular payments to support international aid programmes), investment grants, international aid, taxes earmarked for environmental protection, etc.).

The CEF is based on the pre-existing functional classifications used for monetary environmental accounting:

- classification of environmental protection activities and expenditure (CEPA 2000);
- classification of resource management activities and expenditure (CReMA 2008).

The CEPA 2000 is an internationally agreed classification included in the family of international standard classification[6].

The CReMA 2008 (or CReMA for short) has been developed by Eurostat and used in Europe for data collection and analysis of statistics on the Environmental Goods and Services Sector

[6] The International Family of Classifications primarily contains those classifications that have been reviewed and approved as guidelines by the United Nations Statistical Commission or other competent intergovernmental bodies, covering broad statistical areas such as economics, demographics, labour, health, education, social welfare, geography, environment, and tourism, among others.

(EGSS)[7]. It includes activities and expenditures related to the management of natural resources, i.e. the preservation and maintenance of the stock of natural resources. The CReMA was built consistently with the structure and classification principles of the CEPA. Categories were built complementarily with CEPA and without overlapping with CEPA classes (the numbering of the CReMA classes follows the CEPA's one).

2. Classification purpose and structure

Purpose

The purpose of the classification of environmental functions is to offer an integrated framework, flexible enough to ensure the collection and reporting of data on environmental activities and transactions, and the organisation of the information according policy needs in the short, medium and long-term.

In this context, the following "principles" are at the basis of the classification's design:

- the first level of classification should be informative and clear for the users about the specific environmental activities, products and expenditures included, and ideally also their primary environmental purpose (commonly directly linking with one or a number of environmental policies);
- the breakdown at all levels (first, second and third) should ensure (as much as possible) symmetry across categories of a given classification detail in the availability of information, e.g. it should be avoided that similar type of activities (from the functional point of view, e.g. in-process modification) in one category are available at the third level split while in the other categories the same information is already relatively well defined at the second level breakdown.

Structure

The level 1 structure of CEF (the 1-digits) are the CEF classes. CEF classes 1 to 7 are also called (environmental) domains.

At the first level split, the CEF groups together "homogeneous" environmental protection and/or resource management categories, i.e. categories that are linked together and represent borderline cases, such as for example in the case of activities related to biodiversity and forest, or air and energy (see Table 1).

[7] See Environmental goods and services sector accounts, Handbook, 2016 Edition.

Table 1 – Classification of environmental functions - classes

1	**Air, climate and energy**
2	**Wastewater and water resources**
3	**Waste and materials recovery**
4	**Soil, surface and groundwater, biodiversity and forest**
5	**Noise and radiation**
6	**Research and development**
7	**Cross-cutting and other activities**

CEF classes 6 and 7 include transversal functions, i.e. R&D and administration, management as well as education, training and information. Ideally administration and management as well as education, training and information activities should be classified by environmental domains. Since primary data sources often do not allow the split, they are re-grouped in CEF 7.

At the second level split the environmental protection or resource management categories are singled out. This split also ensures a bridge with CEPA and CReMA as separate classification and as used to classify environmental activities, products, expenditure and other transactions, so that time series reconciliation can be relatively easily established[8].

At the third level split, in almost all cases, an extra level of granularity is offered with regard to the activities, actions, expenditures that are object of the classification (an exception is for materials recovery (CEF 3.2) where the third level split is based on material type).

The structure of the CEF classification has been designed to be flexible enough to accommodate policy and user needs of different international settings. National compilers can also consider to have further level of details to organize available information in their country and relevant for policy needs, by using additional level splits. E.g. the CEF 1.2.1 "Production of energy from renewable sources" can be further detailed by energy sources (wind, solar, etc...) or CEF 7.1 "General environmental administration, management, regulation, dissemination and consultancy" can be further detailed by environmental domains (waste, wastewater, air, etc…) by adding a fourth and a third level split respectively, to organise the possible available information at national level.

3. Classification criteria

The CEF encompasses all activities, goods and services that have an environmental purpose, i.e. that have as primary purpose to prevent, reduce and eliminate pollution and other forms

[8] This is particularly important in Europe to preserve data time series built over the last decade, in particular about products and activities of the environmental sector (EGSS account), environmental expenditure (EPEA account) and environmental subsidies (ESST account).

of degradation of the environment (e.g. treatment of waste and wastewater, protection of biodiversity), or to make more efficient use of natural resources, and hence safeguarding from depletion (e.g. recovery and substitution of natural resources, recharges of natural stocks).

The principal basis for determining the environmental purpose of an activity is the technical nature of the activities and produced goods and services. It determines whether or not the activity is suitable to reduce the pressure on the environment, through prevention, reduction and elimination of pollution or through the reduction of the use of natural resources, whatever the stated motivations and presumed or real effects are. By extension, activities that support the production and the use of environmental products (administration, education, training, information and communication services) as well as environmental research and development activities are also considered environmental activities.

From a statistical point of view, the technical nature is the most neutral basis for determining the environmental protection purpose. Indeed it allows checking the purpose of production activities by considering their suitability from a technical perspective for achieving the environmental purpose, whatever the motivation of the agent that performs it.

It should be also considered that, the purpose of an activity is different from the effect of an activity. Actions and activities undertaken for other than environmental purposes (e.g. human health) can have positive environmental effects; these activities are out of the CEF scope.

As for every functionally oriented classification, there is the possibility that a same activity could serve different environmental purposes in different countries (e.g. the purchase of double-glazed windows in warm countries will typically relate to issues of noise protection, whereas in colder countries they will be an energy saving device). In order to reduce the possible difficulties for the compiler and to have comparable statistics, some clarification, examples and operational rules have been added in the explanatory notes, in order to clarify and harmonize the classification of a number of activities that could lead to different interpretations by the compilers of statistics and accounts.

Annex 2

Proposal for the structure of the classification of environmental functions (CEF)

LEVEL I	LEVEL II	LEVEL III		Correspondence with current version of CEPA CReMA classifications
1	**Air, climate and energy**			CEPA1, CReMA13A, CReMA13B
	1.1	**Reduction and control of air emissions (excluding energy related measures)**		CEPA 1
		1.1.1	*Prevention of pollution*	
		1.1.2	*Treatment*	
		1.1.3	*Monitoring, measurement and similar*	
		1.1.4	*Other activities*	
	1.2	**Energy from renewable sources**		CReMA13A
		1.2.1	*Production of energy from renewable sources*	
		1.2.2	*Equipment and technologies for renewable energy*	
		1.2.3	*Supporting services for renewable energy*	
		1.2.4	*Monitoring, measurement and similar*	
		1.2.5	*Other activities*	
	1.3	**Energy savings and management**		CReMA13B
		1.3.1	*Energy savings through in-process modifications*	
		1.3.2	*Energy efficient buildings; other efficient energy-demand technologies*	
		1.3.3	*Monitoring, measurement and similar*	
		1.3.4	*Other activities*	
2	**Wastewater and water resources**			[Σ – sum of below]
	2.1	**Wastewater management**		CEPA2
		2.1.1	*Prevention of pollution*	
		2.1.2	*Sewerage networks*	
		2.1.3	*Wastewater treatment*	
		2.1.4	*Treatment of cooling water*	
		2.1.5	*Monitoring, measurement and similar*	
		2.1.6	*Other activities*	

LEVEL I	LEVEL II	LEVEL III		Correspondence with current version of CEPA CReMA classifications
	2.2	**Water savings and management of natural water resources**		CReMA10
		2.2.1	*Reduction of the intake*	
		2.2.2	*Water reuse and savings, reduction of water losses and leaks*	
		2.2.3	*Replenishment of water resources*	
		2.2.4	*Monitoring, measurement and similar*	
		2.2.5	*Other activities*	
3	**Waste, materials recovery and savings**			[Σ – sum of below]
	3.1	**Waste management**		CEPA3
		3.1.1	*Prevention of pollution*	
		3.1.2	*Collection and transport*	
		3.1.3	*Treatment and disposal of hazardous waste*	
		3.1.4	*Treatment and disposal of non-hazardous waste*	
		3.1.5	*Monitoring, measurement and similar*	
		3.1.6	*Other activities*	
	3.2	**Materials recovery and savings**		[Σ – sum of below]
		3.2.1	*Wood and paper*	CReMA11B
		3.2.2	*Mineral (metal, stone, glass, ceramics, other)*	CReMA14
		3.2.3	*Plastic*	CReMA13C
		3.2.4	*Textiles*	No direct correspondent
		3.2.5	*Other materials*	No direct correspondent
		3.2.6	*Monitoring, measurement and similar*	CReMA11B, 13C, 14
		3.2.7	*Other activities (related to the recovery of materials)*	CReMA11B, 13C, 14
4	**Soil, surface and groundwater, biodiversity and forest**			CEPA6+CReMA12, CReMA 11A
	4.1	**Protection of soil, surface and groundwater**		CEPA4
		4.1.1	*Prevention of pollutant infiltration*	
		4.1.2	*Cleaning up of soil and water bodies*	
		4.1.3	*Protection from erosion and other physical degradation of soil and water*	
		4.1.4	*Prevention and remediation of soil and groundwater salinity*	
		4.1.5	*Monitoring, measurement and similar*	
		4.1.6	*Other activities*	

LEVEL I	LEVEL II	LEVEL III		Correspondence with current version of CEPA CReMA classifications
	4.2	**Protection of biodiversity and landscape**		CEPA6 + CReMA12 (consolidated in the current version of CEPA & CReMA)
		4.2.1	*Protection and rehabilitation of species and habitats*	
		4.2.2	*Protection of natural and semi-natural landscapes*	
		4.2.3	*Monitoring, measurement and similar*	
		4.2.4	*Other activities*	
	4.3	**Management of forest resources**		CReMA 11A
		4.3.1	*Reforestation and afforestation*	
		4.3.2	*Protection against forest fires*	
		4.3.3	*Monitoring, measurement and similar*	
		4.3.4	*Others activities*	
5	**Noise and radiation**			CEPA5, CEPA7
	5.1	**Protection against noise and vibration**		CEPA5
		5.1.1	*Prevention and reduction of noise and vibration*	
		5.1.2	*Monitoring, measurement and similar*	
		5.1.3	*Other activities*	
	5.2	**Protection against radiation**		CEPA 7
		5.2.1	*Protection of ambient media*	
		5.2.2	*Transport and treatment of high level radioactive waste*	
		5.2.3	*Monitoring, measurement and similar*	
		5.2.4	*Other activities*	
6	**Research and development**			[Σ – sum of below]
	6.1	**R&D for air, climate and energy**		CEPA8.1, CReMA15
	6.2	**R&D for wastewater management**		CEPA8.3, CReMA15
	6.3	**R&D for waste and materials recovery and savings**		CEPA8.2, CReMA15
	6.4	**R&D for soil, surface and groundwater, biodiversity and forest**		CEPA8.4, 8.6, CReMA15
	6.5	**R&D for noise and radiation**		CEPA8.5, 8.7, CReMA15
7	**Cross-cutting and other activities**			[Σ – sum of below]
	7.1	**Environmental education and training**		CEPA9.1, CReMA16
	7.2	**General environmental administration, management, regulation, dissemination and consultancy**		CEPA9.2, CReMA16
	7.3	**Environmental activities not elsewhere classified**		CEPA9.4, CReMA16

Annex 3

Explanatory notes
Classification of environmental functions

Version October 2022

Contents

1. Air, climate and energy

Activities, measures and products aimed at reducing air emissions and/or concentration of air pollutants, production of energy from renewables and at energy savings.

For definitions of mitigation and adaptation, please refer to IPCC, 2018: Annex I: Glossary [Matthews, J.B.R. (ed.)]

It includes activities and measures related to reduction and control of air emissions (see CEF 1.1), to the production of renewable energy (see CEF 1.2) and to energy savings (see CEF 1.3)

It excludes activities and measures related to climate change adaptation

1.1. Reduction and control of air emissions (excluding energy related measures)

Activities, measures and products aimed at reducing emissions into the ambient air or reducing concentrations of air pollutants.

It includes measures and activities aimed at the control of emissions of greenhouse gases, air pollutants and gases that adversely affect the stratospheric ozone layer, such as:

• preventing air emissions through cleaner production processes and products

• treatment of air emissions through end of pipe processes and equipment

• monitoring air emissions

• all other activities aimed at reducing air emissions including education, training, information provision and general administration (ETIGA) activities

It excludes:

• measures undertaken for energy saving reasons (see CEF 1.3);

• climate change adaptation measures (e.g. disaster prevention activities dedicated to extreme weather events such as storms, heat waves, droughts, flood, etc.);

• measures related to renewable energy (see CEF 1.2)

1.1.1. Prevention of pollution

Activities, measures and products aiming to eliminate or reduce the air emissions and pollutants through In-Process Modifications (IPMs), through:

• cleaner production processes and other technologies (cleaner technologies);

• cleaner (adapted) products.

It includes:

• production and installation of processes designed to reduce the generation of air pollutants during production, storage or transportation, e.g.:

o fuel combustion improvement;

o recovery of solvents;

o prevention of spills and leaks through improving air-tightness of equipment, etc.

• modifying or adapting production process or facilities to enable either the substitution of raw materials, energy, catalysts and other inputs by non- (or less) polluting products, or the treatment of raw materials prior to their use in order to make them less polluting.

• electric and hybrid cars, buses and other cleaner and more efficient vehicles, including components (as specified in the Eurostat Guidance Note);

• charging stations and other essential infrastructure for recharging electric road vehicles;

Guidance note – Reporting of electric and more resource-efficient transport equipment in EPEA and EGSS accounts

1.1.2. Treatment

Activities, measures and products involving the installation, maintenance and operation of end-of-pipe equipment for the removal and/or reduction of air emissions and pollutants either from the combustion of fuels or from other processes.

Exhaust gases are emissions into the air, usually through exhaust pipes, stacks or chimneys. Ventilation air refers to the exhaust from air conditioning systems of industrial facilities.

It includes:

• Exhaust gas and air treatment for solids and liquids particulate: dry processes (through fabric filters, separators, dust collectors), wet processes (scrubbers, washing twers)

• Exhaust gas and air treatment for gaseous and vaporous materials through absorbtion processes, condensation processes, catalytic exhaust purification, biological exhaust gas cleaning (biowashers), post combustion

• Carbon capture and storage (CCS) & carbon capture and use (CCU) related infrastructure and systems operation;

• Activities aiming to increase the dispersion of gases so as to reduce concentrations of air pollutants.

1.1.3. Monitoring, measurement and similar

Activities, measures and products aimed at monitoring air emissions and pollutant concentrations

It includes:

• measurement services of air quality

• measurement services of exhaust gases from vehicles and heating systems

• monitoring related to the ozone depleting substances, greenhouse gases and air pollutants

• manufacturing and installation of monitoring and measurement equipment

It excludes:

• activities of weather stations

1.1.4. Other activities

All other activities, measures and products aimed at reducing air emissions and/or concentration of air pollutants.

It includes:

• education, training, information provision and general administration (ETIGA) activities

1.2. Energy from renewable sources

Activities, measures and products related to renewable energy.

It includes:

• the production of renewable energy, supporting services for renewable energy, monitoring, measurement and similar activities

1.2.1. Production of energy from renewable sources

Activities, measures and products related to the production of energy from renewable sources.

'- According to Directive 2018/2001 of the European Parliament and of the Council of 11 December 2018, sources for the production of renewable energy are:

• Wind

• Solar

• Aero-thermal

• Geothermal

• Hydrothermal and oCEFn energy

• Hydropower, excluding pump storage stations (which is to be recorded under CEF 1.3.1)

• Biomass (including biogas and biofuels)

• Landfill gas

• Sewage treatment plant gas and biogas

Biomass is defined as the biodegradable fraction of products, waste and residues of biological origin from nature, agriculture (including vegetal and animal substances), forestry and related industries including fisheries and aquaculture, as well as the biodegradable fraction of industrial and municipal waste. Biomass includes biofuel and biogas

It includes:

• production of electricity, heat and fuels (including H2) from renewable sources. For example: production of electricity from wind, production of heat from aerothermal, hydrothermal and geothermal sources, production of biofuels for transport, production of biogas and biofuels from waste etc., fuel wood production, wood pellets and other wood or vegetal based energy products, biofuels from recycled materials (cooking oil),

• production of renewable energy as non-market output for own use by households and as secondary output by producers classified in other industries;

• production of energy through incineration of biodegradable waste;

• production of energy from cogeneration and trigeneration plants using renewable fuels for this purpose.

It excludes:

• waste incineration without energy recovery (see CEF 3);

• waste incineration with energy recovery from non-biodegradable waste (see CEF 1.3);

• activities aimed at the use of renewable energy (e.g. distribution);

• production of biogas from sewage sludge (see CEF 2);

• production of biomass to be further processed into biofuels.

The production of energy from renewable sources can be further detailed at 4th level by type of renewable energy or split into three categories (renewable with and without CO2 emissions and non carbon based fuels) to have coherence with air emissions accounts

1.2.2. Equipment and technologies for renewable energy

Specific equipment for the production of energy from renewable sources.

It includes:

• equipment for producing energy from renewable sources (solar panels, photovoltaic cells, hydraulic turbines, wind turbines, fire wood and other biomass boilers, etc.);

• energy storage technology associated with renewable energy source (e.g. compressed air storage power stations, sensitive heat storage systems, latent heat storage system, hydrogen storage, power to gas i.e. storage of wind power in the form of hydrogen/methane);

1.2.3. Supporting services for renewable energy

Activities, measures and products related to the construction, installation and maintenance of renewable energy production sites

It includes:

• engineering and architectural services related to renewable energy

1.2.4. Monitoring, measurement and similar

Activities, measures and products aimed at monitoring renewable energy

It includes:

• inventories of renewable energy;

• assessments of the potential for renewable energy production.

1.2.5. Other activities

All other activities, measures and products related to renewable energy.

It includes:

• education, training, information provision and general administration (ETIGA) activities

1.3. Energy savings and management

Activities, measures and products aiming at reducing energy use such as in-process modifications (IPMs), reduction of losses, etc.

It includes:

• activities and measures aiming at providing energy savings through IPMs;

• activities and products aiming at minimising heat and energy losses and maximisation of energy recovery;

• activities and products concerning monitoring and management (M&M) related to energy saving;

• ETIGA linked to the management and saving of heat and energy.

It excludes:

• the production of energy, both from renewable sources and fossil fuels (CEF 1.2); operation of cogeneration and trigeneration plants that use renewable fuels as a specific example of production of energy from renewable sources;

• activities mainly aimed at reducing air pollution (CEF 1.1.1).

1.3.1. Energy savings through in-process modifications

Activities, measures and products aiming at minimising the consumption of energy through IPMs. These activities are often carried out as ancillary or own-final-use activities.

It includes:

• replacement or adjustment of production processes (including energy production processes);

• manufacturing and installation of heat recovery equipment;

• production of (non-renewable) energy from cogeneration and trigeneration plants;

• production of energy through incineration of non-biodegradable waste;

• equipment for heat and electricity cogeneration from non-renewable sources, manufacturing and installation of cogeneration plants and their components;

• equipment for heat, cold and electricity trigeneration from non-renewable sources, manufacturing and installation of trigeneration plants and their components;

• reducing losses in energy transportation;

• pumped-storage hydropower stations (PSHS);

• certain elements of smart grids, such as smart meters and specific software;

• the manufacturing and installing of all equipment used for energy storage (including PSHS), other than the ones specifically developed for the purpose of storing energy produced from renewable sources.

It excludes:

• activities related to the production of renewable energy from cogeneration and trigeneration plants (CEF 1.2.1)

1.3.2. Energy efficient buildings; other efficient energy-demand technologies

Activities, measures and products aiming at minimising the consumption of energy through the renovation of existing buildings and construction of energy efficient buildings as well as the use of other efficient energy-demand technologies.

Standards for renovation of the existing building stock and for construction of new buildings are set at the EU level. Check with the Directive amending the Energy Performance of Buildings Directive (2018/844/EU) for the definition of standards for efficient renovation and definition of new energy efficient buildings.

It includes:

• energetic refurbishment activities;

• construction of new energy efficient buildings;

• production of insulating materials and triple-glassed windows;

• energy efficient appliances and machinery.

1.3.3. Monitoring, measurement and similar

Activities, measures and products aimed at monitoring energy performances with the view of increasing energy efficiency

It includes:

• audits, production of energy performance certificates and assessments of energy savings potentials;

1.3.4. Other activities

All other activities, measures and products related to energy savings and management.

It includes:

• education, training, information provision and general administration (ETIGA) activities

2. Wastewater and water resources management

Activities, measures and products aimed at treating wastewater (up to environmental standards or quality norms) and at safeguarding stocks of water

Wastewater is defined as water that is of no further immediate value for the purpose for which it was used or in the pursuit of which it was produced because of quality, quantity, or time of its occurrence.

Septic tanks are tanks through which wastewater is flowing and the suspended matter is decanted as sludge - organic matter in the water and in the sludge are partly decomposed by anaerobic bacteria and other micro-organisms.

It includes activities and measures related to wastewater management (see CEF 2.1) and water savings and management of natural water (see CEF 2.2)

2.1. Wastewater management

Activities, measures and products aimed at the prevention of pollution of surface water through the reduction of the release of wastewater into inland surface water and seawater.

It includes:

• the collection and treatment of wastewater;

• septic tanks;

• monitoring activities;

• education, training, information provision and general administration (ETIGA) activities.

It excludes:

• actions and activities aiming to protect groundwater from pollutant infiltration and the cleaning up of water bodies after pollution (see CEF 4.1)

2.1.1. Prevention of pollution

Activities, measures and products aimed at reducing the generation of wastewater through in-process modifications (IPMs) through:

• cleaner and more efficient production processes and other technologies (cleaner technologies);

• cleaner (adapted) products.

It includes:

• production and installation of processes designed to reduce water pollutants or wastewater generated during production. Examples include separation of networks and treatment and re-use of water used in production processes, etc.;

• modifying or adapting an existing production process or facilities to enable the substitution of raw materials, catalysts and other inputs by non- (or less) water polluting products.

2.1.2. Sewerage networks

Activities, measures and products aimed at the operation, maintenance and repair of sewerage networks.

Sewerage networks which are the systems of collectors, pipelines, vehicles, tanks, conduits and pumps used in the process of transporting wastewater (rainwater, domestic and other wastewater) from the points of generation to either a sewage treatment plant or to a point where wastewater is discharged.

2.1.3. Wastewater treatment

Activities, measures and products aimed at treating wastewater up to environmental standards or quality norms.

Three broad types of treatment (mechanical, biological, and advanced treatment) are defined below. Alternative definitions of types of treatment may be used, e.g. based on removal rates for biological oxygen demand.

• Mechanical (or physical) treatment separates wastewater into treated water and sludge. Mechanical treatment includes the use of sedimentation and the use of screens to separate large solids. Sedimentation may be assisted by chemicals or flotation (elimination of sand, oil, part of the sludge, etc.).

• Biological treatment employs aerobic or anaerobic microorganisms to treat wastewater and results in treated wastewater and separate sludge containing microbial mass and pollutants. This activity is designed to eliminate pollution from oxidisable materials through the use of bacteria: activated sludge techniques or anaerobic treatment for specific concentrated wastewater. Biodegradable materials are treated with the addition of bacteria-enriched sludge in open or closed tanks.

• Advanced treatment reduces specific constituents in wastewater not normally achieved by other treatment options. It covers all processes which are not considered to be mechanical or biological. This activity is aimed at eliminating oxidisable non-biodegradable matter at a higher level, as well as metals, nitrate, phosphorous, etc. Special equipment is required for each depollution process.

It includes:

• mechanical (or physical) treatment;

• biological treatment;

• advanced treatment

• septic tanks, their maintenance and emptying as well as other products for septic tanks (biological activators, etc.);

• treatment of sewage sludge for disposal or other uses (e.g. agriculture, incineration with energy recovery and biogas production);

• construction and operation of sewage treatment plants and the treatment of sewage sludge for disposal or other uses (e.g. agriculture, incineration with energy recovery

and biogas production).

2.1.4. Treatment of cooling water

Activities, measures and products which bring cooling water up to environmental standards before releasing into the environment.

It includes:

• cooling towers (to the extent they are required to reduce pollution, as distinct from technical needs);

• cooling circuits for processing water and for condensing released vapour;

• equipment for enhancing the dispersion of cooling water on release;

It excludes:

• activities associated with the reduction of the use of cooling water and more efficient water cooling (for exemple in the energy sector) such as air cooling, circuits for use of cooling water for heating purposes, closed cooling circuits (CEF 2.2.1).

2.1.5. Monitoring, measurement and similar

Activities, measures and products aimed at monitoring the concentration of pollutants in wastewater and the quality of inland surface water and marine water at the place wastewater is discharged.

It includes:

• analysis and measurement of pollutants, etc

2.1.6. Other activities

All other activities, measures and products aimed at wastewater management.

It includes:

• education, training, information provision and general administration (ETIGA) activities

2.2. Water savings and management of natural water resources

Activities, measures and products aiming at the minimisation of intake from inland waters and at increasing stocks of water.

It includes:

• activities and measures aiming at providing water savings through IPMs;

• activities and products aiming at minimising water losses and leaks and at water reuse;

• activities and products concerning monitoring and management (M&M) related to water savings;

• ETIGA linked to the management and saving of water.

It excludes:

• activities of collection, treatment and distribution of water (e.g. construction of dams and reservoirs on rivers for the purposes of increasing water stocks);

• activities related to dykes and embankments (e.g. damming activities) as they are related to natural risk management and protection of human property;

• activities performed for the main purpose of improving water quality, fighting water salinity, e.g. in coastal areas increasing groundwater stocks specifically to avoid saltwater intrusion into freshwater (CEF 4.1) or protection of soil against erosion e.g. in mountainous areas (CEPA 4.1);

• M&M related to monitoring pollutant concentrations in wastewater and water quality at the place wastewater is discharged (see CEF 2.1.5);

• M&M related to the monitoring of surface water quality and groundwater and marine waters (see CEF 4.1).

2.2.1. Reduction of the intake of water

Activities, measures and products aimed at reducing the intake of water per unit of output through in-process modifications (IPMs).

It includes all kinds of adjustment of existing technologies for reducing the intake of water as for example:

• cultivation of plants that use less water for agriculture;

• the construction and installation of drip irrigation systems;

• activities associated with the reduction of the use of cooling water and more efficient water cooling (for exemple in the energy sector) such as air cooling, circuits for use of cooling water for heating purposes, closed cooling circuits.

2.2.2. Water reuse and savings, reduction of water losses and leaks

Activities, measures and products aimed at the reduction of water losses and leaks, water reuse and savings

It includes:

• desalinization of seawater,

• rainwater collection,

• construction or installation of water re-use systems, i.e. of systems which capture rainwater or transform wastewater (from industrial processes or households' use) into water that can be used in production processes or by households (e.g. for irrigation, toilet flushing) and of water saving systems for taps, toilets etc.,

• maintenance and repair of water pipelines, water recirculation and more water efficient appliances.

2.2.3. Replenishment of water resources

Activities, measures and products aimed at increasing water stocks

It includes:

• for example: recharge of groundwater bodies through infiltration systems, development of vegetal cover and landscape works to increase water infiltration.

It excludes:

• activities with the primary purpose of prevention and remediation of soil and groundwater salinity (see CEF 4.1)

• activities related with the maintenance of the quality of water bodies (see CEF 4.1)

• activities related to the restoration of aquatic habitats (CEF 4.2)

2.2.4. Monitoring, measurement and similar

Activities, measures and products aimed at measuring and monitoring the use and the level of water stocks

It includes:

• for example: manufacture of electric contact gauge or pressure probes.

2.2.5. Other activities

All other activities, measures and products related to water savings and management of natural water.

It includes:

• education, training, information provision and general administration (ETIGA) activities, for example: information campaigns to encourage water savings, release of licences for water abstraction, activities of general government units or parts thereof that administer and regulate the use of water resources or are responsible for water saving policies.

3. Waste, materials recovery and savings

Activities, measures and products aimed at managing waste (CEF 3.1) and at reducing the use of materials (CEF 3.2)

3.1. Waste management

Activities, measures and products which prevent the generation of waste and reduce the harmful effects of waste on the environment.

'Waste is any substance or object which the holder discards or intends or is required to discard (Directive 2008/98/EC Article 3(1)). Waste may be generated during the extraction of raw materials, during the processing of raw materials to intermediate and final products, during the consumption of final products, and during any other human activity.

It includes:

• prevention of waste

• collection, transport, treatment and disposal of waste including low-level radioactive waste;

• monitoring activities;

• education, training, information provision and general administration (ETIGA) activities

• street cleaning and the collection of public litter

• goods specifically aiming at waste management (e.g. bins, containers, trucks for waste collection);

It excludes:

• snow and ice removal;

• materials recovery including processing of waste into secondary raw materials (see CEF 3.2);

• production of biogas and biofuels from waste (see CEF 1.2);

• production of energy through incineration of waste (see CEF1.2, from biodegradable waste or CEF 1.3, from non-biodegradable waste and where bio-degradable and non-biodegradable waste fractions cannot be separated);

• environmental protection measures and activities related to discharging of waste materials directly into ambient water (included in CEF 2.1 or CEF 4.1) or air (included in CEF 1.1);

• collection and treatment of high level radioactive waste (included in CEPA 5.2).

3.1.1. Prevention of waste generation

Activities, measures and products aimed at eliminating or reducing the generation of solid waste through IPMs through:

• cleaner and more efficient production processes and other technologies (cleaner technologies);

• cleaner (adapted) products

Following the WFD (Directive 2008/98/EC):

'prevention' means measures taken before a substance, material or product has become waste, that reduce:

(a) the quantity of waste, including through the re-use of products or the extension of the life span of products;

(b) the adverse impacts of the generated waste on the environment and human health;

(c) the content of hazardous substances in materials and products;

It includes:

• replacing an existing production process by a new process such that the toxicity or volume of waste produced is reduced. This includes separation and reprocessing (cleaner technologies);

• modifying or adapting the production processes or facilities to enable substitution of raw materials, catalysts and other intermediate inputs with new, "adapted" inputs whose use produces less waste or less hazardous waste (cleaner products).

3.1.2. Collection and transport

Collection of waste, either by municipal services or similar institutions or by public or private corporations, and its transport to the place of treatment or disposal.

WFD (Directive 2008/98/EC):

- 'collection' means the gathering of waste, including the preliminary sorting and preliminary storage of waste for the purposes of transport to a waste treatment facility;

- 'separate collection' means the collection where a waste stream is kept separately by type and nature so as to facilitate a specific treatment.

It includes:

• the separate collection and transport of waste fractions to facilitate recovery, collection and transport of hazardous waste;

• collection and transport of demolition waste;

• the part of street cleaning involving litter and collection of garbage.

It excludes:

• winter services, i.e. snow and ice removal services to ensure roads are passable in winter.

3.1.3. Treatment (incl. preparatory) and disposal of hazardous waste

Activities, measures and products which change the physical, chemical, or biological character or composition of waste to render it non-hazardous, safer for transport, amenable for recovery or storage, or to reduce it in volume as well as operations of final disposal. A particular waste may undergo more than one treatment process.

Hazardous waste is waste which poses a substantial actual or potential hazard to human health or living organisms due to its toxic, infectious, radioactive, flammable or other character as defined by Annex III of EU Directive 2008/98/EC.

Physical treatment of hazardous waste fixes the waste in an inert, impervious matrix via phase separation and solidification.

Chemical treatment is used both to effect the complete breakdown of hazardous waste into non-toxic gases and, more usually, to modify the chemical properties of the waste, e.g. to reduce water solubility or to neutralise acidity or alkalinity.

Thermal treatment of hazardous waste converts hazardous waste into gases and incombustible solid residues via high-temperature oxidation. The flue gases are released into the atmosphere and any slag or ash produced is deposited in the landfill. The main technologies used in the incineration of hazardous waste are the rotary kiln, liquid injection, incinerator grates, multiple chamber incinerators, and fluidised bed incinerators. Residues from hazardous waste incineration may themselves be regarded as hazardous waste. The resulting thermal energy may or may not be used for the production of steam, hot water, or electricity.

Disposal of waste is the final deposition of waste above or underground in controlled or uncontrolled fashion, in accordance with the sanitary, environmental or security requirements.

Landfill refers to final disposal of hazardous waste in or on land in a controlled way, which meets specific geological and technical criteria.

Underground disposal refers to temporary storage or final disposal of hazardous wastes underground that meet specific geological and technical criteria.

It <u>includes</u>:

• treatment of low-level radioactive waste, defined as waste which does not require shielding during normal handling and transportation due to its low radionuclide content.

• physical/chemical, thermal and biological treatment, including the construction of specific facilities;

• conditioning of wastes, and any other relevant treatment method;

• incineration (with no energy recovery) including waste gasification and pyrolysis

• landfill;

• containment;

• underground disposal, and any other relevant disposal method excluding dumping at sea.

It <u>excludes</u>:

- activities related to high level radioactive waste (see CEF 5.2)
- activities aimed at materials recovery (CEF 3.2)

3.1.4. Treatment (incl. preparatory) and disposal of non-hazardous waste

Activities, measures and products which change the physical, chemical, or biological character or composition of waste to render it amenable for recovery or storage, or to reduce it in volume as well as operations of final disposal.

Incineration is the thermal treatment of waste during which chemically fixed energy in matter is transformed into thermal energy. Combustible compounds are transformed into combustion gases leaving the system as flue gases. Incombustible inorganic matters remain in the form of slag and fly ash.

It includes:

• treatment of non-hazardous waste: physical/chemical treatment, biological treatment and any other treatment method (such as composting), including the construction of specific facilities

• disposal of non-hazardous waste: incineration in the case of non-energy use, landfill and any other disposal method, including the construction of specific facilities (e.g. waste disposal sites)

It excludes:

- backfilling using demolition waste (see CEF 3.2)
- activities aimed at materials recovery (CEF 3.2)

3.1.5. Monitoring, measurement and similar

Activities, measures and products aimed at monitoring waste and waste management, for exemple the generation and storage of waste, their toxicity, etc.

3.1.6. Other activities

All other Activities, measures and products aimed at waste management, including ETIGA activities specific to CEF 3.1 when they can be separated from other activities belonging to CEF 3.1 and from similar activities related to other environmental protection classes

It includes:

• education, training, information provision and general administration (ETIGA) activities, as for exemple: e.g. campaigns to inform and encourage waste reduction, implementation of guidelines for waste prevention, etc.

3.2. Materials recovery and savings

Activities, measures and products aiming at minimising the intake of natural resources through increased efficiency, substitution, recovery and reuse of materials

Restoration of materials found in the waste stream to a beneficial use which may be for purposes other than the original use (EEA Glossary).

Following the WFD (Directive 2008/98/EC) recovery' means any operation the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function, in the plant or in the wider economy.

'material recovery' means any recovery operation, other than energy recovery and the reprocessing into materials that are to be used as fuels or other means to generate energy.

'recycling' means any recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes. It includes the reprocessing of organic material but does not include energy recovery and the reprocessing into materials that are to be used as fuels or for backfilling operations

It includes:

• activities aiming at minimising the intake of natural resources per unit of output through IPMs;

• recovery from waste streams;

• reuse of products;

• activities and products concerning monitoring and management (M&M) and similar related to the reduction material use;

• ETIGA activities linked to the management of material resources.

It excludes:

• activities related to the management of biological natural resources (CEF 4.2 and 4.3) and water (CEF 2.2);

• activities related to the management of fossil energy resources.

3.2.1. Wood and paper

Activities, measures and products aiming at minimising the intake of wood through increased efficiency, substitution, recovery and reuse of materials

It includes:

• activities aiming at minimising the intake of timber resources per unit of output through IPMs, for example: wood saving saws, more efficient wood stoves and furnaces;

• recovery of wood and paper (inclusing cardboard) from waste streams

• reuse forest products and by-products, for example: reuse of timber products;

• activities and products concerning M&M and similar related to the reduction of wood and paper use;

• ETIGA activities linked to the management of forest resources.

it excludes:

• the collection, transportation and sorting of waste (CEF 3.1);

• the production of energy from waste (CEF 1.2 and CEF 1.3);

3.2.2. Minerals

Activities, measures and products aiming at minimising the intake of minerals (metallic and non-metallic) through increased efficiency, substitution, recovery and reuse of materials

It includes:

• activities aimed at minimising the intake of minerals through IPMs, for example: all the kinds of replacement or adjustment of production processes aiming at reducing the use of mineral resources; backfilling using demolition waste;

• activities that aim at substituting mineral-based materials by wood-based materials (or materials made of other abundant, renewable resource) for construction;

• activities aimed at reducing scrap and the recovery of mineral based materials from waste streams. This includes the processing of metallic and non-metallic mineral materials waste and scrap and end-of-life products into secondary raw materials. For example:

o mechanical crushing or reduction of metal waste from used cars, washing machines, bikes, railway wagons etc.;

o shredding of metal waste, end-of-life vehicles, dismantling of vessels, etc.;

o physical-chemical and thermal processes for recovery especially for

metals;

o other methods of mechanical treatment as cutting, pressing to reduce the volume;

o reclaiming metals out of photographic waste, e.g. fixer solution or photographic films and paper; recycling of spent batteries and accumulators;

o crushing, cleaning and sorting of glass;

o crushing, cleaning and sorting of other waste such as demolition waste to obtain secondary raw material;

• activities and products concerning M&M and similar related to the reduction of minerals use;

• ETIGA activities linked to the management of minerals.

It excludes:

• exploitation of mineral resource stocks (including exploration and discovery of new reserves);

• measures and activities that improve the efficiency of mineral resources extraction.

• the collection, transportation and sorting of waste (CEF 3.1);

• the production of energy from waste (CEF 1.2 and CEF 1.3);

3.2.3. Plastic

Activities, measures and products aiming at minimising the intake of fossil fuels resources for non energy uses through increased efficiency, substitution, recovery and reuse of materials

It includes:

• activities aiming at the minimisation of the intake of fossil energy resources for uses other than energy production (e.g. the production of plastics, chemicals, rubber) through IPMs, for example: replacement or adjustment of technologies;

• recovery of materials made from fossil energy resources, for example: processing of petro-based waste into secondary raw materials (plastic recovery through mechanical/chemical processes); recovery of textiles (from petrochemical materials), recycled inkjet and toner cartridges for printers;

• production of substitutes for materials made of fossil fuels, for example: bio-based sacks and bags, including paper bags, for replacing plastic bags; other bio-based plastics, composites, lubricants, solvents, detergents, paints, lacquers, varnishes and packaging, etc. which replace comparable and commonly used fossil-fuel based products;

• activities and products concerning M&M related to the reduction of the use of fossil fuel for uses other than energy production;

• ETIGA activities linked to the management and saving of fossil resources used as an input for production processes other than energy production.

It excludes:

• the collection, transportation and sorting of waste (CEF 3.1);

• the production of energy from waste (CEF 1.2 and CEF 1.3);

3.2.4. Textiles

Activities, measures and products aiming at minimising the intake of natural resources for producing textiles through increased efficiency, substitution, recovery and reuse of materials

It includes:

• activities aiming at the minimisation of the intake of natural resources for producing textiles through IPMs;

• recovery of textiles: of clothing (made of wool, cotton and similar), household textiles (bed linen, towels and similar), home textiles (carpets, curtains and similar), technical textiles (medical textiles, textiles in vehicle construction and building industry);

• activities and products concerning M&M related to the recovery of textiles;

• ETIGA activities linked to recovery of textiles.

It excludes:

• the collection, transportation and sorting of waste (CEF 3.1);

• the production of energy from waste (CEF 1.2 and CEF 1.3);

3.2.5. Other materials

Activities, measures and products aiming at minimising the intake of other natural resources through increased efficiency, substitution, recovery and reuse of materials.

It includes:

• activities aiming at the minimisation of the intake of other natural resources through IPMs;

• recovery of other materials;

• activities and products concerning M&M related to the recovery of other materials;

• ETIGA activities linked to recovery of other materials.

It excludes:

• the collection, transportation and sorting of waste (CEF 3.1);

• the production of energy from waste (CEF 1.2 and CEF 1.3);

3.2.6. Monitoring, measurement and similar

Activities, measures and products aimed at measuring and monitoring the reduction of the use of natural resources used as materials.

3.2.7. Other activities (related to the recovery of materials)

All other activities, measures and products related to the reduction of intake of natural resources used as materials.

It includes:

• ETIGA activities linked to recovery of other materials;

• all other activities related to material recovery

4. Soil, surface and groundwater, biodiversity and forest

Activities, measures and products aimed at protection and remediation of soil and water, biodiverity and forests

4.1. Protection of soil, surface and groundwater

Activities, measures and products aimed at the prevention of pollutant infiltration, cleaning up of soils and water bodies and the protection of soil from erosion and other physical degradation including salinisation.

It includes:

• prevention of pollutant infiltration

• cleaning up of soil and water bodies

• protection from erosion

• prevention and remediation of soil and groundwater salinity

• monitoring of soil and groundwater pollution

• activities for protection and remediation of marine environment

It excludes:

• wastewater management activities (see CEF 2.1),

• activities aimed at the protection of biodiversity and landscape (see CEF 4.2).

4.1.1. Prevention of pollutant infiltration

Activities, measures and products aimed at reducing or eliminating the penetration of polluting substances into soil and water.

It includes:

• activities related to sealing of soils of industrial plants;

• installation of catchment for pollutant run-offs and leaks;

• strengthening of storage facilities;

• organic farming as well as agricultural and grazing practices less harmful for soils and water bodies;

• transportation of pollutant products.

4.1.2. Cleaning up of soil and water bodies

Activities, measures and products to reduce the quantity of pollutants in soil and water bodies either in situ or in appropriate installations.

It includes:

• soil decontamination at former industrial sites, landfills and other black spots, with activities consisting of for exemple: measures for separating, containing and recovering deposits, extraction of buried casks and containers, decanting and re-storage, installation of off-gas and liquid effluent drainage networks, soil washing by means of degasification, pumping of pollutants, removal and treatment of polluted soil, biotechnological methods capable of intervening without affecting the site (use of enzymes, bacteria, etc.), physical and chemical techniques such as pervaporation and extraction using supercritical fluids, injection of neutral gases or bases to stifle internal fermentation, etc..

• dredging of pollutants from water bodies (rivers, lakes, estuaries, etc.);

• the decontamination and cleaning up of surface water following accidental pollution e.g. through collection of pollutants or through application of chemicals;

• the cleaning up of oil spills on land, inland surface waters and seas – including coastal areas.

It excludes:

• civil protection services;

• the liming of lakes and artificial oxygenation of water bodies (see CEF 4.2).

4.1.3. Protection from erosion and other physical degradation of soil and water

Activities, measures and products aimed at protecting soil from erosion and other physical and chemical degradation of soil and water (compacting, encrusting, marine water contamination, etc.).

Soil erosion is the detachment and movement of topsoil or soil material from the upper part of the profile by the action of wind or running water especially as a result of changes brought about by human activity (such as unsuitable or mismanaged agricultural methods).

It includes:

• activities intending to restore the protective vegetal cover of soils;

• construction of anti-erosion walls;

• control of eutrophication and growth of green algae

• organic aquaculture.

It excludes:

• conventional agricultural production;

• protection of settlements against natural hazards such as landslides.

4.1.4. Prevention and remediation of soil and groundwater salinity

Activities, measures and products aimed at preventing salinisation or reducing salinity. Concrete actions will depend on climatic, geological and other country-specific factors.

It includes, if undertaken for an explicit purpose of prevention and remediation of soil and groundwater salinity:

• actions to increase groundwater tables, e.g. through increased freshwater infiltration to avoid infiltration of seawater into groundwater bodies;

• lowering of groundwater tables (when groundwater contains high levels of salts) through long-term re-vegetation programmes, changes in irrigation practices, etc.

It excludes:

• measures that respond to economic purposes (conventional agricultural production, reclamation of land from the sea, etc.).

4.1.5. Monitoring, measurement and similar

All Activities, measures and products aimed at monitoring the quality and pollution of soils, groundwater and surface water, measuring the extent of soil erosion and salinisation etc.

It includes:

• the operation of monitoring systems;

• inventories of "black spots";

• maps and databases of groundwater and surface water quality, soil pollution, erosion and salinity, etc.

4.1.6. Other activities

All other activities, measures and products aimed at protecting and remediating soil, groundwater, surface water and marine waters. It includes ETIGA activities specific to the CEF 4.1, when they can be separated from other activities belonging to CEF 4.1 and from similar activities related to other environmental protection classes.

It includes:

• education, training, information provision and general administration (ETIGA) activities;

• all other activities related to protection of soil, surface and groundwater.

4.2. Protection of biodiversity and landscape

Activities, measures and products aimed at protecting and replenishment of wild fauna and flora, safeguarding and restoring their habitats, ecosystems of which they are part, natural or semi-natural landscapes. Such activities, measures and products are included regardless of the type of areas involved (terrestrial, aquatic incl. wetlands, and marine areas) and whether they occur in areas which are classified as protected areas.

It includes:

• the environmental rehabilitation of abandoned mining and quarrying sites and related expenditure.

It excludes:

• farming and gardening activities (outside the scope of CEF classification with the exception of organic farming included under CEF 4.1);

• the protection and rehabilitation of historic monuments or predominantly built-up landscapes;

• the control of weeds for agricultural purposes;

• the recreational structures and spaces such as urban parks and gardens, golf courses and other sports facilities;

• management of zoos, oceanarium, aquarium, and of city greenery;

• establishment and maintenance of green spaces along roads;

• 'extraction' activities, such as 'hunting' or 'fishing';

• activities related to soil cleaning are to be reported under CEF 4.1.

4.2.1. Protection and rehabilitation of species and habitats

Activities, measures and products aimed at the conservation, reintroduction or recovery of wild fauna and flora (irrespective of whether threatened by extinction), the maintenance of their habitats, and the restoration, rehabilitation and reshaping of damaged habitats for the purpose of strengthening their natural functions. Activities aimed at the minimisation of the intake of wild flora and fauna for production purposes, through IPMs, are also covered.

It includes:

• conserving genetic heritage, monitoring and restricting (placing bans on) exploitation, trade, etc. of specific animal and plant species, for protection purposes;

• creation of gene reserves or banks, improvement of linear infrastructures (e.g., underground passages or bridges for animals at highways or railways, the restoration of small-scale structures like hedges or orchards, green bridges etc.), feeding of the young, management of special natural reserves (botanical conservation areas, etc.);

• species conservation including re-introduction of locally extinct species and species repopulation;

• control of invasive alien species that pose a threat to native fauna, flora and habitats;

• control of native species with an intensive development that pose a threat to native fauna, flora and habitats (case of boar or deer);

• restoration activities (replenishment of wild flora and fauna stocks), for example: repopulation of stocks of wild fauna by introducing new individuals;

• activities for the restoration of water bodies as aquatic habitats: artificial oxygenation and lime-neutralisation actions;

• renaturalisation of river banks;

• land control: purchase of land for protection of species and habitats;

• production of fishing nets which reduce the by-catch, production of pesticides with no (lower) impact on the wild flora, algorithm to switch off the wind turbines, the installation of warning sounds to protect the bats;

• measures that protect plants or a stand of plants, like trees, from mechanical or chemical damage.

It excludes:

• activities aimed at the minimisation of the intake wild growing forest products (CEF 4.3.1).

4.2.2. Protection of natural and semi-natural landscapes

Activities, measures and products aimed at protecting natural and semi-natural landscapes to maintain and increase their ecological value.

It includes:

• the preservation of legally protected natural objects;

• environmental rehabilitation of abandoned mining and quarrying sites;

• burying electricity lines;

• maintenance of landscapes that are the result of traditional agricultural practices threatened by prevailing economic conditions, etc.;

• renaturation of artifical lakes and bogs;

• biodiversity and landscape protection related to agriculture.

It excludes:

• measures taken in order to protect historic monuments, measures to increase aesthetic values for economic purposes (e.g., re-landscaping to increase the value of real estates);

• protection of predominantly built-up landscapes.

4.2.3. Monitoring, measurement and similar

Monitoring, analysis and inspection activities, measures and products which are not classified under the preceding items.

It includes:

• for example: censuses, inventories, databases of flora and fauna.

4.2.4. Other activities

All other activities, measures and products aimed at protecting species and habitats and landscapes. It includes ETIGA activities specific to CEPA 6, when they can be separated from other activities belonging to CEPA 6 and from similar activities related to other environmental protection classes.

It includes:

• education, training, information provision and general administration (ETIGA) activities, for example: general government activities for preserving stocks through the enforcement of quotas, regulation, monitoring, control (including police functions) for e.g. fishing activities, the management of wild game reserves which preserves resource functions;.

4.3. Management of forest resources

It includes activities, measures and products related to the preservation and replenishment of timber stocks and sustainable management of forests. The management of forest resources concerns all types of forests (planted, natural or naturally regenerated according to SEEA classification) in both forests available for wood supply and forests not available for wood supply, but excluding the management of protected areas and nature conservation activities (CEF 4.2).

It includes:

• restoration, replenishment activities or development of new forest areas, for example: reforestation and afforestation, machinery for planting;

• the prevention and control of forest fires, biological and mechanical control of pests, for example: development of firewalls;

• forest-management-related land improvements, for example: soil conservation, fertilisation and liming to improve soil properties, terracing works to reduce erosion, reclamation of unproductive land and land from sea for forestry;

• activities and products concerning M&M related to sustainable management of forests;

• ETIGA activities linked to the sustainable management of forests.

It excludes:

• activities related to roundwood production (both industrial roundwood and fuelwood) and extraction of non-wood forest products (mushrooms, truffles, berries, nuts, balata and other rubber-like gums, cork, lac and resins, balsams, vegetable hair, eelgrass, acorns, horse chestnuts, mosses and lichens);

• afforestation, reforestation with invasive alien tree species or management of invasive alien tree species for timber production

• control of invasive alien tree species (CEF 4.2);

• pest control using chemical agents (of non-biological origin);

• buildings, unless serving exclusively forest-related environmental purpose;

• machinery associated with timber extraction and machinery associated with fire-protection unless serving exclusively to fight forest fire;

• activities of soil protection outside forest areas (CEF 4.1);

4.3.1. Reforestation and afforestation

Activities, measures and products aimed at restoration, replenishment or development of new forest areas.

It includes:

• growing of standing timber: planting, replanting, transplanting, thinning and conserving of forests and timber tracts

• growing of coppice, pulpwood and fire wood

• operation of forest tree nurseries

• Manufacturing of equipment dedicated to silviculture

4.3.2. Protection against forest fires

Activities, measures and products aimed at the prevention and control of forest fires

It includes:

• manufacturing and installing of firebreaks;

• other activities linked to the control of forest fires

4.3.3. Monitoring, measurement and similar

Activities, measures and products aimed at monitoring the management of the forest resources

It includes:

• forestry inventories

• forest management consulting services

• timber evaluation

• forest pest control

4.3.4. Others activities

All other activities, measures and products aimed at sustainable management of forest resources

It includes:

• education, training, information provision and general administration (ETIGA) activities related to sustainable management of forests

• all other activities related to sustainable management of forests

5. Noise and radiation

Activities, measures and products aimed at the control, reduction and abatement of industrial and transport noise and the reduction or elimination of the negative consequences of particle radiation emitted from any source.

5.1. Protection against noise and vibration

Activities, measures and products aimed at the control, reduction and abatement of industrial and transport noise.

It includes:

• activities for the abatement of neighbourhood noise (soundproofing of dancing halls, etc.);

• activities for the abatement of industrial and transport noise and vibration in places frequented by the public (schools, etc.).

It excludes:

• abatement of noise and vibration for purposes of protection for employees in the workplace .

5.1.1. Prevention and reduction of noise and vibration

Activities, measures and products aimed at reducing noise and vibration from industrial equipment, vehicle motors, aircraft and ships engines, exhaust systems and brakes, or noise level due to tyre/road or wheel/rail surface contact and activities and measures aimed at installing and managing anti-noise / anti-vibration facilities.

It includes:

• adaptation of equipment, vehicles (buses, trucks, or train and power units in the case of rail transport, aircraft and ships) in order to make them less noisy: soundproofing of hoods, brakes, exhaust systems, silencers etc.;

• equipment and machines conceived or constructed for low noise or vibrations, low noise level flares and burners, etc.;

• noise abatement through the modification of surfaces such as substituting concrete by silent asphalt, multi-layered surfaces, etc.

screens, embankments or hedges;

• covering sections of urban motor ways or railroads;

• measures to limit industrial and vicinity noise:

- o add-on facilities, covering and soundproofing of machines and piping, fuel regulation systems;
- o sound absorption, noise screens, barriers, soundproofing of buildings, noise protective windows;
- o plant modifications, specially conceived foundations to absorb vibrations, extra cost for regrouping of buildings and/or of facilities in the interest of noise abatement, special facilities in building construction or reconstruction

5.1.2. Monitoring, measurement and similar

Activities, measures and products aimed at monitoring the level of noise and vibration

It includes:

• for examples the installation and operation of stationary measurement and monitoring sites or mobile equipment in urban areas, observation networks, etc..

5.1.3. Other activities

All other activities, measures and products aimed at noise and vibration abatement.

It includes:

• education, training, information provision and general administration (ETIGA) activities, for example training to raise awareness of noise issues (e.g. through educational initiatives for schools, educational media, and national or international campaigns such as “International Noise Awareness Day”);

• development of noise reduction action plans when relevant measures can be traced as a distinct activity;

• traffic management; introduction of time and geographical restrictions for noisy vehicles;

• bypass roads which divert traffic from residential areas; creation of pedestrian areas; creation of construction-free buffer zones;

• financial incentives for the production and use of low-noise vehicles; labelling or information programmes for consumers which encourage the use of low-noise vehicles and low-noise driving.

5.2. Protection against radiation

Activities, measures and products aimed at the reduction or elimination of the negative consequences of particle radiation emitted from any source.

Radioactive waste is defined as any material that contains or is contaminated with radionuclides at concentrations or radioactivity levels greater than the "exempt quantities" established by the competent authorities, and for which no use is foreseen. Radioactive wastes are produced at nuclear power plants and at associated nuclear fuel cycle facilities as well as through other uses of radioactive material, for example, the use of radionuclides in hospitals and research establishments. Other important wastes are those from mining and milling of uranium and from the reprocessing of spent fuel.

It includes:

• collection, conditioning, handling, transportation, treatment and disposal of high-level radioactive waste, i.e. waste that, because of its high radionuclide content, requires shielding during normal handling and transportation.

It excludes:

• activities and measures related to the prevention of technological hazards (e.g. external safety of nuclear power plants);

• protection measures taken at workplaces;

• activities and measures relating to electromagnetic and acoustic radiation;

• activities related to collection and treatment of low-level radioactive waste (see CEF 3);

5.2.1. Protection of ambient media

Activities, measures and products for the protection of soil, air and water and other ambient media from radiation

It includes

• protection measures such as screening, creation of buffer zones, etc.

5.2.2. Transport and treatment of high level radioactive waste

Activities, measures and products related to any process designed for the transport, conditioning, containment or underground disposal of high-level radioactive waste.

It includes:

• Collection and transport of high-level radioactive waste,

• Conditioning of high-level radioactive,

• Underground disposal of high-level radioactive waste (construction of burial sites for radioactive waste and the manufacturing and installation of relating equipment)

5.2.3. Monitoring, measurement and similar

Activities, measures and products aimed at monitoring ambient radioactivity and radioactivity due to high level radioactive waste by means of specific equipment, instruments and installations

It includes:

• audits, production of energy performance certificates and assessments of energy savings potentials;

5.2.4. Other activities

All other activities, measures and products related to protecting ambient media against radiation.

It includes:

• education, training, information provision and general administration (ETIGA) activities.

6. Research and development

R&D for developing the stock of knowledge related to the prevention and elimination of all forms of pollution and the preservation of natural resources stocks. This includes the conception of new applications of available knowledge in the field of environmental protection and resource management.

Research and development (R&D) comprises “creative and systematic work undertaken in order to increase the stock of knowledge…and to devise new applications of available knowledge” (see Frascati manual, OECD 2015) in the field of environmental protection. Environmental R&D is classified in accordance with the 2007 NABS (Nomenclature for the Analysis and Comparison of Scientific Programmes and Budgets).

It includes:

• identification and analysis of sources of pollution (incl. climate change), mechanisms of dispersion of pollutants in the environment as well as their effects on human beings and the biosphere;

• resource management oriented R&D;

• R&D oriented towards equipment and instruments for pollution/resource use, incl. treatment, abatement, measurement and analysis.

6.1. R&D for air, climate and energy (CEF1)

R&D related to the reduction of air emissions and/or concentration of air pollutants.

It includes R&D related to renewable energy and energy savings and management such as:

• R&D related to electromobility;

• R&D related to the development of carbon capture and storage processes;

• R&D related to methanation and hydrogen upgrading processes.

6.2. R&D for wastewater and water resources (CEF2)

R&D related to treating wastewater (up to environmental standards or quality norms) and at saufeguarding stocks of water.

It includes:

• R&D related to membrane technology for wastewater and water treatment.

6.3. R&D for waste and materials recovery (CEF3)

R&D related to waste management and materials recovery

6.4. R&D for soil, surface and groundwater, biodiversity and forest (CEF4)

R&D related to the protection and remediation of soil and water, biodiverity and forests

6.5. R&D for noise and radiation (CEF5)

R&D related to the reduction and abatement of industrial and transport noise and the reduction or elimination of the negative consequences of particle radiation emitted from any source.

7. Cross-cutting and other activities

All ETIGA activities, measures and products related to environmental protection and resource management in the case that they cannot be classified in CEF 1-5.

It includes:

• activities aimed at the general support of decisions taken in the context of resource management activities by government or non-government bodies, for example: preparation of declarations or requests for permission, internal resource management, environmental certification processes (ISO 14000, environmental management), activities of units specialised in consultancy, supervision and analysis, regulation;

• education, training and information, for example: high school programs, university degrees or special courses specifically aimed at training for resource management;

• international financial aid where it may be difficult for the donor countries to attribute related expenditure to individual CEF classes.

7.1. General environmental administration, management, regulation, dissemination and consultancy

Administration, management and support to decisions regarding environmental protection and resource management by government and non-government bodies.

It includes:

• regulation by the government;

• preparation of declarations or requests for permission;

• internal environmental management;

• environmental certification processes (ISO 14000, environmental management);

• activities of units specialised in environmental consultancy, supervision and analysis.

7.2. Environmental education and training

Activities, measures and products aimed at providing general environmental education or training and disseminating environmental information not elsewhere classified.

It includes:

• high school programs related to environmental protection and resource management;

• university degrees or special courses specifically aimed at training for environmental protection and resource management;

• continuing education programmes aimed at training for environmental protection and resource management

• environmental reports, environmental training tools (including web sites or platforms)

7.3. Environmental activities not elsewhere classified

This position groups together all environmental protection and resource management activities, measures and products that cannot be classified under other CEF classes.

It includes:

International financial aid due to difficulties in attributing international aid to individual classes.

8. Borderline cases

1. Air, climate and energy

Production of biogas and biofuels from waste is reported under CEF 1.2. When different data sources and consequently different classifications are used, issues of double counting may arise.

In this specific case double counting occurs if:

• waste management output is estimated based on NACE classification

(38.1+38.2 NACE rev.2 groups) and

• production of biogas and biofuels from waste is estimated based on CPA.

Double counting occurs because NACE 38.2 rev.2 already covers production of biogas from waste. To avoid double counting, production of biogas and biofuels has to be deducted from total waste management output in CEF 3.1

Production of energy through incineration of waste is reported under CEF 1.2. When different data sources and consequently different classifications are used issues of double counting may arise.

In this specific case double counting occurs if

• waste management output is estimated based on NACE classification

(38.1+38.2 NACE rev.2 groups) and

• production of energy from incineration of waste is estimated based on CPA.

Double counting occurs because NACE 38.2 rev. 2 covers incineration of waste regardless of whether energy is produced. To avoid double counting, production of energy from waste (biodegradable and non-biodegradable) has to be deducted from total waste management output in CEF 3.1.

1.1.4 Air, climate and energy; Reduction and control of air emissions ; Other activities

ETIGA activities should be reported here when they can be separated from other activities belonging to CEF 1.2 and from similar activities related to other CEF-domains

1.2.5 Air, climate and energy; Energy from renewable sources; Other activities

ETIGA activities should be reported here when they can be separated from other activities belonging to CEF 1.2 and from similar activities related to other CEF-domains+I19

1.3.4 Air, climate and energy; Energy savings and management; Other activities

ETIGA activities should be reported here when they can be separated from other activities belonging to CEF 1.3 and from similar activities related to other CEF-domains

3 Waste, materials recovery and savings

Production of biogas and biofuels from waste is reported under CEF 1.2. When different data sources and consequently different classifications are used, issues of double counting may arise.

In this specific case double counting occurs if:

• waste management output is estimated based on NACE classification

(38.1+38.2 NACE rev.2 groups) and

• production of biogas and biofuels from waste is estimated based on CPA.

Double counting occurs because NACE 38.2 already covers production of biogas from waste. To avoid double counting, production of biogas and biofuels has to be deducted from total waste management output in CEF 3.1

Production of energy through incineration of waste is reported under CEF 1.2. When different data sources and consequently different classifications are used issues of double counting may arise. In this specific case double counting occurs if

• waste management output is estimated based on NACE classification

(38.1+38.2 NACE rev.2 groups) and

• production of energy from incineration of waste is estimated based on CPA.

Double counting occurs because NACE rev.2 38.2 covers incineration of waste regardless of whether energy is produced. To avoid double counting, production of energy from waste (biodegradable and non-biodegradable) has to be deducted from total waste management output in CEF 3.1.

Materials recovery activities can be allocated at the third level split by type of material.

If for some "residual" materials recovery activities no information is available to estimate the split by type of material, they should be distributed by convention according to the shares of recovery activities already allocated. If no materials recovery activities can be assigned to a specific material (wood/plastic/minerals/textiles..) and there is no information in available sources for the calculation of relevant shares, the total value of the materials recovery activities has to be reported by convention under CEF 3.2.5. This rule applies only if no additional information can provide a proxy for a split between the pertinent CEF subcategories.

3.1.4 Waste management; Treatment (incl. preparatory) and disposal of non-hazardous waste

Production of energy through incineration of waste is reported under CEF 1.2 (from bio-degradable waste) and CReMA 1.3 (from non-biodegradable waste). When different data sources and consequently different classifications are used issues of double counting may arise.

In this specific case double counting occurs if:

• waste management output is estimated based on NACE classification (38.1+38.2 NACE groups) and

• production of energy from incineration of waste is estimated based on CPA.

Double counting occurs because NACE 38.2 covers incineration of waste regardless of whether energy is produced. To avoid double counting, production of energy from waste (biodegradable and non-biodegradable) has to be deducted from total waste management output in CEF 3.

3.2 Materials recovery and savings

Materials recovery activities can be allocated at the third level split by type of material. If for some "residual" materials recovery activities no information is available to estimate the split by type of material, they should be distributed by convention according to the shares of recovery activities

already allocated. This rule applies only if no additional information can provide a proxy for a split between the pertinent CEF subcategories.

4 Soil, surface and groundwater, biodiversity and forest

The broad definition of the scope of CEF4 can lead to some overlappingat the second level split between CEF4.1, CEF4.2 and CEF4.3, since forest resources and soil, groundwater and surface water are part of the landscapes. Arguably, in a specific area there can occur activities to preserve groundwater, to protect biodiversity or to avoid depletion of forest

resources. Depending on the characteristics of the areas, the activities could have one, two or even three different purposes.

In such cases the operational rule will be the following:

• allocation to CEF4.1 if it can be proved through laws, programmes or any other evidence that the activity has as its main environmental purpose the protecting of soil, groundwater and surface water;

• allocation to CEF4.2 if it can be proved through laws, programmes or any other evidence that the activity has as its main environmental purpose the protection of biodiversity and landscapes or if there is no clear evidence in favour of the other two environmental domains (i.e., CEF4.1 or CEF4.3)

• allocation to CEF4.3 if it can be proved through laws, programmes or any other evidence that the activity has as its main environmental purpose the managing of forest resources;

5.1 Protection against noise and vibration

Noise abatement measures and activities are often also related to insulation and therefore energy saving. As an operational rule, activities are classified in CEF 5.1 only if the laws or programs (public or private) governing these activities mention noise (or vibration) abatement as their single main objective. In all other cases they should be classified under CEF 1.3.

6 Research and development

When separable, all R&D activities even when referring to a specific class have to be classified under CEF 6.

7.3 Cross-cutting and other activities; Environmental activities not elsewhere classified

If international aid is important in volume and/or of specific political interest, a separate 3-digit heading under CEF 7 could be adequate for national purposes