GENERAL PRINCIPLES FOR AN ENVIRONMENTAL COMMUNICATION ON MASS-MARKET PRODUCTS

PART 0: GENERAL PRINCIPLES AND METHODOLOGICAL FRAMEWORK

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Contents

Preamble

This document was prepared under the law 2009 967 from 03 August 2009, called “Grenelle I”, and particularly its Article 54 establishing the prospect of mandatory communication of environmental information relating to products. It was also prepared under the law 2010-788 from 12 July 2010 institutionalizing national commitment to environmental goals, called “Grenelle II”, and particularly its Article 228**. To this end, the COMOP23 “Consumption” workgroup of the “Grenelle de l’environnement” requested the ADEME (The French Environment and Energy Management agency) to drive the development of a good practices guide within AFNOR. This approach should be promoted at both community and international level, so that the guide document can evolve following international or European Community normative evolutions. It may also evolve to accommodate the various sources of feedback.

Chairperson: Mrs OUGIER (ADEME)

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The list of organizations involved in the follow-up, drafting and/or making of this guide can be found at the end.

**Article 54: “Consumers have the right to accurate, objective and complete environmental information covering all aspects of the product and its packaging and to be offered environmentally-friendly products at an attractive price. France will support the recognition of these requirements at European Union level. The mention of the environmental impacts of products and services complementing the display of prices will be progressively phased in, including at EU level, as well as the display and availability in shops and retail outlets of information on product traceability and on social production conditions. The methodology associated with the assessment of these impacts will be discussed in consultation with the relevant stakeholders. The French government will launch a multiannual programme of information and awareness campaigns on the key challenges and issues in energy performance and in integrating sustainable development in the homes and buildings sector. Public information campaigns will be organised to spotlight sustainable consumption. The French government will oversee that public TV and radio stations give airtime to the key challenges and issues in sustainable development and environmental protection, including through amendments to their mission specifications. Professional advertising governance will be ushered in following consultation between advertising industry professionals and consumer protection agencies, environmental protection agencies, and environmental education agencies in order to more effectively integrate sustainable development and environmental protection issues. In line with EC law, the French government will introduce incentivization measures designed to confer the most environmentally-friendly products in specific categories with competitive price advantages—measures to be funded through a scheme that adds penalty taxes to the most environmentally-damaging products. France will back the EC-wide introduction of a lower VAT rate on products that have minimal impact on climate or biodiversity. In a series of measures designed to keep households and building-sector professionals fully informed, the French government pledges to improve the quality and content of the energy performance certificates scheme in order to deliver a reliable, universally-recognised benchmark system”.*

***Article 228 (excerpt)*

I. — The consumer code is amended as follows:

1°Book I, Chapter II, Section II is completed by a redrafted Article L.112-10, which now reads as follows:

“Art. L.112-10. - From July 1st 2011, and after consultation with all stakeholders of the sectors concerned, an experiment will be conducted for a minimum period of one year. The objective of this experiment is to progressively inform consumers, via any suitable method, of the equivalent carbon content of products and their packaging, and any natural resource consumption or natural environment impacts that are attributable to these products throughout their life cycle”.

“This experiment is reported to Parliament, assessing the potential and perspectives for generalizing this scheme”.

If need be, a State Council decree based on this assessment report shall define the terms and procedures through which the scheme can be generalized. Allowing for the fact that small businesses are specifically well geared to meet the objectives sought, it shall state the nature of the information, the information media, the respective responsibilities of the economic agents, procedures governing how data is recorded, arrangements governing access to the scientific data on which this information is based, and the product categories covered under this obligation“.

“State Council decrees shall specify, on the basis of the rules defined and for each product category, the nature of the relevant information depending on how it is distributed and the media used, together with the reference guides to use”.

1. Nature of good practice guide

1) This good practice guide defines the principles and guidelines for drawing up a product's environmental declarations for consumer information.

2) This good practice guide will be made clear to AFNOR through methodological guidelines on drafting a product's environmental declarations relating to consumer information broken down into product categories.

3) The general methodology covering all product categories is given in Annex B of this guide and developed further in Annexes A, C, D and E.

4) It may be necessary to make changes to this guide to take into account the developments in European and International normative work and the recognised practices currently in place if they bear relevance to this guide. It may also evolve to accommodate the various sources of feedback.

2. Objectives

1) The objective of the environmental communication is to give consumers practical information concerning the environmental impacts of a product throughout its life cycle as a choice criterion when deciding on a purchase. This communication shall be readily understandable for consumers and operationally usable for businesses.

2) The environmental communication must allow comparison of products belonging to the same category and, when relevant, between product categories. Relevance for the consumer will be assessed when defining the nomenclature of the product categories.

3) The communication shall respect the principles and guidelines of this guide so that the information is comparable, on the one hand, within the same purchase or acquisition location of a product, and on the other hand, with different purchase or acquisition locations of a product.

4) The aim of this good practice guide is to harmonize the environmental communication practices. Implementation of the environmental communication, irrespective of product category, shall be at acceptable cost, affordable to any type of business regardless of its size and type of activity (especially for microenterprise and SMEs), and based on accessible scientific knowledge.

3. Scope

1) This guide applies to all products currently available on the market[1)], irrespective of how they are distributed.

2) This guide applies to the environmental communication at the purchase or acquisition location[2)].

3) This guide deals with the environmental impacts generated throughout the product lifecycle. It does not cover other sustainable development-related issues.

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1) For example, the products used for the following sectors will be included in the scope (non-exhaustive list): food, hygiene, homeware and home maintenance, clothing, leisure (sport, DIY, culture etc.), ICT, and luxury goods. Examples of services: energy or water supply, public transport (metro tickets), laundry services (kg of ironed laundry), telephone and internet services (communication minutes), etc.
Furthermore, samples of advertised products distributed for promotional purposes when purchasing products or services are also included in the scope.

2) This covers all shops as well as mail order and internet shopping companies.

4. Terms and definitions

For the purposes of this document, the following terms and definitions apply.

4.1
Life Cycle Assessment (LCA)
compilation and evaluation of the inputs, outputs and potential environmental impacts of a product system throughout its life cycle

[NF EN ISO 14040:2006]

NOTE Life cycle assessment is presented in the following way in [NF EN ISO 14044:2006]: “LCA addresses the environmental aspects and potential environmental impacts (e.g. use of resources and environmental consequences of releases) throughout a product's life cycle from raw material acquisition through production, use, end-of-life treatment, recycling and final disposal (i.e. cradle-to-grave). ”

4.2
environmental aspect
element of an organisation’s activities, products or services that can interact with the environment

NOTE A significant environmental aspect has or can have a significant impact on the environment.

[NF EN ISO 14001:2004]

4.3
impact category
class representing environmental issues of concern to which life cycle inventory analysis results may be assigned

[NF EN ISO 14040:2006]

4.4
product category
group of products that can fulfil equivalent functions

[NF ISO 14025:2006]

4.5
consumer
individual member of the general public purchasing or using goods or services for private purposes

[NF ISO 14025:2006]

4.6
recycled content
proportion, by mass, of recycled material in a product or packaging. Only pre-consumer and post-consumer materials shall be considered as recycled content, consistent with the following usage of terms

[NF EN ISO 14021:2001]

4.7
co-product
a co-product is defined as “any of two or more products coming from the same unit process or product system”

[NF EN ISO 14044:2006]

4.8
life cycle
consecutive and interlinked stages of a product system, from raw material acquisition or generation from natural resources to final disposal

[NF EN ISO 14040:2006]

4.9
environmental declaration/environmental label
statement, symbol or image which indicates an environmental aspect of a product, a component or packaging

NOTE 1 An environmental declaration may be made on product or packaging labels, through product literature, technical bulletins, advertising, publicity and telemarketing, as well as through digital or electronic media such as the Internet.

[NF EN ISO 14021:2001]

NOTE 2 An environmental label or declaration may take the form of a statement, symbol or graphic on a product or package label, in product literature, in technical bulletins, in advertising or in publicity, amongst other things.

[NF EN ISO 14020:2002]

4.10
primary activity data (or primary data) or specific data
quantified value originating from a direct measurement or calculation from the direct measurements of an activity or a process of the product's life cycle. This value is used, after multiplication by an emission or characterization factor, to calculate an impact category indicator

NOTE 1 The primary data sources reflect the specific nature and efficiency of a process and as a result, their specific environmental impacts.

NOTE 2 The primary activity data does not include emission or characterization factors.

4.11
semi-specific data
secondary data or generic data given by default but that may be specified by the operator to improve the environmental impact assessment. Similarly, it may be primary data or specific data that the operator needs to complete but for which a default value is given

4.12
secondary data or generic data
quantified value of an activity or life cycle process obtained from sources other than the direct measurement or calculation from direct measurements

4.13
normative lifespan
the normative lifespan corresponds to the mean functional lifespan measured under specific test conditions as defined in standards drafted by standardization organizations such as the AFNOR, CENELEC or the IEC. This lifespan period is not necessarily measured as a time but can also be measured as a number of cycles or units

[Study on the lifespan of electrical and electronic equipment – ADEME – July 2012]

4.14
effective lifespan
effective lifespan corresponds to the time interval during which the product is effectively used, i.e. in good working condition and ready for use[3], by a given user. It is specific to a given user/household. Total effective lifespan is a sum of effective lifespans

[Study on the lifespan of electrical and electronic equipment – ADEME – July 2012]

4.15
environment
surroundings in which organisation operates, including air, water, land, natural resources, flora, fauna, humans, and their interrelation

NOTE Surroundings in this context extend from within an organization to the global system.

[NF EN ISO 14001:2004]

4.16
environmental labelling
way of informing the consumer on the environmental aspects of the product's life cycle through an environmental label

NOTE Environmental labelling is a specific solution of the environmental communication.

4.17
Life Cycle Impact Assessment (LCIA)
phase of life cycle assessment aimed at understanding and evaluating the magnitude and significance of the potential environmental impacts of a product system throughout the life cycle of the product

[NF EN ISO 14040:2006]

NOTE The shorter expression "Impact Assessment" may be used throughout this document for improved readability.

4.18
expert
person with the skills required for leading or taking part in the assessment concerned

NOTE An expert may be internal or external to the **organization** under assessment. It may be necessary to call on several experts to ensure that all relevant issues are covered, such as when specific skills are required for example.

[NF ISO 14015]

4.19
reference flow
the reference flow is the measure of the outputs from processes in a given product system required to fulfil the function, expressed by the functional unit

[ISO 14044:2006]

3) These clarifications rule out the case where a product is kept in a basement, even if the product is in good working condition, as it cannot realistically be considered "ready for use". Furthermore, product use as defined here does not correspond to a number of hours in 'on' mode or a number of cycles, but to the number of months/years where the product is kept in the household, in good working condition and ready for use.

4.20
category endpoint
attribute or aspect of natural environment, human health or resources, identifying an environmental issue giving cause for concern

[NF EN ISO 14040:2006]

4.21
environmental impact
any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organisation's environmental aspects[4)]

[NF EN ISO 14001:2004]

4.22
impact category indicator
quantifiable representation of an impact category

[NF EN ISO 14040:2006]

NOTE The shorter expression "impact indicator" will be used in this document for improved readability.

4.23
Life Cycle Inventory (LCI)
phase of life cycle assessment involving the compilation and quantification of inputs and outputs for a product throughout its life cycle

[NF EN ISO 14040:2006]

4.24
pre-consumer material
material diverted from the waste stream during a manufacturing process. Excluded is reutilization of materials such as rework, regrind or scrap generated in a process and capable of being reclaimed within the same process that generated it

[NF EN ISO 14021:2001]

4.25
post-consumer material
material generated by households or by commercial, industrial and institutional facilities in their role as end-users of the product which can no longer be used for its intended purpose. This includes returns of material from the distribution chain

[NF EN ISO 14021:2001]

4.26
product
any goods or service

NOTE 1 The product can be categorized as follows:

— services (e.g. transport);

— "software" (e.g. computer program, dictionary);

— hardware (e.g. mechanical engine part);

4) Definition 4.2.

— processed materials (e.g. lubricant).

NOTE 2 Services have tangible and intangible elements. Provision of a service can involve, for example, the following:

— an activity performed on a customer-supplied tangible product (e.g. automobile to be repaired);

— an activity performed on a customer-supplied intangible product (e.g. the income statement needed to prepare a tax return);

— the delivery of an intangible product (e.g. the delivery of information in the context of knowledge transmission);

— the creation of ambience for the customer (e.g. in hotels and restaurants);

— “software” consists of information and is generally intangible and can be in the form of approaches, transactions or procedures;

— hardware is generally tangible and its amount is a countable characteristic. Processed materials are generally tangible and their amount is a continuous characteristic.

[NF EN ISO 14040:2006]

4.27
data quality
characteristics of data that relate to their ability to satisfy stated requirements

[NF EN ISO 14040:2006]

4.28
critical review
process intended to ensure consistency between a life cycle assessment and the principles and the requirements of the International Standards on life cycle assessment

NOTE 1 The principles are described in NF EN ISO 14040:2006.

NOTE 2 The requirements are described in NF EN ISO 14044:2006.

[NF EN ISO 14040:2006]

4.29
transparency
open, comprehensive and understandable presentation of information

[NF EN ISO 14040:2006]

4.30
functional unit
quantified performance of a product system for use as a reference unit

[NF EN ISO 14040:2006]

4.30
validation
process whereby the assessor determines that the information gathered is accurate, reliable, sufficient and appropriate to meet the objectives of the assessment

[NF ISO 14015]

4.31
soil sealing
the term soil sealing covers the expansion of human habitat (living space, lawns), traffic routes (roads, parking space…), business parks (retail parks, factories…) and leisure parks (greenspace, sports fields…)

[SOLAGRO]

4.33
recyclable
characteristic of a product, packaging or associated component that can be diverted from the waste stream through available processes and programs and can be collected, processed and returned to use in the form of raw materials or products

NOTE Material recycling is only one of a number of waste-prevention strategies. The choice of a particular strategy will depend on circumstances and account should be taken of differing regional impacts in making this choice

[NF EN ISO 14021]

4.34
packaging system
complete set of packaging for a packaged good, encompassing one or more of the following that are applicable (depending on the packaged goods): primary packaging, secondary packaging, tertiary (distribution or transport) packaging

Translation borrowed from [ISO 18602:2012, definition 3.6]

4.35
potentiality of the indicators (concept and explanations)
the complex processes involved and their equally complex interactions is a source of uncertainty over the real value of environmental impacts (e.g. failure to account for synergistic of antagonistic effects between pollutants, specific characteristics of the local-habitat environment, effects of kinetics, concentrations, exposure patterns), which is why the impacts assessed are qualified in terms of “potentials”. The fact that local-level impacts (like eutrophication) are highly dependent on the features of the receiving environment lends them a higher “potential” quotient than global impacts (like global warming) which have little or no correlation with receiving environment

There are various methodologies available for characterizing inventoried process flows to get environmental impact indicators on various levels:

— the most widely recognized methodologies employed today are used to characterize inventoried process flows to get indicators of potential impacts (called *midpoint* indicators). These methodologies thus work with up to a dozen indicators;

— some methodologies make it possible to move to a second level of characterization to get indicators of potential damage (called *endpoint* indicators). These methods facilitate the understanding and interpretation of life cycle inventory results as they work to a more compact number of indicators, generally four (e.g. risk for human health, risk for ecosystem health, etc.) but are not widely recognized as they lack scientific robustness.

It is even possible to move to a third level of characterization to get a single aggregate metric indicator, although such methods are necessarily less robust and so have not gained much currency.

5. Principles for the environmental communication of products

1) The environmental communication of products covers all solutions used for transmitting information to the consumer on the environmental impacts of the product–packaging combination. The communication does not include data relating to improving the environmental impact of the product.

2) The environmental communication relates to a functional unit of the product. The product's functional unit is defined by guidelines specific to the product category.

3) Guidelines will be specifically developed in order to specify the communication format. They will be drawn up in compliance with national consumer code and the ISO 1402X series of standards (NF EN ISO 14020:2002, NF EN ISO 14021:2001, NF EN ISO 14024:2001 and NF ISO 14025:2006).

4) The environmental communication includes the indicators specific to the product category. These indicators, which are limited in number, take into account the main relevant environmental impacts generated by the product which may be easily read by the consumer. These indicators may vary according to product category.

5) Information relative to drawing up the communication must be accessible by all, transparent and free, in appropriate conditions (i.e. report, website, etc.): hypotheses, method for acquiring data, articulation between primary and secondary data, emission factors or impact factors and the assessment's limits.

6) Sector-specific guides specify data that does not have to be communicated to the consumer but that must however be kept for the inspection authorities.

7) In all cases, without prejudice to the indicators mentioned in the previous paragraph, the environmental communication takes into account greenhouse gas emissions defined in Annex D. This indicator is expressed in CO_2 equivalent mass.

8) The carbon offset measures initiated by the companies must not be included in the assessment of the impact the product's life cycle has on the greenhouse effect. They are therefore excluded from the scope of the product's environmental communication. The environmental communication of products may not in any case whatsoever include data for calculations relating to carbon offsetting, as instructions such as "carbon neutral product" or "minimised carbon impact" or equivalent are unauthorized.

9) A declaration of conformity with this guide may not be displayed on the product but may be subject to corporate communication. This communication will be drawn up in compliance with the rules indicated in standard NF EN ISO 14021:2001.

6. Data for calculating the environmental impacts

1) The data used are of acceptable quality, and are validated in compliance with the rules established for the product category.

2) The primary data are preferred. Without prejudice to Article 6 clause 1) sub-clause i), when the primary data are not available or if their collection is not suitable in terms of cost and reliability, secondary data shall be used. Secondary data are taken from:

   — the public database provided for this purpose;

   — sector-specific guides or BP X 30-323-0 (chiefly activity-related data).

3) The validation methods are developed in compliance with:

— a transparency principle which concerns: hypotheses, the data acquisition method, emission factors, generic inventory-related data and the assessment's limitations. A data source and tracking table can be compiled for this purpose (Annex A.8);

— a relevancy principle: the methods are revised according to the latest scientific public report on knowledge established at national and/or international level (IPCC, SETAC, etc.).

7. Data quality assessment

The data used as a basis for environmental communication shall aim for a level of quality commensurate with their contribution to the environment indicators. The quality of the data used is assessed against the following six criteria:

— Geographic representativeness: the data used shall demonstrate the best geographic representativeness;

— Timescale representativeness: the data used shall demonstrate the best timescale representativeness;

— Technological representativeness: the data used shall demonstrate the best technological representativeness;

— Completeness: the data used shall demonstrate the fullest completeness;

— Uncertainty: the data used shall demonstrate the lowest uncertainty;

— Relevancy and methodological coherency: the data used shall be coherent with the methodological approaches adopted through BP X 30-323-0 and the sector-specific guides.

On option, the requirements set out in the European Commission Product Environmental Footprint (PEF) guide[5] can be used to semi-quantitatively assess data quality and ensure compliance with the data quality objectives set.

8. Period of validity and update frequency for the environmental information

The maximum period of validity of environmental information is set at 5 years. The information shall, however, be updated in the following cases:

— revision of a guide standard: the environmental information shall be updated within 3 years;

— product modification that causes the environmental impact of the functional unit to vary by more than 20%: the environmental information shall be updated immediately.

5) A French-language copy of the PEF guide can be found at: http://eur-lex.europa.eu/legal-content/FR/TXT/PDF/?uri=CELEX:32013H0179&from=EN

9. References

[1] NF EN ISO 14001:2004, *Environmental management systems — Requirements with guidance for use (classification index: X 30-200)*

[2] NF EN ISO 14040:2006, *Environmental management — Life cycle assessment — Principles and framework (classification index: X 30-300)*

[3] NF EN ISO 14044:2006, *Environmental management — Life cycle assessment — Requirements and guidelines (classification index: X 30-304)*

[4] NF ISO 14020:2002, *Environmental labels and declarations — General principles (classification index: X 30-320)*

[5] NF EN ISO 14021:2001, *Environmental labels and declarations — Self-declared environmental claims (Type II environmental labelling) (classification index:X 30-321)*

[6] NF EN ISO 14024:2001, *Environmental labels and declarations — Type I environmental labelling — Principles and procedures (classification index: X 30-324)*

[7] NF ISO 14025:2006, *Environmental labels and declarations — Type III environmental declarations — Principles and procedures (classification index: X 30-325)*

[8] NF ISO 14015, *Environmental management — Environmental assessment of sites and organizations (EASO) (classification index: X 30-225)*

[9] IEC PAS 62545:2008, *Environmental Information on Electrical and Electronic Equipment (EIEEE)*

[10] NF P 01-010, *Environmental quality of construction products — Environmental and health declaration of construction products*

[11] BSI PAS 2050 (UK), Product-related life cycle GHG emissions communication guidance, 2008

[12] Voluntary Assessment and Communication of Environmental Information on food and drink products: Underlying CIAA principles for future methodology work, 5th draft of 9th April 2008 - CIAA (Food and Drink industry)

[13] Comité opérationnel N°23 : « Consommation » du Grenelle de l'environnement — Rapport d'étape au ministre d'État, Ministre de l'Écologie, de l'Énergie, du Développement durable et de l'Aménagement du territoire — Présenté par Yves BUR, député du Bas-Rhin et Christian BABUSIAUX, président de chambre à la cour des comptes, 23 mars 2008

[14] Convention sur les engagements pris par les entreprises du Commerce et de la Distribution dans le cadre du Grenelle de l'Environnement — FCD/MEDAD, 29 janvier 2008

[15] Rapports d'études, « Bilan 2007 — Publicité et environnement », rapport BVP – ADEME Mai 2008

[16] Bilan du recyclage 1997-2006 (ADEME)

[17] Enquête sur le recyclage des plastiques en 2005 (ADEME)

Annex A

Guide to developing sector-specific guides

A.1 Main principles for drawing up methodological guides specific to product categories

1) The guidelines and methodological guides broken down into product categories:

   a) specify the scope definition. Sector-specific guides should be based on a two-digit CPA (classification of product activity) code division (default option). However, the rules allow for (justified) deviations (e.g. allow a three-digit code), for example if more than two digits are necessary when addressing the complexity of the sector. Where multiple production routes for similar products are defined using alternative CPAs, the sector-specific guides shall accommodate all such CPAs;

   b) define the functional unit of the product category. The functional unit shall be defined according to the following aspects:

      — the function(s)/services(s) provided: “what”;

      — the magnitude of the function or service: “how much”;

      — the expected level of quality: “how well”;

      — the product life (span): “how long”;

      — the CPA code(s);

      NOTE The reference flow is a measure of the outputs from processes in a given product system required to fulfil the function expressed by the functional unit (based on ISO 14040:2006). For example, if the functional unit of a pair of shoes is “Wear a good pair of purpose-adapted shoes for one year” and the pair of shoes studied lasts two years, then it will be necessary to produce 0.5 pairs of shoes to fulfil this function.

      The sector-specific working groups shall therefore look into the relevancy of the lifespan in the functional unit. If lifespan proves a relevant factor, it shall be addressed as follows:

      — characterize the functional or normative lifespan of the product;

      — if this is impossible, define an effective lifespan;

      — if this is impossible, lifespan is not factored in.

   c) identify the main environmental impacts of the category;

   d) identify the life cycle inventory data at the source of the impacts;

   e) based on the results of the environmental assessment of a product category and an analysis of conformity with the cross-table of criteria specified under A.7., they specify the relevant indicators for the category and their degree of precision. Indicators tied to impacts shall be preferred over indicators tied to flows;

f) define the allocation rules between products and co-products;

g) define the conditions of taking into account the product's end of life;

h) specify the scope of assessment and the methods for calculating the selected indicators, knowing that scope has to fit the cut-off rule;

i) specify among the quantified data those which must be the primary data according to their accessibility at an economically acceptable price, by specifying, if there is space, the procedures specifically applicable to the SME;

j) specify if need be the quantified data which must be secondary;

The sector-specific working groups shall ensure the consistency of primary-to-secondary data fit and the data granularity proposed in the database. The sector-specific specific working groups may also express needs for secondary data that cannot be found in the database.

k) specify the validation method and data collection method of the data and of the results necessary for the indicator to be credible.

The data collection rules and procedures shall, as far as is practicable, revolve around the following:

— specify the processes for which specific data shall be collected;

— specify the requirements governing the collection of specific data;

— define the data collection requirements applicable to each site for:

— the step(s) targeted and the relevant coverage of data collection;

— data collection source (national or international campaigns, specific factories, etc.);

— data collection period (year, season, month, etc.).

— If it proves necessary to work with limited data collection sources and limited data collection periods, then practitioners will need to justify the rationale and demonstrate that the data collected will yield adequate sample populations.

NOTE Sector-specific working groups shall also detail semi-specific data which are secondary data given by default but that may be specified by the operator to improve modelling.

2) The guidelines are developed by the search for a consistency of recommended methods for the various categories of products so as to guarantee readability for the consumer, make conducting the assessment easier and to optimise cost.

3) The assessment of environmental impacts is based around a scientifically recognised method which complies with standards NF EN ISO 14040:2006 and NF EN ISO 14044:2006, notably:

a) the assessment of environmental impacts of products must be carried out in compliance with the life cycle approach. The guidelines per product category specify, if needed, whether it is possible to simplify the approach by disregarding one or several phases of the life cycle;

b) the environmental evaluation of products must take into account the main relevant environmental impacts. It is known as multi-criteria;

4) For each product category, the environmental impact assessment includes questioning on the relevance of the following issues:

   — biodiversity;

   — consumption of water that is not returned to its original source;

   — soil sealing.

5) The characterization methods for the indicators are specified in Annex D. If no characterization method is specified in this annex for an issue considered crucial for a product category group, it defines an indicator and submits it to the ADEME/AFNOR platform.

6) The various scenarios and processes specific to the end-of-life processing of products must be included in the assessment of the environmental impacts, depending on the knowledge and data available. The methodological cross-media annex covers the issues to ensure that there is consistency throughout the approach.

7) For each revision of a sector-specific guide, all of Article 6 should be addressed notably to ensure that the chosen indicators are still the most relevant to the category concerned.

8) The sector-specific working groups shall re-review the need to revise the sector-specific guide standards within 3 years of adoption and at least every 5 years thereafter.

A.2 Cut-off rules

Several cut-off criteria are used in LCA practice to decide which inputs are to be included in the assessment, such as mass, energy and environmental significance. Making the initial identification of inputs based on mass contribution alone may result in important inputs being omitted from the study. Accordingly, energy and environmental significance should also be used as cut-off criteria in this process.

a) **Mass**: an appropriate decision, when using mass as a criterion, would require the inclusion in the study of all inputs that cumulatively contribute more than a defined percentage to the mass input of the product system being modelled.

b) **Energy**: similarly, an appropriate decision, when using energy as a criterion, would require the inclusion in the study of those inputs that cumulatively contribute more than a defined percentage of the product system's energy inputs.

c) **Environmental impact radius**: decisions on cut-off criteria should be made to include inputs that contribute more than an additional defined amount of the estimated quantity of individual data of the product system that are specially selected because of environmental relevance.

Similar cut-off criteria may also be used to identify which outputs should be traced to the environment, e.g. by including final waste treatment processes.

For all three of these criteria, total cumulated flows of less than **5% of the reference flow** can be excluded.

A.3 Allocation approach for partitioning between products and co-products

The study shall identify the processes shared with other product systems and deal with them according to the stepwise procedure presented below:

1) Step 1: Wherever possible, allocation should be avoided by:

   — dividing the unit process to be allocated into two or more sub-processes and collecting the input and output data related to these sub-processes; or

   — expanding the product system to include the additional functions related to the co-products, taking into account the requirements of clause 4.2.3.3. of standard NF EN ISO 14044:2006.

2) Step 2: Where allocation cannot be avoided, then continue the allocation process by partitioning the inputs and outputs of the system according to underpinning physical relationships (mass, energy, etc.) relevant to the functional units of the product.

3) Step 3: Where no one physical relationship can be established or used as a basis for allocation, then continue the allocation process by partitioning the inputs and outputs of the system according to economic value.

4) Step 4: continue the allocation process by partitioning the inputs and outputs of the system according to a series of the rules above.

Whatever choice is made (i.e. on the set of alternatives listed above), that choice shall be relevant to the overriding environmental communication on products objective.

A.4 Distribution phase

The distribution phase includes transport from production sites to warehousing, in-warehousing storage, transport from warehousing to points of sale, and at-point-of-sale storage.

In all discussion that follows, warehousing and points of sale are referred to under the same generic term “distribution sites”.

Product-related impacts tied to distribution sites shall be allocated based on one of the following limiting factors: volume occupied, mass, or floor area. This allocation system for distribution site impacts will also separate room-temperature products, cool products (fresh products) and subzero (frozen) products. Product turnaround period at the distribution site is not factored in.

In principle, distribution shall integrate every step right through to retail to the customer, whether through shop retailing or non-shop (online, mail order) retailing.

NOTE The management of waste generated by distribution sites is in principle to be considered under the distribution site impacts.

A.5 Use phase

Impacts relating to the use phase are assessed based on a use scenario determined by sector-specific working groups. The working groups shall draw on:

— harmonized standards, where available;

— recommendations issued by manufacturers and/or federations[6)];

— consumer surveys, where available;

— use agreements consensus-built by the sector-specific workgroup.

A.6 Uncertainties in the results

The sector-specific working groups shall conduct uncertainty and sensitivity analysis based on standard NF EN ISO 14040:2006. Specific focus will be given to significant environmental aspects to ensure that the information communicated to consumers stays relevant and makes good sense.

The sector-specific working groups shall ensure that calculation methods do not lead to communication on a negative value.

6) e.g. wash cycle temperature for a textile, recommended dose for a detergent…

A.7 Cross-table of environment indictor selection criteria

Criterion	Comments
Relevance	
Evaluation of an environmental issue in the product category and which is attributable to the product	Consistency with the general guidance document (see principle 5.2)
Importance of the issue	Especially in terms of daily impacts of a person living in France (norming) + stakeholder expertise
Differentiation for a majority of products on the market (comparability)	Consistency with the general guidance document (see objective 2.2)
Redundancy with other indicators	
Places ecodesign in the spotlight	Consistency with the general guidance document
Implementation, feasibility	
Possibility/implementability for the database	Implementability for ADEME (availability of characterization factors, etc.)
Accessibility to the primary data required for the firm to characterize the indicator	Implementability for the firm
Consistency	
Consistency with the recommendations issued by the ADEME/AFNOR platform (general, methodology WG, sector-specific WGs)	
Life cycle scope	Informative/justify the choice of any indicator that does not fit this criterion
Product/packaging scope	Informative/justify the choice of any indicator that does not fit this criterion
Consistency with other selected indicators	Informative
Robustness, reliability	
Scientific and international recognition	
Methodological robustness	
Reliability of the modelling component (computation rule)	The modelling of the use phase is particularly important
Expected reliability of primary data	
Reliability of the secondary data available	

A.8 Validation of sector-specific guides

Sector-specific guides are validated by the ADEME/AFNOR platform. Upstream of validation, the sector-specific guides are sent out to members of the ADEME/AFNOR platform for consultation.

In parallel, the platform appoints a panel of three experts, from either inside or outside the ADEME/AFNOR platform but all fully independent from any sector-specific work, to lead a critical review of the guide. This tripartite panel is composed of an LCA expert from an NGO, and industrial engineering expert, and a microenterprise expert. The expert panel drafts comments on any gaps and drift between the draft-version sector-specific guide and the present good practices guide BP X 30-3230 and on the orientations adopted by the sector-specific working group. It forwards its comments to the working group coordinator, who addresses the concerns raised.

The sector-specific guide will only get formal validation if the platform reaches a consensus on the way the concerns have been addressed and the modifications made. At the conclusion of this process, the critical review panel drafts its summary report.

The list of organizations involved in validating the sector-specific work is given in annex to each sector-specific guide.

A.9 Example of a data tracking sheet (illustrative)

This annex, in its current form as drafted here, is borrowed from NF EN ISO 14044:2006. It may be re-edited under future revisions in response to needs expressed.

A.9.1 General

The data input sheets below are examples that may be used as guidelines. The purpose is to illustrate the nature of the information that can be collected from a reporting location for a unit process.

The example sheets may be modified by adding columns for other factors, such as the quality of the data (uncertainty, measured/calculated/estimated).

A.9.2 Example data sheet for upstream transportation

In this example, the names and tonnages of the intermediate products for which transportation data are required are already recorded in the model of the system to be studied.

Name of intermediate product	**Road transport**			
	Distance km	**Truck capacity** tons	**Actual load** tons	**Empty backhaul** (Yes/No)

Fuel consumption and the related air emissions are calculated using a transportation model.

A.9.3 Example data sheet for internal transportation

In this example, the inventory is on internal transportation in a plant. The values are collected for a specific period of time and show the actual amounts of fuel used. Additional columns in the data sheet will be required if minimum and maximum values from different time periods are required.

Internal transportation raises allocation issues, as does total electricity consumption for a site, for instance.

Air emissions are calculated using a fuel consumption model.

	Total amount of inputs transported	**Total consumption of fuel**
Diesel		
Gasoline		
LPG[a]		
[a] Liquefied petroleum gas.		

A.9.4 Example data sheet for unit process

Completed by:	**Date of completion:**			
Unit process identification:	**Reporting location:**			
Period: Year	**Starting month:**	**Ending month:**		
Description of the unit process: (attach additional sheet if required)				
Material inputs	**Units**	**Quantity**	**Description of sampling procedures**	**Origin**
Water consumption[a]	**Units**	**Quantity**		
Energy inputs[b]	**Units**	**Quantity**	**Description of sampling procedures**	**Origin**
Material outputs (including products)	**Units**	**Quantity**	**Description of sampling procedures**	**Destination**

NOTE The data in this data collection sheet refer to all unallocated inputs and outputs during the specified time period.

[a] For example, surface water, drinking water, etc.

[b] For example, heavy fuel oil, medium fuel oil, light fuel oil, kerosene, gasoline, natural gas, propane, coal, biomass, grid electricity, etc.

A.9.5 Example life cycle inventory analysis data collection sheet

Unit process identification:			Reporting location:
emissions to air[a]	**Units**	**Quantity**	**Description of sampling procedures** (attach additional sheets if necessary)
emissions to water[b]	**Units**	**Quantity**	**Description of sampling procedures** (attach additional sheets if necessary)
emissions to soil[c]	**Units**	**Quantity**	**Description of sampling procedures** (attach additional sheets if necessary)
Other releases[d]	**Units**	**Quantity**	**Description of sampling procedures** (attach additional sheets if necessary)
Describe any unique calculations, data collection, sampling, or variation from the description of unit process functions (attach additional sheets if necessary).			

a For example: inorganics: Cl_2, CO, CO_2, dust/particulate, F_2, H_2S, H_2SO_4, HCl, HF, N_2O, NH_3, NO_x, SO_x; and organics: hydrocarbons, PCBs, dioxins, phenols; metals: Hg, Pb, Cr, Fe, Zn, Ni, etc.

b For example: BOD, COD, acids, Cl_2, CN_2-, oils, detergents, dissolved organics, F-, Fe ions, Hg ions, hydrocarbons, Na^+, NH_4^+, NO_3^-, organochlorides, other metals, other nitrogen compounds, phenols, phosphates, SO_4^{2-}, suspended solids, etc.

c For example: mineral waste, mixed industrial waste, municipal solid waste, toxic wastes (please list compounds included in this data category).

d For example: noise, radiation, vibration, odour, waste heat.

Annex B

Computation rules common to all product categories

This annex shall be revisited, and where appropriate amended, in response to operating feedback acquired or the publication of international (ISO) or European (CEN) standards on the same topic. In the wake of the publication of the European Commission Product Environmental Footprint (PEF) guide, this annex was revisited and revised, primarily to make it coherent and consistent with the EU guide. However, it continues to retain certain different methodology options in order to ensure the methodology does not lose applicability to the environmental communication of products.

The ADEME aims to ensure there is cross-consistency between “product-focused” environmental assessment methodology (BP X30-323-0) and “organization-focused” environmental assessment methodology. In the event differences are found, such as differences in how carbon storage is integrated, that require convergence in order to ensure cross-consistency, especially for firms under obligation to report on GHG emissions and who issue environmental communications, then a fast-track process shall be launched to revise the methodology annex. ADEME shall also oversee that the methodologies established at national level remain consistent with all international standards being drafted.

The methodological annex reflects the analysis of the cross-disciplinary working group on the environmental assessment of mass market products. This document may also undergo revisions in response to any difficulties encountered when developing the secondary data base.

The environmental impact assessment meets the methodological guides broken down by product categories. These guides are developed based on the standards NF EN ISO 14040:2006, NF EN ISO 14044:2006 and NF EN ISO 14025:2006. This annex therefore provides additional information and clarifications in relation to these normative documents.

B.1 Scope

This methodological annex applies to all mass market products, excluding building-sector products. Building-sector products are governed by the standard applicable to their sector.

B.2 System boundaries

B.2.1 Inclusions

a) All gases driving greenhouse gas emissions shall be included in the inventories produced. These gases are listed in Annex B of this guide. Elementary flows of biogenic and fossil fuel-source CO_2 are accounted for via separate procedures.

b) The inventory of these gases throughout the product life cycle is compiled based on the following accounting rule:

— elementary flows extracted from the atmosphere are accounted for under inventory output as a specific flow given a minus sign in the balance calculation. A carbon removal can be factored into the carbon account when producing product containing a biomass-source component if the component is derived from replanted forest or sustainably-farmed;

— elementary flows released as emissions into the atmosphere are accounted for under inventory output as flows given a plus sign in the balance calculation;

— if there is no product—atmosphere exchange, then there will be no corresponding item accounted for in the balance calculation. The residual carbon contained in a landfilled product is considered outside the atmosphere exchange loop once fermentation, aerobic digestion and anaerobic digestion reactions are exhausted.

c) The contribution of each GHG to the overall increase in GHGs is calculated using the 100-year global warming potential updated with the latest data published by the IPCC[7)].

This accounting rule (points a) to c)) corresponds to the default method: carbon (fossil and biogenic) storage and emissions are accounted for in the same way, but without factoring in time scale or time lag.

The modelling can be improved by factoring in the time-delay factor in compliance with the method given in d). In this case, credits associated with temporary (carbon) storage or delayed emissions shall not be integrated into the calculation of the environmental communication indicators. However, they may be reported under “additional environmental information”.

This is a choice that shall be employed per product category within sector-specific working groups in order to ensure that the environmental information remains cross-compatible. It also implies systematically defining a lifespan for the product category or categories concerned.

The accounting rule for carbon biomass storage shall be updated according to relevant best practices, in particular those released in the final draft of the “ILCD Handbook: General guide for Life Cycle Assessment – Detailed guidance” by the European Commission Joint Research Centre.

d) If factoring in the time-delay offset, accounting shall only integrate contributions to the greenhouse effect over the time interval spanning product production and the next 100 years, which will consequently integrate the effect of a time-delay offset in GHG emissions due to the product lifespan. This contribution to the greenhouse effect shall be estimated as follows:

— Dvx = lifetime of GHG X. GHG lifetimes are recapped in Annex B of this guide;

— GWP (X; 100) = contribution relative to the increase in greenhouse effect caused by GES X over a 100-year interval;

— Dvp = product lifespan;

— Contribution to the greenhouse effect of GHG X at the end-of-life of a product P of lifespan Dvp:

if (100 – Dvp) > Dvx: GWP (X; 100);

if (100 – Dvp) < Dvx: GWP (X; 100) * (100 – Dvp)/100.

This formula for evaluating the contribution to the greenhouse effect of GHG X at the end-of-life of a product P of lifespan Dvp corresponds to an approximation in the formula given above.

e) Where significant, impacts tied to direct land use changes shall also be accounted for. Greenhouse gas emissions and storages are calculated in line with the study scope and objective using internationally-recognised methods such as the IPCC guidelines for national inventories and the method specified in the European Commission “Product Environmental Footprint” methodology[8].

7) IPCC: Intergovernmental Panel on Climate Change.

8) http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:124:FULL:FR:PDF

Indirect land use changes shall be taken into consideration once an internationally-recognised method becomes available.

f) End-of-life product processing is included within the boundaries of the system, and its impacts are assessed. Only the ultimate waste flows can be identified in the outputs.

g) If a product is systematically accompanied by a promotional product, the flows tied to the promotional product are integrated into the product impact calculation.

h) Primary, secondary and tertiary packaging shall, in principle, be factored in. The sector-specific working groups can elect to exclude them from the scope of the study but only on the basis of the provisions set out in subsection A.2.

B.2.2 Exclusions

a) Carbon offsetting operations are not included in the product's carbon footprint assessment.

b) Information related to the impacts of customer transportation to a product retail outlet is not directly integrated into the environmental communication indicators, although it can be offset and made available to the consumer.

c) Other procedures may also be excluded from the sector-specific guides provided that the decision to exclude complies with the cut-off rule set out earlier. Those procedures that prove impossible to model (due to real difficulty in allocating flows, for example) can also be excluded provided the exclusion if explicitly justified in the sector-specific guide. As an illustrative example, this may involve the following flows:

— flows tied to R&D;

— flows tied to employee transport from home to work and back and out-of-office missions;

— flows tied to services allied to a product or system, such as advertising, canvassing and marketing.

B.2.3 End-of-life processing

a) Impacts tied to product end-of-life processes and impacts tied to packaging system are determined based on national averages and account for real-world practices, including when waste is processed abroad. Recycling rates (R_2) are therefore national-average rates.

b) Recycled content rates (R_1) are product-specific and packaging system-specific rates. These rates can draw on specific, semi-specific or generic data in the sector-specific guides.

c) Environmental impacts tied to recycling, incineration (with or without energy recovery) and landfilling are accounted for in the calculation of the environmental impacts of products on a pro rata basis indexed to national practices.

d) The rates associated to these operations are specified under Annex D.

e) If a product uses materials that cannot be separated through current sorting technologies at any stage in the re-treatment chain but that are accepted in organized recycling channels, the R_2 (see definition below) for the channel set to recycle these materials shall be used and applied to the major material dictating the appropriate recycling channel. As the remaining materials are is not recycled, their respective R_2 values will be zero. This computation is a rough approximation, given that the national R_2 value includes these amounts at pool level.

f) If a product uses materials that are non-separable and not accepted in the channel, the R_2 shall be considered zero for each individual material. Anti-recyclability materials are defined by extended producer responsibility agencies and professional stream channels.

B.2.3.1 Calculation of the impacts of the material used

For this section, the operator responsible for environmental communication shall first identify whether the material is recycled in a closed loop (section B.2.3.2) or an open loop (section B.2.3.3) system. Then, depending on the material the product is made of, the operator shall apply the corresponding calculation formula.

As follows:

EM	Impacts of the material;
EV	Impacts tied to extracting or producing the primary raw material + impacts tied to processing the raw feedstock into virgin raw material;
Ed	Impacts tied to collected landfilled waste + impacts tied to landfilling (with biogas recovery) or impacts tied to the sewage treatment plant (e.g. end-of-life of toilet paper);
Ei	Impacts tied to collecting incinerated waste + impacts tied to incineration of the material;
Ebf	Impacts tied to the collection of waste reclaimed for energy + impacts of the waste-to-energy plant boiler or furnace;
Eheat_bf	Impacts of heat generation substituted by energy reclaimed in the boiler/furnace;
Eelec_bf	Impacts of electricity generation substituted by energy reclaimed in the boiler/furnace;
Eheat	Mean national impacts of heat generation per unit of energy generated;
Eelec	Mean national impacts of electricity generation per unit of energy generated;
LHV	Lower heating value of the material incinerated;
r1n	Yield tied to heat production in household waste incineration plants;
r2n	Yield tied to electricity production in household waste incineration plants;
r3n	Yield tied to heat production in the boilers;
r4n	Yield tied to electricity production in the boilers;
R1 or R1x	Specific rate of raw material recycled from the material;
R1y	Specific rate of raw material recycled from another material presenting similar properties (e.g. paper and carton);
R2	National recycling rate for the considered [9];

9) recycling rate = (quantity of material recycled / pool available).

Ve	Rate of material collected for a subsequent specific energy recovery process;
I	National rate of household waste incineration;

EV'	Specific emissions and resources consumed arising from the acquisition and pre-processing of virgin material assumed to be substituted by recyclable materials: EV' represents to the input of virgin material that corresponds to the actual virgin material substituted through open-loop recycling, according to source. If this information is not available, assumptions should be made as to what virgin material is substituted, or average data should be used. If no other relevant information is available, it can be assumed that EV' = EV, as if as if closed-loop recycling had taken place.
ERupstream	Specific emissions and resources consumed arising from the recycling process of the recycled (or reused) material, including collection, sorting and transportation processes. If this information is not available, generic data should be used.
ERdownstream	Specific emissions and resources consumed arising from the recycling process at the end-of-life stage, including collection, sorting and transportation processes. If this information is not available, generic data should be used.
EDdownstream	Specific emissions and resources consumed arising from the disposal of waste material (e.g. landfilling, incineration, pyrolysis) at the end-of-life of the product under study. If this information is not available, generic data should be used.
EDupstream	Specific emissions and resources consumed arising from the disposal of waste material (e.g. landfilling, incineration, pyrolysis) at the end-of-life of the recyclate. If this information is not available, generic data should be used. EDupstream represents the elimination of the recycled-content recyclate. If this information is not available, assumptions should be made as to how this material would have been disposed of if it had not been recycled. If no other relevant information is available, it can be assumed that EDupstream = EDdownstream, as if as if closed-loop recycling had taken place.
$\rho 1$	Yield of the recycling process producing R1 category recycled material input to the product;
$\rho 2$	Yield of the recycling process producing R2 category material streamed to recycling;
$\sigma 1$	Rate of substitution between R1 category recycled material input to the product and virgin material input;
$\sigma 2$	Rate of substitution between recycled material produced from R2 category material streamed to recycling and virgin material input.

EM, EV, EV', ERupstream, EDupstream, ERdownstream, EDdownstream, Ei and Eboiler/furnace are unit inventory results expressed as:

- EM: per 1 kg of material input to product composition;
- EV, EV': per 1 kg of virgin material output from the production stage;
- ERupstream, EDupstream, ERdownstream, EDdownstream, Ei and Eboiler/furnace: per 1 kg of material input to recycling (upstream or downstream), end-of-life (upstream or downstream) incineration, waste-to-energy.

R_1, R_{1x}, $R_{1y,}$ $\sigma 1$ and $\sigma 2$ are data that shall be specified by the sector-specific working groups.

Recycling process efficiencies $\rho 1$ and $\rho 2$ are usually integrated into generic inventory data, in which case they must not be double-counted.

R_2 recycling rates are specified under Annex D.

In principle, the entire end-of-life system boundary shall be considered, i.e. all missions and resources consumed through the waste incineration, landfilling and recycling streams (see the definitions of the Ei, ED and ER terms). Sector-specific working groups may choose to exclude a section of this system boundary but only on the basis of the provisions set out in subsection A.1.1.h.

B.2.3.2 Closed-loop system recycling with or without energy recovery

a) In scenarios where the material of a product system is recycled within this same products system, then the impacts are calculated using the following formula:

EM = EV + EDdownstream + R1 (ERupstream/$\rho 1$ – EV*$\sigma 1$) - R2 EDdownstream + Ve (Ebf - r3n*LHV*Eheat_bf - r4n*LHV*Eelec_bf - EDdownstream)

With

EDdownstream=I*(Ei - r1n*LHV*Eheat - r2n*LHV*Eelec) + (1-I) Ed

b) In the specific case where two closed loops are nested together, the impacts are calculated using the following formula:

EM = EV + EDdownstream + (R1x+R1y) (ERupstream/$\rho 1$ – EV* $\sigma 1$) - R2 EDdownstream + Ve (Ebf - r3n*LHV*Eheat_bf - r4n*LHV*Eelec_bf - EDdownstream)

With

EDdownstream=I*(Ei - r1n*LHV*Eheat - r2n*LHV*Eelec) + (1-I) Ed

This is a scenario that applies to graphic paper, toilet paper and special purpose industrial-grade paper, for instance.

c) If a producer organises a particular closed loop-based end-of-life mode, he can report through a particular method of calculation.

B.2.3.3 Open-loop system recycling with or without energy recovery

The allocation of recycling-related impacts in the situation where the material for a product system is recycled in a different products system is calculated according to market rates for the considered raw material. Each revision of the guide document shall trigger discussion on market balance for each of these materials:

— if the raw materials market is in disequilibrium because producers are demanding secondary raw materials which are in short supply, then there are grounds for offering incentives to producers of recycled products in order to pull the market. All impacts of recycling (including collection and sorting) and the associated credit benefits are allocated to the producer;

— materials or the available secondary raw materials are not being used), then the advantage should be split equally between the producer using recycled material and the producer producing a recycled product: 50/50 allocation split;

— if the raw materials market is in disequilibrium because the pool of secondary materials is being under-exploited (insufficient source channels), then there are grounds for offering incentives to producers that

use recycled feedstock in order to pull the market. All impacts of recycling (including collection and sorting) and the associated credit benefits are allocated to the producer.

B.2.3.3.1 Model formula for open-loop recycling

The environmental impacts of a material recycled through an open-loop system are calculated using the following formula:

EM = EV + EDdownstream + a R1 (ERupstream/ρ1 – EV*σ1 – EDupstream/ρ1) + (1-a) R2 (ERdownstream – ρ2*σ2*EV' - EDdownstream) + Ve (Ebf - r3n*LHV*Eheat_bf - r4n*LHV*Eelec_bf - EDdownstream)

With

EDupstream/downstream=l*(Ei - r1n*LHV*Eheat - r2n*LHV*Eelec) + (1-l) Ed

and

Material	Value of a
Steel	0
Aluminium	0
Glass	0
Packaging paper - carton	0
Plastic	0.5
Wood	0.5
Textile (non-synthetic)	1

B.2.3.4 Case of manufacturing process scrap

Manufacturing process scrap is split into two categories:

— manufacturing process scrap recycled within the same process that generated it, in which case there is no allocation to make;

— manufacturing process scrap recycled out-of-process, i.e. pre-consumer material, in which case the impacts and credits of reprocessed are allocated following the same rules as for post-consumer material as defined under sections B.2.3.2 and B.2.3.3. Special individual cases may warrant a different set of rules, provided the grounds are justified.

These end-of-life-phase allocation rules only apply to the waste component. Process-generated co-products shall comply with the allocation rules defined under section A.3. Sector-specific working groups will therefore need to look closely at the type of manufacturing process scrap generated and detail these scrap types in their sector-category guides.

Waste, as a concept, is defined by framework directive 2008/98/EC on waste.

B.2.3.5 Individual case of a specific energy recovery format

In the scenario where product B is clearly identified as having incorporated energy coming from waste (derived from product A) energy recovery during its manufacturing process, it is allocated with half of the energy recovery-related impacts. Product A, which has been energy-recovered, will also be allocated with half of the impacts.

In this case, the term V_e is halved in the above formulae in order to allocate the other half of the impacts of product B energy recovery. The model of product B energy consumption must be coherent with the model of product A energy recovery.

Note that this 50/50 allocation split on energy recovery-related impacts can only apply to products selectively collected specifically for this energy recovery process. For household waste, the identified energy recovery-related impacts are always allocated to incinerated products as it is impossible to identify products having incorporated energy coming from this recovery process.

Annex C

Guide to developing secondary data

The public database may ultimately include the validated data from the ELCD community database[10]. The literature associated with the public database and the associated modelling protocols is available online at the dedicated website[11].

C.1 Energy analysis models (electricity)

a) The electricity analysis model selected for the production phase of the product under study is the electricity analysis model of the original producer country. For the use phase and the end-of-life phase, the selected electricity model is the French electricity model.

b) Data related to the electricity analysis models is featured in the public database mentioned in Article 7. This data is calculated on the basis of the impacts related to average kWh consumption over last three years available.

c) Where appropriate, the database described in Article 7 may calculate the inventories for a raw material or a manufacturing process based on a European electricity mix.

d) The electricity analysis model may be replaced by any of a number of models that incorporate electricity production from specific sources if the electricity generated is consumed within a closed loop unconnected to the mains network.

NOTE The electricity mix may go unspecified in cases where electricity is produced from a renewable source and injected into the grid as this electricity will already have been integrated in the national electricity mix.

C.2 Transport analysis models

a) Impacts tied to products or inputs transport are dependent on the following key parameters:

- distance covered;
- means of transport and the transportation equipment used (and which includes fuel consumption);
- fuels used;
- load factor of the means of transport used;
- empty backhaul rate of the means of transport used (fraction of the distance covered while empty)*.

*Base Impacts® defines use ratio via the following formula: use ratio = load factor * (1 – empty backhaul rate)

b) The parameters named “distance covered”, “means of transport and transportation equipment used”, “load factor” and “empty backhaul rate” draw on specific, semi-specific or generic data in the sector-

10) European Life Cycle Data System: http://lca.jrc.ec.europa.eu/lcaainfohub/datasetArea.vm.

11) Base Impacts®: *http://base-impacts.ademe.fr/*

specific guides. For the other parameters, generic data extracted from the public database described in Article 7 is used.

c) Greenhouse gas emissions from air transport are determined from the combustions emissions of the fuel used. The calculation system shall be readjusted to integrate progress in scientific knowledge.

C.3 Infrastructures

Life cycle inventory studies shall include infrastructures as far as possible.

C.4 Flows tied to biogenic carbon

The life cycle inventories shall account for biogenic carbon storage and biogenic carbon emissions separately.

Annex D

Calculation-related data

D.1 List of greenhouse gases and their associated atmospheric lifetimes

The greenhouse gases to be accounted for are those listed in this annex. The 100-year global warming potentials (GWP) are given for illustrative purposes only, and shall be kept up to date with the latest IPCC data releases.

Industrial Designation or Common Name (years)	Chemical Formula	Lifetime (years)	Radiative Efficiency (W m^{-2} ppb^{-1})	Global Warming Potential for Given Time Horizon			
				SAR‡ (100-yr)	20-yr	100-yr	500-yr
Carbon dioxide	CO_2	See below[a]	[b]1.4x10^{-5}	1	1	1	1
Methane[c]	CH_4	12[c]	3.7x10^{-4}	21	72	25	7.6
Nitrous oxide	N_2O	114	3.03x10^{-3}	310	289	298	153
Substances controlled by the Montreal Protocol							
CFC-11	CCl_3F	45	0.25	3,800	6,730	4,750	1,620
CFC-12	CCl_2F_2	100	0.32	8,100	11,000	10,900	5,200
CFC-13	$CClF_3$	640	0.25		10,800	14,400	16,400
CFC-113	CCl_2FCClF_2	85	0.3	4,800	6,540	6,130	2,700
CFC-114	$CClF_2CClF_2$	300	0.31		8,040	10,000	8,730
CFC-115	$CClF_2CF_3$	1,700	0.18		5,310	7,370	9,990
Halon-1301	$CBrF_3$	65	0.32	5,400	8,480	7,140	2,760
Halon-1211	$CBrClF_2$	16	0.3		4,750	1,890	575
Halon-2402	$CBrF_2CBrF_2$	20	0.33		3,680	1,640	503
Carbon tetrachloride	CCl_4	26	0.13	1,400	2,700	1,400	435
Methyl bromide	CH_3Br	0.7	0.01		17	5	1
Methyl chloroform	CH_3CCl_3	5	0.06		506	146	45
HCFC-22	$CHClF_2$	12	0.2	1,500	5,160	1,810	549
HCFC-123	$CHCl_2CF_3$	1.3	0.14	90	273	77	24
HCFC-124	$CHClFCF_3$	5.8	0.22	470	2,070	609	185
HCFC-141b	CH_3CCl_2F	9.3	0.14		2,250	725	220
HCFC-142b	CH_3CClF_2	17.9	0.2	1,800	5,490	2,310	705
HCFC-225ca	$CHCl_2CF_2CF_3$	1.9	0.2		429	122	37
HCFC-225cb	$CHClFCF_2CClF_2$	5.8	0.32		2,030	595	181
Hydrofluorocarbons							
HFC-23	CHF_3	270	0.19	11,700	12,000	14,800	12,200
HFC-32	CH_2F_2	4.9	0.11	650	2,330	675	205
HFC-125	CHF_2CF_3	29	0.23	2,800	6,350	3,500	1,100
HFC-134a	CH_2FCF_3	14	0.16	1,300	3,830	1,430	435
HFC-143a	CH_3CF_3	52	0.13	3,800	5,890	4,470	1,590
HFC-152a	CH_3CHF_2	1.4	0.09	140	437	124	38
HFC-227ea	CF_3CHFCF_3	34.2	0.26	2,900	5,310	3,220	1,040
HFC-236fa	$CF_3CH_2CF_3$	240	0.28	6,300	8,100	9,810	7,660
HFC-245fa	$CHF_2CH_2CF_3$	7.6	0.28		3,380	1030	314
HFC-365mfc	$CH_3CF_2CH_2CF_3$	8.6	0.21		2,520	794	241
HFC-43-10mee	$CF_3CHFCHFCF_2CF_3$	15.9	0.4	1,300	4,140	1,640	500
Perfluorinated compounds							
Sulphur hexafluoride	SF_6	3,200	0.52	23,900	16,300	22,800	32,600
Nitrogen trifluoride	NF_3	740	0.21		12,300	17,200	20,700
PFC-14	CF_4	50,000	0.10	6,500	5,210	7,390	11,200
PFC-116	C_2F_6	10,000	0.26	9,200	8,630	12,200	18,200

Industrial Designation or Common Name (years)	Chemical Formula	Lifetime (years)	Radiative Efficiency (W m^{-2} ppb^{-1})	Global Warming Potential for Given Time Horizon			
				SAR[f] (100-yr)	20-yr	100-yr	500-yr
Perfluorinated compounds (continued)							
PFC-218	C_3F_8	2,600	0.26	7,000	6,310	8,830	12,500
PFC-318	c-C_4F_8	3,200	0.32	8,700	7,310	10,300	14,700
PFC-3-1-10	C_4F_{10}	2,600	0.33	7,000	6,330	8,860	12,500
PFC-4-1-12	C_5F_{12}	4,100	0.41		6,510	9,160	13,300
PFC-5-1-14	C_6F_{14}	3,200	0.49	7,400	6,600	9,300	13,300
PFC-9-1-18	$C_{10}F_{18}$	>1,000[d]	0.56		>5,500	>7,500	>9,500
trifluoromethyl sulphur pentafluoride	SF_5CF_3	800	0.57		13,200	17,700	21,200
Fluorinated ethers							
HFE-125	CHF_2OCF_3	136	0.44		13,800	14,900	8,490
HFE-134	CHF_2OCHF_2	26	0.45		12,200	6,320	1,960
HFE-143a	CH_3OCF_3	4.3	0.27		2,630	756	230
HCFE-235da2	$CHF_2OCHClCF_3$	2.6	0.38		1,230	350	106
HFE-245cb2	$CH_3OCF_2CHF_2$	5.1	0.32		2,440	708	215
HFE-245fa2	$CHF_2OCH_2CF_3$	4.9	0.31		2,280	659	200
HFE-254cb2	$CH_3OCF_2CHF_2$	2.6	0.28		1,260	359	109
HFE-347mcc3	$CH_3OCF_2CF_2CF_3$	5.2	0.34		1,980	575	175
HFE-347pcf2	$CHF_2CF_2OCH_2CF_3$	7.1	0.25		1,900	580	175
HFE-356pcc3	$CH_3OCF_2CF_2CHF_2$	0.33	0.93		386	110	33
HFE-449sl (HFE-7100)	$C_4F_9OCH_3$	3.8	0.31		1,040	297	90
HFE-569sf2 (HFE-7200)	$C_4F_9OC_2H_5$	0.77	0.3		207	59	18
HFE-43-10pccc124 (H-Galden 1040x)	$CHF_2OCF_2OC_2F_4OCHF_2$	6.3	1.37		6,320	1,870	569
HFE-236ca12 (HG-10)	$CHF_2OCF_2OCHF_2$	12.1	0.66		8,000	2,800	860
HFE-338pcc13 (HG-01)	$CHF_2OCF_2CF_2OCHF_2$	6.2	0.87		5,100	1,500	460
Perfluoropolyethers							
PFPMIE	$CF_3OCF(CF_3)CF_2OCF_2OCF_3$	800	0.65		7,620	10,300	12,400
Hydrocarbons and other compounds – Direct Effects							
Dimethylether	CH_3OCH_3	0.015	0.02		1	1	<<1
Methylene chloride	CH_2Cl_2	0.38	0.03		31	8.7	2.7
Methyl chloride	CH_3Cl	1.0	0.01		45	13	4

Notes:

[a] The CO_2 response function used in this report is based on the revised version of the Bern Carbon cycle model used in Chapter 10 of this report (Bern2.5CC; Joos et al. 2001) using a background CO_2 concentration value of 378 ppm. The decay of a pulse of CO_2 with time t is given by

$$a_0 + \sum_{i=1}^{3} a_i \cdot e^{-t/\tau_i}$$

Where $a_0 = 0.217$, $a_1 = 0.259$, $a_2 = 0.338$, $a_3 = 0.186$, $\tau_1 = 172.9$ years, $\tau_2 = 18.51$ years, and $\tau_3 = 1.186$ years.

[b] The radiative efficiency of CO_2 is calculated using the IPCC (1990) simplified expression as revised in the TAR, with an updated background concentration value of 378 ppm and a perturbation of +1 ppm (see Section 2.10.2).

[c] The perturbation lifetime for methane is 12 years as in the TAR (see also Section 7.4). The GWP for methane includes indirect effects from enhancements of ozone and stratospheric water vapour (see Section 2.10.3.1).

[d] Shine et al. (2005c), updated by the revised AGWP for CO_2. The assumed lifetime of 1,000 years is a lower limit.

[e] Hurley et al. (2005)

[f] Robson et al. (2006)

[g] Young et al. (2006)

Source: IPCC (2007) (Intergovernmental panel on climate change)

The atmospheric lifetimes of greenhouse gases are given here for illustrative purposes only and shall be revised as analysis, knowledge and understanding progress.

D.2 Calculation-related activity data

Processing scenario for residual household waste

Process	Percentage	Source
Incineration (including energy recovery)	64 %	Sinoe – 2011 campaign – ADEME
Storage	36 %	

Energy recovery

Process	Source
LHV	ELCD
Yield	ITOM 2012 (2010 figures) Modecom 2009

Recycling rates: ferrous metals

Ferrous metals	Recycling	Source
Electrical and electronic equipment[a]	LHA cold: 33 % LHA non-cold 33 % SHA 33 % Screens 33 %	Annual characterization campaigns led by WEEE-sector extended producer responsibility agencies – 2011

[a] The recycling rates of WEEE materials have been weighted by the WEEE collection rate (33 %).

Recycling rates: non-ferrous metals

Non-ferrous metals	Recycling	Source
Electrical and electronic equipment[a]	LHA cold: 33 % LHA non-cold 31 % SHA 32 % Screens 29 %	Annual characterization campaigns led by WEEE-sector extended producer responsibility agencies – 2011
Batteries and battery cells	to be estimated	

[a] The recycling rates of WEEE materials have been weighted by the WEEE collection rate (33 %).

Recycling rates: paper – carton

Paper and board	Recycling	Source
Graphic paper	43.2 %	Household (and equivalent) graphic paper – 2011 data – ADEME – November 2012

Recycling rate: glass

Glass	Recycling	Source
Electrical and electronic equipment[a]	to be estimated	
Flat glass	to be estimated	

[a] The recycling rates of WEEE materials have been weighted by the WEEE collection rate (33 %).

Recycling rate: plastics

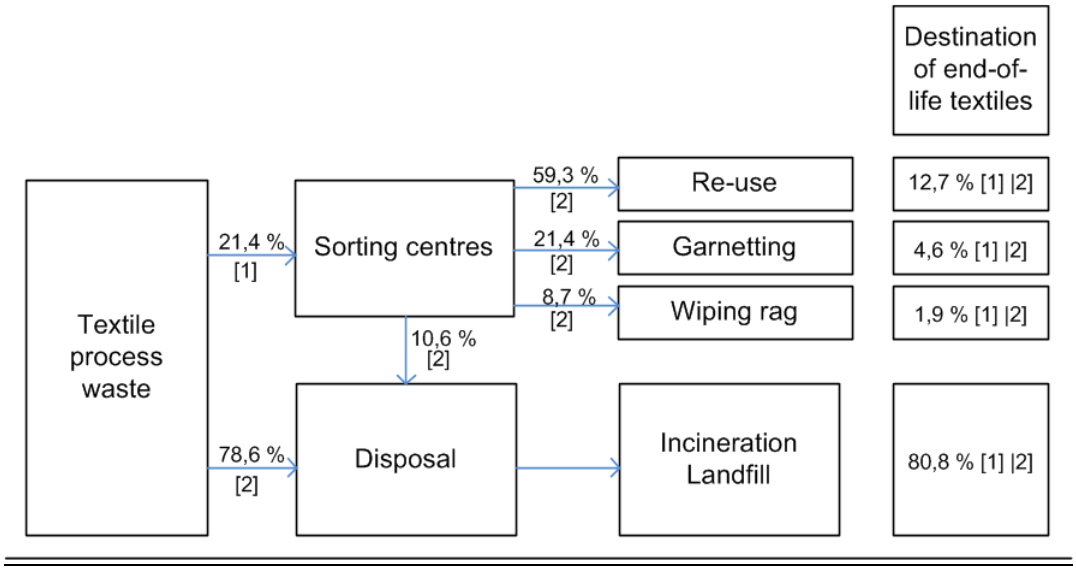
Plastics	Recycling	Source
Electrical and electronic equipment[a]	LHA cold: 31 % LHA non-cold 17 % SHA 21 % Screens: 28 %	Annual characterization campaigns led by WEEE-sector extended producer responsibility agencies – 2011

[a] The recycling rates of WEEE materials have been weighted by the WEEE collection rate (33 %).

Recycling rate: wood

Wood	Recycling	Source

Recycling rate: textiles (clothing/linen/footwear)



Sources: Household waste clothing, linen and footwear – 2011 – ADEME data – October 2012 and ADEME committee conclusions

End-of-life transport

	Value	Source
Distance for the collection of residual household waste	12 km/ton	ADEME, 2009 – Waste collection survey 2007 Analysis of distances covered by kerbside collection bins
Distance for the collection of recycling bin-sorted packaging	54 km/ton	

Transport: semi-specific data

Scale	Distance
Local	1,000 km by truck
Intracontinental	2,000 km by truck
Intercontinental	18,000 km by boat + 1,500 km by truck

Annex E

Characterization methods

E.1 Characterization methods for impact indicators

Recommended characterization methods

Impact category	Recommended default LCIA method	Indicator	Classification	Comments
Climate change	Baseline model of 100 years of the IPCC	Radiative forcing as Global Warming Potential (GWP100)	I	
Ozone depletion	Steady-state ODPs 1999 as in WMO assessment	Ozone Depletion Potential (ODP)	I	
Human toxicity, cancer effects	USEtox model (Rosenbaum et al, 2008)	Comparative Toxic Unit for humans (CTU_h)	II/III	
Human toxicity, non-cancer effects	USEtox model (Rosenbaum et al, 2008)	Comparative Toxic Unit for humans (CTU_h)	II/III	
Particulate matter/Respiratory inorganics	RiskPoll model (Rabl and Spadaro, 2004) and Greco et al 2007	Intake fraction for fine particles (kg PM2.5-eq/kg)	I	
Ionising radiation, human health	Human health effect model as developed by Dreicer et al. 1995 (Frischknecht et al, 2000)	Human exposure efficiency relative to U	II	
Photochemical ozone formation	LOTOS-EUROS (Van Zelm et al, 2008) as applied in ReCiPe	Tropospheric ozone concentration increase	II	
Acidification	Accumulated Exceedance (Seppälä et al. 2006, Posch et al, 2008)	Accumulated Exceedance (AE)	II	
Eutrophication, terrestrial	Accumulated Exceedance (Seppälä et al. 2006, Posch et al, 2008)	Accumulated Exceedance (AE)	II	
Eutrophication, aquatic (freshwater)	EUTREND model (Struijs et al, 2009b) as implemented in ReCiPe	Fraction of nutrients reaching freshwater end compartment (P)	II	Eutrophication due to phosphate oversupply "Hierarchist" scheme in ReCiPe
Eutrophication, aquatic (marine)	EUTREND model (Struijs et al, 2009b) as implemented in ReCiPe	Fractions of nutrients reaching marine end compartment (N)	II	Eutrophication due to nitrate oversupply "Hierarchist" scheme in ReCiPe
Ecotoxicity (freshwater)	USEtox model, (Rosenbaum et al, 2008)	Comparative Toxic Unit for ecosystems (CTU_e)	II/III	
Resource depletion, mineral, fossil and renewable[a]	CML 2002 (Guinée et al., 2002)	Scarcity	II	"Baseline reserves" scheme (van Oers et al., 2002) in CML 2002
[a] Depletion of renewable resources is included in the analysis but none of the analysed methods is mature for				

recommendation.

Characterization methods to be considered (but to be applied with caution)

Impact category	Recommended default LCIA method	Indicator	Classification	Comments
Ionising radiation, ecosystems	No methods recommended		Interim	
Ecotoxicity (terrestrial and marine)	No methods recommended			
Land transformation	Model based on Soil Organic Matter (SOM) (Milà i Canals et al, 2007b)	Soil Organic Matter	III	
Resource depletion, water	Model for water consumption as in Swiss Ecoscarcity (Frischknecht et al, 2008)	Water use related to local scarcity of water	III	

Indicators tied to impacts shall be preferred over indicators tied to flows.

These factor characterization methods are taken from the ILCD Handbook. Indicators tied to impacts are preferred over indicators tied to flows.

Classification scheme (translated from the ILCD Handbook):

— level “I”: recommended and satisfactory;

— level “II”: recommended but in need of some improvements;

— level “III”: recommended but to be applied with caution;

— interim indicates that a method was considered the best among the analysed methods for the impact category, but too immature to be recommended. This does not indicate that the impact category would not be relevant but further efforts are needed before a recommendation for use can be given.

List of the organizations involved in the follow-up, drafting and/or making of this guide

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ADISSEO FRANCE SAS
AFA - CHAMBRE SYNDICALE DE L'ALUMINIUM
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AGROE - POLE D'EXCELLENCE REG AGROALIMENT NPDC
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CCD - CENTRE DE LA CONSOMMATION DURABLE
CCI DE BORDEAUX
CCI DE FRANCE
CCI REGION PARIS ILE DE FRANCE - BIOP
CELENE
CENTRE D'ANIMATION REGIONAL CARMA
CENTRE EUROPEEN ENTREPRISE ET INNOVATION
CETIE
CETIM
CGDD - COMMISSARIAT GEN DEVELOPPEMENT DURABLE
CGI
CGP PRIMAGAZ
CGPME
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CIV CTRE INFORMATION VIANDES
CIVC - COMITE INTERPROF DU VIN DE CHAMPAGNE
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CLCV
CLIMAT MUNDI
CLM - CENTRE FOR AGRICULTURE AND ENVIRONMENT
CLUB BIO PLASTIQUES
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CSIF - CHAMBRE SYND. IMPORT. FR. FRUITS LEGUMES
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DGE/SCIDE/SQUALPI
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DGE/SI
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DIRAMODE-PIMKIE
DNV GL
DNVCERT - DET NORSKE VERITAS CERTIFICATION FCE
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