# Organisation Environmental Footprint

# Sector Rules (OEFSR)

# Retail

*Version 1.0 of April 20, 2018*

*(accepted by the PEF/OEF Steering Committee on April 19, 2018)*

*Valid until December 31, 2020*

| PROJECT INFORMATION | |
|---|---|
| **Project title** | Organisation Environmental Footprint Sector Rules (OEFSR): Retail |
| **Contracting organisation** | **Technical Secretariat:** Quantis; Carrefour; Colruyt Group; Kering; Office Depot Inc.; Decathlon; Picard; PERIFEM; ADEME; EAA; ENEA; GLOBAL 2000 – Friends of the Earth Austria. |
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## Acronyms

| | |
|---|---|
| **ADEME** | French Environment and Energy Management Agency |
| **AF** | Allocation factor |
| **AR** | Allocation ratio |
| **B2B** | Business to Business |
| **B2C** | Business to Consumer |
| **BoC** | Bill of Components |
| **BoM** | Bill of Materials |
| **CF** | Characterization Factor |
| **CFF** | Circular Footprint Formula |
| **CFF-M** | Circular Footprint Formula – Modular form |
| **CMWG** | Cattle Model Working Group |
| **CPA** | Classification of Products by Activity |
| **DC** | Distribution centre |
| **DMI** | Dry Matter Intake |
| **DNM** | Data Needs Matrix |
| **DQR** | Data Quality Rating |
| **EA** | Economic Allocation |
| **EC** | European Commission |
| **EF** | Environmental Footprint |
| **EI** | Environmental Impact |
| **EAA** | Environment Agency Austria |
| **EF** | Environmental Footprint |
| **ENEA** | Italian National Agency for New Technologies, Energy and Sustainable Economic Development |
| **EOL** | end of life |
| **FU** | Functional unit |
| **G** | gram |
| **GE** | Gross Energy intake |
| **GHG** | Greenhouse Gas |
| **GR** | Geographical Representativeness |
| **GWP** | Global Warming Potential |
| **HD** | Helpdesk |
| **ILCD** | International reference life cycle data system |
| **IPCC** | Intergovernmental Panel on Climate Change |
| **ISO** | International Organisation for Standardization |
| **JRC** | Joint Research Centre |
| **kg** | kilogram |
| **km** | kilometre |
| **kWh** | kilowatt hour |
| **L** | litre |
| **LCA** | Life Cycle Assessment |
| **LCDN** | Life Cycle Data Network |
| **LCI** | Life Cycle Inventory |
| **LCIA** | Life Cycle Impact Assessment |
| **LT** | Lifetime |
| **m** | metre |
| **MJ** | mega joules |
| **mL** | millilitre |

| | |
|---|---|
| **NACE** | Nomenclature Générale des Activités Economiques dans les Communautés Européennes |
| **NDA** | Non Disclosure Agreement |
| **NGO** | Non-Governmental Organisation |
| **NMVOC** | Non-methane volatile compounds |
| **OEF** | Organisation Environmental Footprint |
| **OEFSR** | Organisation Environmental Footprint Sector Rules |
| **P** | Precision |
| **PCR** | Product Category Rule |
| **PEF** | Product Environmental Footprint |
| **PEFCR** | Product Environmental Footprint Category Rules |
| **PERIFEM** | French Technical Association of Trade |
| **RF** | Reference Flow |
| **RO** | Representative Organisation |
| **SB** | System Boundary |
| **SC** | Steering Committee |
| **SCP** | Sustainable Consumption and Production |
| **SMRS** | Sustainability Measurement & Reporting System |
| **SS** | Supporting study |
| **TAB** | Technical Advisory Board |
| **TeR** | Technological Representativeness |
| **TiR** | Time Representativeness |
| **TS** | Technical Secretariat |
| **UNEP** | United Nations Environment Programme |
| **UUID** | Universally Unique Identifier |

## Definitions

This glossary defines key terms used in this OEFSR and the retail sector.

**Activity data** - This term refers to information which is associated with processes while modelling Life Cycle Inventories (LCI). In the OEF Guide it is also called “non-elementary flows”. The aggregated LCI results of the process chains that represent the activities of a process, are each multiplied by the corresponding activity data[1] and then combined to derive the environmental footprint associated with that process (see Figure 1). Examples of activity data include quantity of kilowatt-hours of electricity used, quantity of fuel used, output of a process (e.g. waste), number of hours equipment is operated, distance travelled, floor area of a building, etc. In the context of OEF the amounts of ingredients from the bill of material (BOM) shall always be considered as activity data.

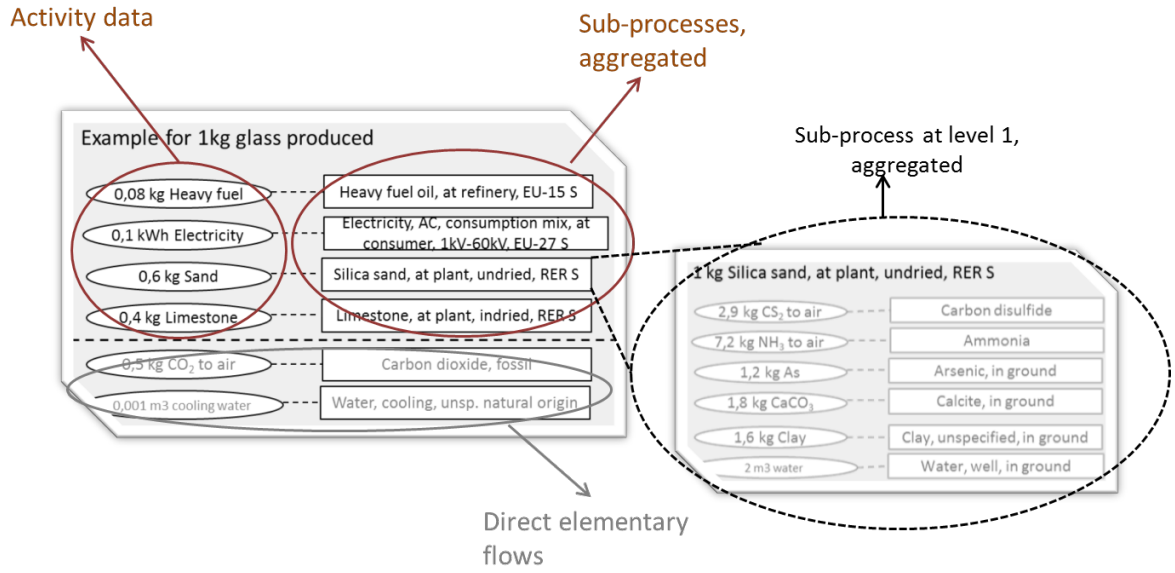


**Figure 1: An example of a partially aggregated dataset, at level 1. The activity data and direct elementary flows are to the left, and the complementing sub-processes in their aggregated form are to the right. The grey text indicates elementary flows.**

**Aggregated dataset** - This term is defined as a life cycle inventory of multiple unit processes (e.g. material or energy production) or life cycle stages (cradle-to-gate), but for which the inputs and outputs are provided only at the aggregated level. Aggregated datasets are also called "LCI results", “cumulative inventory” or “System processes” datasets. The aggregated dataset can have been aggregated horizontally and/or vertically. Depending on the specific situation and modelling choices a "unit process" dataset can also be aggregated. See Figure 2[2].

[1] Based on GHG protocol scope 3 definition from the Corporate Accounting and Reporting Standard (World resources institute, 2011).

[2] Source: UNEP/SETAC “Global Guidance Principles for LCA Databases"

**Application specific -** It refers to the generic aspect of the specific application in which a material is used. For example, the average recycling rate of PET in bottles.

**Bill of materials** – A bill of materials or product structure (sometimes bill of material, BOM or associated list) is a list of the raw materials, sub-assemblies, intermediate assemblies, sub-components, parts and the quantities of each needed to manufacture an end product.

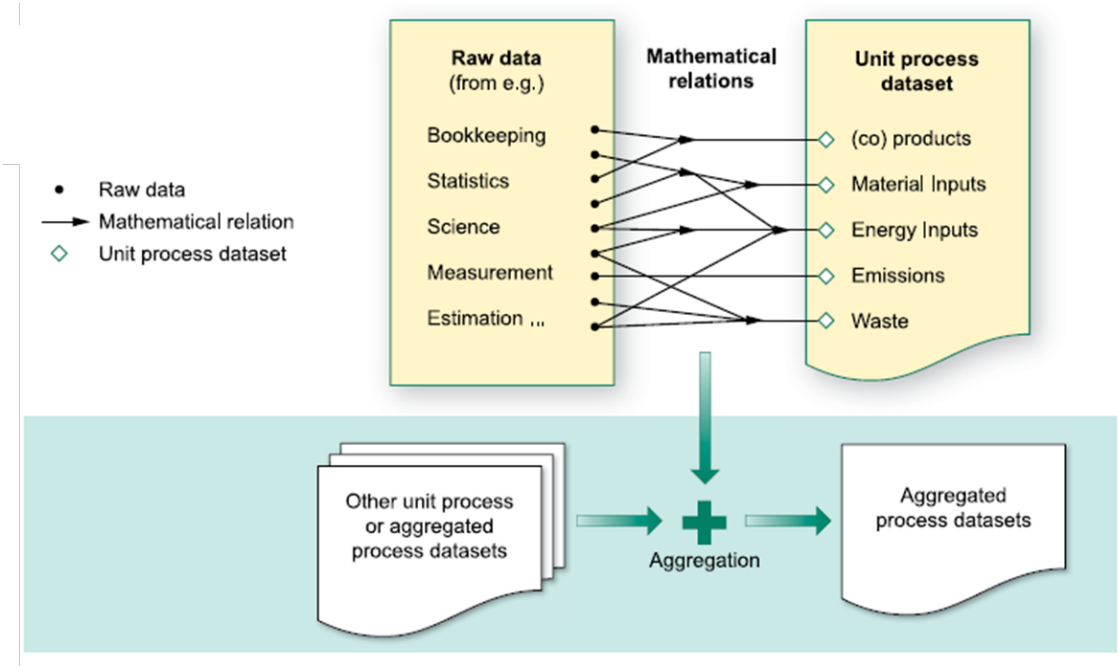


**Figure 2: Definition of a unit process dataset and an aggregated process dataset.**

**Business to Business (B2B)** – Describes transactions between businesses, such as between a manufacturer and a wholesaler, or between a wholesaler and a retailer.

**Business to Consumers (B2C)** – Describes transactions between business and consumers, such as between retailers and consumers. According to ISO 14025:2006, a consumer is defined as "an individual member of the general public purchasing or using goods, property or services for private purposes".

**Commissioner of the EF study** - Organisation (or group of organisations) that finances the EF study in accordance with the EF Guide, EF Guidance and the relevant OEFSR, if available (definition adapted from ISO 14071/2014, point 3.4).

**Company-specific data** – It refers to directly measured or collected data from one or multiple facilities (site-specific data) that are representative for the activities of the company. It is synonymous to "primary data". To determine the level of representativeness a sampling procedure can be applied.

**Comparative assertion** – An environmental claim regarding the superiority or equivalence of one organisation versus a competing organisation that operates in the same sector, based on the results of an OEF study and supporting OEFSRs.

**Comparison** – A comparison, not including a comparative assertion, (graphic or otherwise) of two or more organisations/production sites/time frames based on the results of an OEF study, and supporting OEFSRs. Comparing production sites or time frames within the same company falls under this definition and is not a comparative assertion.

**Data Quality Rating (DQR) -** Semi-quantitative assessment of the quality criteria of a dataset based on Technological representativeness, Geographical representativeness, Time-related representativeness, and Precision. The data quality shall be considered as the quality of the dataset as documented.

**Direct elementary flows (also named elementary flows) -** All output emissions and input resource use that arise directly in the context of a process. Examples are emissions from a chemical process, or fugitive emissions from a boiler directly onsite. See Figure 1.

**Disaggregation -** The process that breaks down an aggregated dataset into smaller unit process datasets (horizontal or vertical). The disaggregation can help making data more specific. The process of disaggregation should never compromise or threat to compromise the quality and consistency of the original aggregated dataset

**EF communication vehicles -** It includes all the possible ways that can be used to communicate the results of the EF study to the stakeholders. The list of EF communication vehicles includes, but it is not limited to, labels, environmental product declarations, green claims, websites, infographics, etc.

**EF report -** Document that summarises the results of the EF study. For the EF report the template provided as annex to the PECFR Guidance and OEFSR Guidance shall be used. In case the commissioner of the EF study decides to communicate the results of the EF study (independently from the communication vehicle used), the EF report shall be made available for free through the commissioner's website. The EF report shall not contain any information that is considered as confidential by the commissioner, however the confidential information shall be provided to the verifier(s).

**EF study -** Term used to identify the totality of actions needed to calculate the EF results. It includes the modelling, the data collection, and the analysis of the results.

**Electricity tracking[3] -** Electricity tracking is the process of assigning electricity generation attributes to electricity consumption.

**Elementary flow -** Material or energy entering the system being studied that has been drawn from the environment without previous human transformation, or material or energy leaving the system being studied that is released into the environment without subsequent human transformation.

[3] https://ec.europa.eu/energy/intelligent/projects/en/projects/e-track-ii

**EMAS -** Eco-Management and Audit Scheme (REGULATION (EC) No 1221/2009 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 25 November 2009 on the voluntary participation by organisations in a Community eco-management and audit scheme (EMAS). EMAS is a premium management instrument developed by the European Commission for companies and other organisations to evaluate, report, and improve their environmental performance. EMAS is open to every type of organisation and spans all economic and service sectors and is applicable worldwide.

**EMAS Sectoral Reference Documents (EMAS SRDs)** – Documents developed according to Art. 46 of the EMAS Regulation4, which contain best environmental management practice, environmental performance indicators for specific sectors and, where appropriate, benchmarks of excellence and rating systems identifying environmental performance levels.

**ENVIFOOD** - The ENVIFOOD protocol is a harmonized framework assessment methodology for the environmental assessment of food and drink products launched by the European Food Sustainable Consumption and Production Round Table (http://www.food-scp.eu/node/72).

**Environmental aspect** – Element of an organization's activities or products or services that interacts or can interact with the environment (ISO 14001:2015).

**External Communication -** Communication to any interested party other than the commissioner or the practitioner of the study.

**Foreground elementary flows -** Direct elementary flows (emissions and resources) for which access to primary data (or company-specific information) is available.

**Independent external expert -** Competent person, not employed in a full-time or part-time role by the commissioner of the EF study or the practitioner of the EF study, and not involved in defining the scope or conducting the EF study (adapted from ISO 14071/2014, point 3.2).

**In-house product** - There is no one accepted definition for in-house product. In this OEFSR (as suggested by the OEFSR Retail TS), the term "in-house products" typically refers for products that are "designed", manufactured (or significantly transformed – e.g., going from green coffee beans to instant coffee) by the retailer by opposition to "non-in-house, but still own products" (or "non-in-house, but still own brands") which would be typically products that are "designed" by the retailer but where the manufacturing (or significant transformation) is outsourced. NOTE1: "in-house products" may also come on the market as "own brands". NOTE 2: For some products, typically food, own brands could even be not designed by the retailer but simply products containing the brand of the retailer. (OEFSR Retail Technical Secretariat definition).

[4] Regulation (EC) No 1221/2009

**Input flows** – Product, material or energy flow that enters a unit process. Products and materials include raw materials, intermediate products and co-products (ISO 14040:2006).

**Intermediate product** - An intermediate product is a product that requires further processing before it is saleable to the final consumer.

**Lead verifier -** Verifier taking part in a verification team with additional responsibilities compared to the other verifiers in the team.

**Life Cycle Inventory (LCI)** - The combined set of exchanges of elementary, waste and product flows in a LCI dataset.

**Life Cycle Inventory (LCI) dataset -** A document or file with life cycle information of a specified product or other reference (e.g., site, process), covering descriptive metadata and quantitative life cycle inventory. A LCI dataset could be a unit process dataset, partially aggregated or an aggregated dataset.

**Material-specific** - It refers to a generic aspect of a material. For example, the recycling rate of PET.

**National and international brands** - Products produced by another company that are either sold nationally or internationally. (OEFSR Retail Technical Secretariat definition).

**Output flows** – Product, material or energy flow that leaves a unit process. Products and materials include raw materials, intermediate products, co-products and releases (ISO 14040:2006).

**OEF Profile** – The quantified results of an OEF study. It includes the quantification of the impacts for the various impact categories and the additional environmental information considered necessary to be reported.

**OEF screening** – A preliminary study carried out on the representative organisation, and intended to identify the most relevant life cycle stages, processes, elementary flows, impact categories, data quality needs, and any other major requirement to be part of the final OEFSR.

**OEFSR Supporting study** – An OEF study done on the basis of a draft OEFSR. It is used to confirm the decisions taken in the draft OEFSR before the final OEFSR is released.

**Other products** - All products that are not manufactured nor significantly transformed by the retailer (includes own brands, national and international brands). (OEFSR Retail Technical Secretariat).

**Organisation** - A company, corporation, firm, enterprise, authority or institution, or part or combination thereof, whether incorporated or not, public or private. For the purpose of calculating the OEF, the function of the organisation is defined as the provision of products (i.e. goods and services) over a specified reporting interval, thus it is defined with reference to its Product Portfolio.

**Organisational claims** – Any form of communication regarding an organisation's environmental performance, such as reports, responses to questionnaires, declarations and press releases. Herein claims refer exclusively to those based on a life cycle assessment (LCA-based claims).

**Organisation Environmental Footprint Sector Rules (OEFSRs)** – Sector-specific, life-cycle-based rules that complement general methodological guidance for OEF studies by providing further specification at the level of a specific sector. OEFSRs help to shift the focus of the OEF study towards those aspects and parameters that matter the most, and hence contribute to increased relevance, reproducibility and consistency of the results whilst reducing costs in comparison to a study based on the comprehensive requirements of the OEF Guide. OEFSRs are defined primarily with reference to the activities characteristic of the sector, as represented in a typical Product Portfolio.

**Own brands / own products** - There is no one accepted definition for "own brands" and "own products". In this OEFSR (as suggested by the OEFSR Retail TS), the term "own brands" or "own products" typically refers for products designed by the retailer and sold under a brand managed by the retailer but where the products' manufacturing (or significant transformation) is outsourced

**Partially disaggregated dataset -** A dataset with a LCI that contains elementary flows and activity data, and that only in combination with its complementing underlaying datasets yield a complete aggregated LCI data set. We refer to a partially disaggregated dataset at level 1 in case the LCI contains elementary flows and activity data, while all complementing underlaying datasets are in their aggregated form (see an example in Figure 1).

**Population -** Any finite or infinite aggregation of individuals, not necessarily animate, subject to a statistical study.

**Practitioner of the EF study -** Individual, organisation or group of organisations that performs the EF study in accordance with the EF Guide, EF Guidance and the relevant OEFSR, if available. The practitioner of the EF study can belong to the same organisation as the commissioner of the EF study (adapted from ISO 14071/2014, point 3.6).

**Primary data**[5] **-** This term refers to data from specific processes within the supply-chain of the company applying the OEFSR. Such data may take the form of activity data, or foreground elementary flows (life cycle inventory). Primary data are site-specific, company- specific (if multiple sites for the same product) or supply-chain-specific. Primary data may be obtained through meter readings, purchase records, utility bills, engineering models, direct monitoring, material/product balances, stoichiometry, or other methods for obtaining data from specific processes in the value chain of the company applying the OEFSR. In this Guidance, primary data is synonym of "company-specific data" or supply-chain-specific data".

[5] Based on GHG protocol scope 3 definition from the Corporate Accounting and Reporting Standard (World resources institute, 2011).

**Product Portfolio -** The Product Portfolio refers to the amount and nature of goods and services provided by the Organisation over the reporting interval, which should be one year.

**Refurbishment -** The process of restoring components to a functional and/or satisfactory state to the original specification (providing the same function), using methods such as resurfacing, repainting, etc. Refurbished products may have been tested and verified to function properly.

**Representative sample -** A representative sample with respect to one or more variables is a sample in which the distribution of these variables is exactly the same (or similar) as in the population from which the sample is a subset.

**Representative organisation (model) -** The "representative organisation" is a real or fictive organisation that is typical for the given sector and Product Portfolio. Especially when technologies and the composition of Production Portfolios within a sector are varied, the "representative organisation" can be a virtual (non-existing) organisation, built, for example, with the average EU sales-weighted characteristics of all technologies used, using the Product Portfolio as a reference. If appropriate, an OEFSR might include more than one representative organisation (business unit).

**Representative sample -** A representative sample with respect to one or more variables is a sample in which the distribution of these variables is exactly the same (or similar) as in the population from which the sample is a subset.

**Sample -** A sample is a subset containing the characteristics of a larger population. Samples are used in statistical testing when population sizes are too large for the test to include all possible members or observations. A sample should represent the whole population and not reflect bias toward a specific attribute.

**Secondary data**[6] **-**It refers to data not from specific process within the supply-chain of the company applying the OEFSR. This refers to data that is not directly collected, measured, or estimated by the company, but sourced from a third-party life-cycle-inventory database or other sources. Secondary data includes industry-average data (e.g., from published production data, government statistics, and industry associations), literature studies, engineering studies and patents, and can also be based on financial data, and contain proxy data, and other generic data. Primary data that go through a horizontal aggregation step are considered as secondary data.

**Sector** – A sector is defined with reference to the characteristic sectorial Product Portfolio, defined using NACE codes (i.e. in line with the Nomenclature générale des Activités Economiques dans les Communautés Européennes NACE Rev. 2).

[6] Based on GHG protocol scope 3 definition from the Corporate Accounting and Reporting Standard (World resources institute, 2011)

Site-specific data – It refers to directly measured or collected data from one facility (production site). It is synonymous to “primary data”.

**Sub-population -** In this document this term indicates any finite or infinite aggregation of individuals, not necessarily animate, subject to a statistical study that constitutes a homogenous sub-set of the whole population. Sometimes the word "stratum" can be used as well.

**Sub-sample -** In this document this term indicates a sample of a sub-population.

**Sub-processes -** Those processes used to represent the activities of the level 1 processes (=building blocks). Sub-processes can be presented in their (partially) aggregated form (see Figure 1).

**Supply-chain –** It refers to all of the upstream and downstream activities associated with the operations of the company applying the OEFSR, including the use of sold products by consumers and the end-of-life treatment of sold products after consumer use.

**Supply-chain specific –** It refers to a specific aspect of the specific supply-chain of a company. For example the recycled content value of an aluminium can produced by a specific company.

**Type III environmental declaration** – An environmental declaration providing quantified environmental data using predetermined parameters and, where relevant, additional environmental information (ISO 14025:2006). The predetermined parameters are based on the ISO 14040 series of standards, which is made up of ISO 14040 and ISO 14044.

**Unit process dataset -** Smallest element considered in the life cycle inventory analysis for which input and output data are quantified (ISO 14040:2006). In LCA practice, both physically not further separable processes (such as unit operations in production plants, then called “unit process single operation”) and also whole production sites are covered under "unit process", then called “unit process, black box” (ILCD Handbook).

**Validation statement -** Conclusive document aggregating the conclusions from the verifiers or the verification team regarding the EF study. This document is mandatory and shall be electronically or physically signed by the verifier or in case of a verification panel, by the lead verifier. The minimum content of the verification statement is provided in this document.

**Verification report -** Documentation of the verification process and findings, including detailed comments from the verifier(s), as well as the corresponding responses. This document is mandatory, but it can be confidential. However, it shall be signed, electronically or physically, by the verifier or in case of a verification panel, by the lead verifier.

**Verification team -** Team of verifiers that will perform the verification of the EF study, of the EF report and the EF communication vehicles.

**Verifier -** Independent external expert performing a verification of the EF study and eventually taking part in a verification team.

# 1. Introduction

The Organisation Environmental Footprint (OEF) Guide provides detailed and comprehensive technical guidance on how to conduct an OEF study. OEF studies may be used for a variety of purposes, including in-house management and participation in voluntary or mandatory programmes.

For all requirements not specified in this OEFSR the applicant shall refer to the most recent version of the OEF Guide.

The compliance with the present OEFSR is optional for OEF in-house applications, whilst it is mandatory whenever the results of an OEF study or any of its content is intended to be communicated.

**Terminology: shall, should and may**

This OEFSR uses precise terminology to indicate the requirements, the recommendations and options that could be chosen when an OEF study is conducted.

- The term "shall" is used to indicate what is required in order for an OEF study to be in conformance with this OEFSR.
- The term "should" is used to indicate a recommendation rather than a requirement. Any deviation from a "should" requirement has to be justified when developing the OEF study and made transparent.
- The term "may" is used to indicate an option that is permissible. Whenever options are available, the OEF study shall include adequate argumentation to justify the chosen option.

# 2. General information about the OEFSR

## 2.1. Technical secretariat

The technical secretariat responsible for the development of the OEFSRs for the retail sector is composed of the following organisations (listing all people having been involved in the project) (Table 1).

**Table 1: Technical secretariat composition.**

| Name of the organization | Type of organization | Name of the members (not mandatory) | Participation since |
|---|---|---|---|
| Quantis (Coordinator) | Consultant | Sebastien Humbert (main contact), Carole Dubois, Cécile Guignard, Simone Pedrazzini, Angela Adams | 2013 |

| | | | |
|---|---|---|---|
| Carrefour* | Industry | Pascal Léglise, Lea Lim, Vik Vets, Evert Vermaut (Vincotte, support), Gwendolyn Bailey, Meredith Baker | 2013 |
| Colruyt Group* | Industry | Frederic Vermeiren, Steven Van Hemelryck, Mieke Vercaeren, Arne Braems | 2013 |
| Decathlon* | Industry | Emilie Aubry, Filippo Sessa (LCE, support) | 2013 |
| Kering | Industry | François-Xavier Morvan | 2013 |
| Office Depot, Inc. | Industry | Shela Fletcher, Thomas Lingen | 2013 |
| Picard | Industry | Arnaud Brulaire | 2013 |
| French Technical Association of Trade and Retail (PERIFEM) | Industry | Sophie Gillier | 2013 |
| French Environment and Energy Management Agency (ADEME) | Government | Romain Poivet | 2013 |
| Environment Agency Austria (EAA) | Government | Hanna Schreiber | 2013 |
| Italian National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA) | Government | Paolo Masoni, Alessandra Zamagni | 2013 |
| GLOBAL 2000-Friends of the Earth Austria | NGO | Martin Wildenberg, Kewin Comploi | 2013 |

where * indicates that the organisation is a retailer that performed a supporting study.

## 2.2. Consultation and stakeholders

A 1st public consultation on the scope document for the OEFSR Retail was performed from February 7th, 2014 to March 7th, 2014 (9 commenters[7], 33 comments).

A 1st physical consultation was held in Brussels on February 21st, 2014 (5 stakeholders[8] outside of the TS and DG ENV).

A 2nd public consultation on the scope document for the OEFSR Retail was performed from April 22nd, 2014 to May 20th, 2014 (9 commenters[9], 33 comments; one consolidated set of comments with the consultation of February 7th, 2014 to March 7th, 2014).

A 1st public consultation on the draft screening and draft OEFSR documents for the Retail pilot was performed from April 29th, 2015 to May 27st, 2015 (5 commenters[10], 32 comments).

A draft OEFSR was presented to, voted and accepted by the Steering Committed on July 9, 2015.

A 3rd public consultation on the updated draft OEFSR Retail was performed from August 29th, 2016 to September 26th, 2016 (2 commenters[11], 70 comments).

Documents related to the OEFSR Retail are available at the following web-link in the dedicated wiki page: https://webgate.ec.europa.eu/fpfis/wikis/display/EUENVFP/OEFSR+Pilot:+Retail.

The results of the open stakeholder consultations are available at: https://webgate.ec.europa.eu/fpfis/wikis/display/EUENVFP/Stakeholder+workspace%3A+OEFSR+pilot+Retail.

## 2.3. Review panel and review requirements of the OEFSR

The review panel was composed of the following members (Table 2).

[7] World Resources Institute, ILIB, Vinçotte nv, Aalborg University and 2.-0 LCA consultants, Eurocommerce, BGA, JRC, PERIFEM, and Castorama.

[8] ILIB, Vinçotte nv, THEMA1 GmbH, Bureau Veritas CODDE, and PE International.

[9] World Resources Institute, ILIB, Vinçotte nv, Aalborg University and 2.-0 LCA consultants, Eurocommerce, BGA, JRC, PERIFEM, and Castorama.

[10] Belgian Federal Ministry of public Health and Environment, DG ENV, EU Food SCP round table, and ILIB.

[11] Belgian Federal Ministry of public Health and Environment, and DG ENV.

**Table 2: Review panel composition.**

| Name of the member | Affiliation | Role |
|---|---|---|
| Ugo Pretato | pretato@studiofieschi.it<br>Studio Fieschi & soci Srl<br>Via Cesare Lombroso, 25, I-10125 Tornio | LCA expert (and panel chair) |
| Emmanuelle Neyroumande | neyroumande@gmail.com<br>Envol-Vert, ex-WWF International<br>France | NGO perspective |
| Jan Dörrich | j.doerrich@rewe-group.at<br>REWE Group<br>Austria | Retail industry perspective |

The reviewers have verified that the following requirements have been fulfilled:

- The OEFSR has been developed in accordance with the requirement provided in the OEFSR Guidance 6.3, and where appropriate in accordance with the requirements provided in the most recent approved version of the OEF Guide, and supports creation of credible and consistent OEF profiles,
- Functional unit, allocation and calculation rules are adequate for the sector under consideration,
- Company-specific and secondary datasets used to develop this OEFSR are relevant, representative, and reliable,
- The selected LCIA indicators and additional environmental information are appropriate for the sector under consideration and the selection is done in accordance with the guidelines stated in the OEFSR Guidance version 6.2 and the most recent approved version of the OEF Guide, and
- Both LCA-based data and the additional environmental information prescribed by the OEFSR give a description of the significant environmental aspects associated with the sector.

The detailed review report is provided in Annex 6 of this OEFSR.

## 2.4. Review statement

This OEFSR has been developed in compliance with version 6.3 of the OEFSR Guidance, and with the OEF Guide adopted by the Commission in April 2013.

The representative product portfolio correctly describes the average sector in scope of this OEFSR.

OEF studies carried out in compliance with this OEFSR would reasonably lead to reproducible results and the information included therein may be used to make comparisons under the prescribed conditions (see chapter on limitations and other assumptions/limitations throughout the document).
The panel members confirm that they have sufficient knowledge and experience of the sector involved and of the relevant methods and guidance to carry out this review.
The panel members confirm that they have been independent in their role as reviewers, they have not been involved in the development of the OEFSR and they do not have conflicts of interest regarding this review.

## 2.5. Geographic validity

This OEFSR is developed in a European context but may also be used to assess the OEF of business units or supply chain outside Europe. It may be used to conduct OEF studies inside and outside of Europe.
Each OEF study shall identify its geographical validity listing all the countries where the organisation's activities take place, together with the relative market share.

## 2.6. Language

The OEFSR is written in English. The original in English supersedes translated versions in case of conflicts.

## 2.7. Conformance to other documents

This OEFSR has been prepared in conformance with the following documents (in prevailing order):

- OEFSR Guidance - version 6.3
- Organisation Environmental Footprint (OEF) Guide; Annex III to the Recommendation 2013/179/EU, 9 April 2013. Published in the official journal of the European Union Volume 56, 4 May 2013

Deviations from the Guidance version 6.3:
One major deviation from the OEF guide is the fact that the classification of direct vs. indirect boundary / impacts as defined in the OEF guide is not the same as what is used by the retail sector. In

order to avoid confusion, it is therefore recommended to avoid the concepts of direct vs. indirect classification in the presentation of the results.[12]

# 3. OEFSR scope

## 3.1. The sector

This OEFSR addresses the activities related to the **retail sector** that covers all activities involving the sale of products[13] to consumers.

This OEFSR may be used by all different types of retailers (e.g., independent stores, chains, franchises, etc.) selling food, fast-moving consumer goods (e.g., shampoo), durable goods (e.g., dishwashers), consumables (e.g., t-shirt) and services (e.g., oil change) to the end user for personal, professional or household use and consumption, **to assess their OEF** over part or full of their product portfolio, including the full life cycle of the product portfolio chosen.

A retailer may engage in the following two major types of activities:

- The **sale of products**: retailing logistics that include all activities necessary for the service of buying and selling products
- The **production and service provision of in-house products**: where the retailer has control (taking into account both financial and operational control)

The NACE codes for the sectors included in this OEFSR are:

Rev. 2 Division 47 (retail trade, except of motor vehicles and motorcycles).

Furthermore, for retailers producing in-house products, NACE divisions C10-32 are considered.

Depending on further activities of the retailer, other NACE codes may apply.

## 3.2. Representative organisation (virtual retailer)

The model used to help develop this OEFSR is based on a virtual retailer. The screening study is available upon request to the TS coordinator[14] that has the responsibility of distributing it with an adequate disclaimer about its limitations.

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[12] Furthermore, it adds another level of complexity to the already complex situation of the retailer:
- organisational boundary-activities
- the broad product portfolio
- the often different retail branches within a company
- other activities (sectors) within the same company (e.g. wholesale, food service, etc.).

[13] Goods and services.

[14] Sebastien Humbert, sebastien.humbert@quantis-intl.com, +41 79 754 7566.

This exemplary retailer is a retailer situated “somewhere in Europe”, selling both food and non-food products (i.e. goods and services) for a consumer “population” of about 3’000’000 people. It has some in-house products but mainly provides out-of-house products.

The entire life cycle (from cradle to grave) of the retailer is included in the system boundaries. The following seven life cycle stages are included (Table 3): production and service provision, logistics, retail place, support, distribution of sold products to the client, use of sold products, end-of-life of sold products.

**Table 3: Life cycle stages.**

| Life cycle stage | Short description of the processes included |
|---|---|
| Production and service provision | Production of raw materials (food & non-food)<br>Plants (factories) |
| Logistics | Transport<br>Warehouses<br>Distribution centers |
| Retail place | Shopping malls<br>Shops<br>Tele-commerce / E-commerce<br>Self pick-up |
| Support | Administration and human resources<br>Financial services and purchased unit<br>R&D, IT, quality, technical and design<br>Marketing<br>Sustainability<br>Customer support |
| Distribution of sold products to the client | Customer transport (shopping trip)<br>Delivery by, e.g., van (for what is not picked-up by the client) |
| Use of sold products | Use of products (typically at home) |
| End-of-life of sold products | End-of-life of sold products (including packaging)<br>Including transport to end-of-life plant |

The entire life cycle (from cradle to grave) of this retailer is depicted in Figure 3 below and includes all organisation activities (upstream and downstream) associated with the product portfolio of the organisation assessed.


**Figure 3: System boundaries for the organisation assessed.**

Table 4 represents the product portfolio considered in the representative organisation.

**Table 4: Product portfolio considered in the representative organisation.**

| | Retail trade sector | Category | Representative product for modeling | | | | Amount consumed | Losses at consumer | Losses at consumer (units) | Losses at consumer (kg) | Amount sold to consumer | Losses at retailer | Losses at retailer | Amount purchased by retailer/year | Category unit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Product | Modelled quantity | Unit | Comments | | | | | | | | | |
| Goods | Food | Fruits and vegetables | Apples | 1.00 | kg | in plastic | 338136000 | 0.19 | 79315851.85 | 79315851.85 | 417451851.85 | 0.10 | 46383539 | **463835391** | kg |
| | | Meat and meat alternatives | Beef (suckle beef, Europe) | 1.00 | kg | in plastic | 18731000 | 0.11 | 2315067.42 | 2407670.11 | 21046067.42 | 0.04 | 876919 | **21922987** | kg |
| | | Meat and meat alternatives | Beef (suckle beef, Brazil) | 1.00 | kg | in plastic | 6244000 | 0.11 | 771730.34 | 802599.55 | 7015730.34 | 0.04 | 292322 | **7308052** | kg |
| | | Meat and meat alternatives | Pork | 1.00 | kg | in plastic | 72675000 | 0.11 | 8982303.37 | 9341595.51 | 81657303.37 | 0.04 | 3402388 | **85059691** | kg |
| | | Meat and meat alternatives | Poultry | 1.00 | kg | in plastic | 46800000 | 0.11 | 5784269.66 | 6015640.45 | 52584269.66 | 0.04 | 2191011 | **54775281** | kg |
| | | Meat and meat alternatives | Sheep/Goat | 1.00 | kg | in plastic | 4500000 | 0.11 | 556179.78 | 578426.97 | 5056179.78 | 0.04 | 210674 | **5266854** | kg |
| | | Meat and meat alternatives | Fish | 1.00 | kg | in plastic | 49500000 | 0.11 | 6117977.53 | 6362696.63 | 55617977.53 | 0.04 | 2317416 | **57935393** | kg |
| | | Meat and meat alternatives | Eggs | 1.00 | kg | in 6 pieces cardboard box | 28913000 | 0.11 | 3573516.85 | 3666428.29 | 32486516.85 | 0.04 | 1353605 | **33840122** | kg |
| | | Dairy products | Milk | 1.00 | L | in plastic bottle | 315360000 | 0.07 | 23736774.19 | 25160980.65 | 339096774.19 | 0.01 | 1704004 | **340800778** | L |
| | | Grain products | Pasta | 1.00 | kg | in plastic bag | 197100000 | 0.25 | 65700000.00 | 66357000.00 | 262800000.00 | 0.02 | 5363265 | **268163265** | kg |
| | | Oils and fats | Sunflower oil | 1.00 | L | in glass bottle | 29565000 | 0.04 | 1231875.00 | 1752958.13 | 30796875.00 | 0.01 | 311080 | **31107955** | L |
| | | Prepared/processed meals | Frozen pizza | 0.40 | kg | | 87600000 | 0.01 | 440201.01 | 484221.11 | 88040201.01 | 0.01 | 531430 | **88571631** | kg |
| | | Confectionery | Chocolate bar | 0.10 | kg | in aluminium | 16425000 | 0.02 | 335204.08 | 372076.53 | 16760204.08 | 0.05 | 882116 | **17642320** | kg |
| | | Other foods | Chips | 0.10 | kg | | 27375000 | 0.02 | 558673.47 | 572640.31 | 27933673.47 | 0.01 | 282158 | **28215832** | kg |
| | Beverages | Coffee and tea | R&G coffee | 0.25 | kg | | 1725000 | 0.05 | 90789.47 | 92151.32 | 1815789.47 | 0.01 | 18341 | **1834131** | kg |
| | | Coffee and tea | R&G coffee | 0.25 | kg | | 1725000 | 0.05 | 90789.47 | 92151.32 | 1815789.47 | 0.01 | 18341 | **1834131** | kg |
| | | Alcoholic beverages | Beer | 0.50 | L | reusable bottle | 32850000 | 0.05 | 1728947.37 | 2907775.12 | 34578947.37 | 0.01 | 349282 | **34928230** | L |
| | | Other beverages | Bottled water | 1.00 | L | in plastic | 109500000 | 0.05 | 5763157.89 | 5895710.53 | 115263157.89 | 0.01 | 1164274 | **116427432** | L |
| | Tobacco | Tobacco | Cigarettes | 1.00 | unit | | 45727000 | 0.00 | 0.00 | 0.00 | 45727000.00 | 0.00 | 0 | **45727000** | unit |
| | Pet food | Pet food | Dog food | 1.00 | kg | per 10 kg packaging | 41063000 | 0.05 | 2161210.53 | 2182822.63 | 43224210.53 | 0.05 | 2274958 | **45499169** | kg |
| | Live animals | Live animals | Goldfish | 1.00 | unit | | 36000 | 0.00 | 0.00 | 0.00 | 36000.00 | 0.00 | 0 | **36000** | unit |
| | Clothing and textiles | Clothing and textiles | T-shirt | 1.00 | unit | | 7500000 | 0.00 | 0.00 | 0.00 | 7500000.00 | 0.10 | 833333 | **8333333** | unit |
| | | Clothing and textiles | T-shirt | 1.00 | unit | | 7500000 | 0.00 | 0.00 | 0.00 | 7500000.00 | 0.10 | 833333 | **8333333** | unit |
| | Footwear and leather goods | Footwear and leather goods | Leather shoes | 1.00 | unit | | 3000000 | 0.00 | 0.00 | 0.00 | 3000000.00 | 0.00 | 0 | **3000000** | unit |
| | Personal accessories | Personal accessories | Jewel | 1.00 | unit | | 750000 | 0.00 | 0.00 | 0.00 | 750000.00 | 0.00 | 0 | **750000** | unit |
| | Home and professional supplies | Home hardware supplies | Paint | 1.00 | kg | | 1500000 | 0.00 | 0.00 | 0.00 | 1500000.00 | 0.01 | 15152 | **1515152** | kg |
| | | Furniture, furnishings and decor | Office chair | 1.00 | unit | | 150000 | 0.00 | 0.00 | 0.00 | 150000.00 | 0.00 | 0 | **150000** | unit |
| | | Electrical household appliances | Refrigerator | 1.00 | unit | | 600000 | 0.00 | 0.00 | 0.00 | 600000.00 | 0.01 | 6061 | **606061** | unit |
| | | Kitchen merchandise | Plate | 1.00 | unit | | 30000000 | 0.00 | 0.00 | 0.00 | 30000000.00 | 0.00 | 0 | **30000000** | unit |
| | | Information and communication equipment | Cell phone | 1.00 | unit | | 1500000 | 0.00 | 0.00 | 0.00 | 1500000.00 | 0.01 | 15152 | **1515152** | unit |
| | | Office machinery and supplies | Toner cartridge | 1.00 | unit | | 1500000 | 0.00 | 0.00 | 0.00 | 1500000.00 | 0.01 | 15152 | **1515152** | unit |
| | Cultural and recreational goods | Books, newspapers and paper/paper supplies | Printing paper | 1.00 | kg | | 1500000 | 0.00 | 0.00 | 0.00 | 1500000.00 | 0.01 | 15152 | **1515152** | kg |
| | | Music and videos | DVD | 1.00 | unit | | 6000000 | 0.00 | 0.00 | 0.00 | 6000000.00 | 0.01 | 60606 | **6060606** | unit |
| | | Sporting equipment and gadgets | Soccer ball (--> playball) | 1.00 | unit | | 3600000 | 0.00 | 0.00 | 0.00 | 3600000.00 | 0.00 | 0 | **3600000** | unit |
| | | Other cultural and recreational goods | Toy | 1.00 | unit | | 9000000 | 0.00 | 0.00 | 0.00 | 9000000.00 | 0.01 | 90909 | **9090909** | unit |
| | Healthcare | Healthcare | Aspirin | 1.00 | unit | | 6000000 | 0.05 | 315789.47 | 11368.42 | 6315789.47 | 0.05 | 332410 | **6648199** | unit |
| | Cleaning/hygiene products, cosmetics and toiletries | Cleaning/hygiene products, cosmetics and toiletries | Laundry detergent | 1.00 | kg | liquid, in plastic bottles containing 1850 g | 13500000 | 0.05 | 710526.32 | 794297.37 | 14210526.32 | 0.05 | 747922 | **14958449** | kg |
| | Fuels, gases, lubricants and oils | Fuels, gases, lubricants and oils | Automotive oil | 1.00 | L | in 5 L container | 900000 | 0.00 | 0.00 | 0.00 | 900000.00 | 0.01 | 9091 | **909091** | L |
| | Batteries and power | Batteries and power | Battery | 1.00 | unit | 1 unit = a LR3 AAA of 13 g | 7500000 | 0.00 | 0.00 | 0.00 | 7500000.00 | 0.00 | 0 | **7500000** | unit |
| | Plants and garden supplies | Flowers, plants and seeds | Roses | 1.00 | unit | 1 unit = bouquet of 12, from Kenya, in plastic | 900000 | 0.00 | 0.00 | 0.00 | 900000.00 | 0.10 | 100000 | **1000000** | unit |
| | | Other garden supplies | Fertilizers | 25.00 | kg | ammonium nitrate, in plastic | 600000 | 0.00 | 0.00 | 0.00 | 600000.00 | 0.01 | 6061 | **606061** | kg |
| | Other goods | Other goods | Reusasble shopping bag | 1.00 | unit | 1 unit = a 150 g bag | 9000000 | 0.00 | 0.00 | 0.00 | 9000000.00 | 0.00 | 0 | **9000000** | unit |
| Services | Gas stations | Gas station infrastructure | Gas station | 1.00 | unit | Production, use and end-of-life included in retail places | 0 | | 0.00 | 0.00 | 0.00 | | 0 | **100** | unit |
| | | Gas station products | Gasoline | 1.00 | L | | 540000000 | 0.00 | 0.00 | 0.00 | 540000000.00 | 0.01 | 5454549 | **545454545** | L |
| | Printing services | Printing services infrastructure | Printing centre | 1.00 | unit | Production, use and end-of-life included in retail places | 0 | | 0.00 | 0.00 | 0.00 | | 0 | **100** | unit |
| | | Printing service products | Paper | 1.00 | kg | | 150000 | 0.00 | 0.00 | 0.00 | 150000.00 | 0.01 | 1515 | **151515** | kg |
| | Banking services | Banking services | ATM | 1.00 | unit | Production, use and end-of-life included in retail places | 0 | | 0.00 | 0.00 | 0.00 | | 0 | **200** | unit |
| | Real estate | Real estate | Commercial space rented | 1.00 | $m^2$.year | | 151515 | | 0.00 | 0.00 | 151515.00 | | 0 | **151515** | $m^2$.year |
| | Rental services | Rental services | Utility vehicle | 1.00 | unit.day | assuming a 1300 kg vehicle, 15 years lifetime | 15000 | | 0.00 | 0.00 | 15000.00 | | 0 | **15000** | unit.day |
| | Other services* | Other services | ... | n/a | n/a | | | | | | | | | **0.00** | unit |

## 3.3. Reporting unit and product portfolio

The reporting unit of the OEF of a retailer shall be the following:

- **The retailer, as a product provider (i.e., taking into account the life cycle impacts of the products provided), over a 1-year time interval**.

All activities of a retailer shall be in the scope of the analysis, even if some activities are not retailing activities as such.

When assessing the life cycle impacts of the products sold during the 1-year time interval, the impacts of their storage, even if existing before the start of the 1-year time interval shall be included.

The final result may be expressed, in addition to the basic reference of 1 year (and to be reported as an additional information), using a different reference, for example per amount of product consumed. This way of presenting the information may then be used in communication and/or in comparison (but in no way in a comparative assertion) with alternative retailing systems (for example a retailing system delivering frozen vegetables vs. a retailing system delivering fresh vegetables).

The Product Portfolio considered for the organisation includes the following:

- **the products** (goods and services)[15]* **provided for sale**[16] (both in-house products (i.e., products that are manufactured or significantly transformed by the retailer) and other products (i.e., own brands that are not manufactured nor significantly transformed by the retailer, as well as national and international brands)

The product portfolio shall cover the entire range of products provided for sale or a sub-set of them. The product portfolio covered shall be clearly specified in the OEF study. If only a sub-set of the product portfolio is covered by the OEF study, then it shall be clearly stated in the OEF study that not all the entire range of products provided for sale is covered.

The product portfolio shall be represented by product categories: one (in rare cases where the retailer is specialized in one specific product category) or several product categories. The product categories chosen shall "capture" the entire product portfolio selected in the scope of the study[17]. The following list of major retail trade sectors[18] should be used as a starting point:

- food
- beverage

[15] According to ISO, a product is any good or service (ISO 14040:2006).

[16] i.e., that products provided for sale but which ended up not sold and thrown away (e.g., fresh food getting out of date) are also included in the Product Portfolio.

[17] It means that all the products of the product portfolio of the retailer need to be in one of the product category of the product portfolio.

[18] European Commission Joint Research Centre: Best Environmental Management Practice in the Retail Trade Sector, 2013, http://susproc.jrc.ec.europa.eu/activities/emas/documents/RetailTradeSector.pdf

- tobacco
- fruit and vegetables
- meat and meat products
- fish, crustaceans and molluscs
- bread, cakes, flour and sugar confectionery
- automotive fuel
- information and communication equipment
    - computers, peripheral units and software
    - telecommunications equipment
    - audio and video equipment
- textiles
- hardware, paints and glass
- carpets, rugs, wall and floor coverings
- electrical household appliances
- furniture, lighting equipment
- cultural and recreation goods
    - books
    - newspapers and stationery
    - music and video recordings
    - sporting equipment
    - games and toys
- clothing
- footwear and leather goods
- dispensing chemist
- medical and orthopaedic goods
- cosmetic and toilet articles
- flowers, plants, seeds, fertilisers, pet animals and pet food
- watches and jewellery
- cleaning products
- other
- services (e.g. printing services, banking, real estate, car washing, car rental, gas station, etc.)

The number of categories defined will depend on the goal of the study and the product portfolio subject to the OEF study.

Each category should be divided into several sub-categories when deemed necessary. When defining the product categories used to divide the product portfolio, the retailer could easily "go into detail" for some products if pertinent and consider other factors (e.g., whether data are available or can be easily modelled, time and budget restraints, if a specific environmental strategy is planned for the product, etc.). This refining process should be done throughout the study, whenever deemed necessary.[19,20]

The list used in the representative organisation (see section 3.2) may be used as an example for selecting the product categories within the product portfolio.

It is advised to present the product portfolio in a table using for example the Table 4 of section 3.2 as a template.

The amount for each product category shall be expressed in a unit that avoids misunderstanding (e.g. typically kg / year, etc.). Units such as "pieces / year" should be avoided, except when no misunderstanding can happen in terms of the definition of piece (e.g. expressing a certain amount of chainsaw sold per year in "pieces" is acceptable but not "tomatoes" since "one piece" of tomato may be one tomato, one bag of tomato, etc.). If only the information "piece" is available during data collection and a mass should be used during modelling, expert judgement should be used to assess the typical mass of one piece. Also, if only the information in monetary value is available during data collection and a mass should be used during modelling, expert judgement should be used to assess the typical mass of one unit of monetary value (e.g. what would typically be the mass of tomatoes per one € of tomatoes sold).

**Approach to assess each product category of the product portfolio**

The process-based approach should be used for OEF assessment. Input/output may be used if justified (e.g. to assess the impacts associated with services such as accounting, marketing, etc.).

**Approach using a representative product**

In order to model the impacts of each product category, if an existing PEFCR's representative product already exist, and that the types of products sold by the retailer in that product category matches the

[19] As an example, see the representative organization (section 3.2) where one can see the case of meat in the screening of a category that was divided in several sub-categories within the course of the screening to model more precisely the impacts associated with meat.

[20] In practice, this is an iterative process. One needs to perform an OEF study several times before the 'ideal' granularity of the product portfolio is reached.

representative product of the PEFCR[21], the representative product of the PEFCR shall be used.[22] If that is not the case, one needs to define one (or several) representative product(s) per product category. The representative product(s) for each category shall be selected based on the most commonly sold product within the sector and category from the specific retailer (based on statistics or expert judgement) or, where such an assessment would lead to a misrepresentation of the environmental impacts of the product category, a product that, from an environmental impact perspective, represents the category the closest (based expert judgement)[23]. When selecting the representative product, one also needs to consider the availability of the product in the LCI databases (starting from the list of official datasets of the PEF/OEF LCI database). If the main product does not exist in a LCI database, one can look at a dataset from a product that is as close as possible from the main product of the category assessed. Section 5.6 gives additional information on how to select a representative product.

When selecting the representative product(s), one should keep in mind that the purpose of the representative products(s) is to estimate the environmental impact of the overall product category sold, with the ultimate goal to reduce it by introducing specific measures. The level of accuracy in estimating the product category footprint is therefore connected with its overall relevance both in terms of magnitude and of possibility of reduction. Therefore, a retailer should reduce the uncertainty in assessing the environmental footprint of a product category where necessary by an iterative approach introducing a more detailed representation of the product category.

The list used in the representative organisation (section 3.2) may be used as an inspirational example of selecting representative product(s) for each product category within the product portfolio.

When modelling the products of the product portfolio, the retailer shall consider that all products in the product portfolio are ready to be sold, and therefore including everything that is “with them” when sold (typically with all required packaging included but also any protection device or user manual).

This OEFSR shall not be used as a basis for comparative assertions.

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[21] Whether two products “match” is based on expert judgement. For example, if the retailer only sells organic milk in returnable glass, then it should not use the representative product of the PEFCR milk, but reconstruct a representative product for organic milk in returnable glass using the PEFCR milk rules.

[22] If the retailer has primary data regarding the production of a specific product, the retailer may remodel/adapt the representative product following the rules of the existing PEFCR for that product (if a PEFCR exists for that product).

[23] As an example where expert judgement might be better than the actual most commonly sold product is if the most commonly sold product is the product with the lowest impact within that product category. Indeed, choosing the most commonly sold product in that case would certainly underestimate the impact of the overall product category. A product that may not be the most commonly sold but with slightly more impacts than the most commonly sold product would in that case be a better fit to calculate the overall product category impacts and therefore be a better representative product than the most commonly sold product.

## 3.4. System boundary

The entire life cycle (from cradle to grave) of a retailer is included in the system boundaries. The following seven life cycle stages shall be included in the system boundary (Table 5): production and service provision, logistics, retail place, support, distribution of sold products to the client, use of sold products, end-of-life of sold products.

**Table 5: Life cycle stages.**

| Life cycle stage | Short description of the processes included |
|---|---|
| Production and service provision | Production of raw materials (food & non-food)<br>Plants (factories) |
| Logistics | Transport<br>Warehouses<br>Distribution centers |
| Retail place | Shopping malls<br>Shops<br>Tele-commerce / E-commerce<br>Self pick-up |
| Support | Administration and human resources<br>Financial services and purchased unit<br>R&D, IT, quality, technical and design<br>Marketing<br>Sustainability<br>Customer support |
| Distribution of sold products to the client | Customer transport (shopping trip)<br>Delivery by, e.g., van (for what is not picked-up by the client) |
| Use of sold products | Use of products (typically at home) |
| End-of-life of sold products | End-of-life of sold products (including packaging)<br>Including transport to end-of-life plant |

The entire life cycle (from cradle to grave) of a retailer is depicted in Figure 4 below and includes all organisation, upstream and downstream activities associated with the product portfolio of the organisation assessed.


**Figure 4: System boundaries for the organisation assessed.**

The entire system depicted in Figure 4 corresponds to what is defined as the "OEF boundary". The "Organisational boundary" is the subsystem of the OEF boundary and can be defined using three approaches (OEF Guide).

- the equity share approach, where Organisational boundaries encompass all activities in which there is an ownership share (and only that share of the total activity is included in the OEF);
- the financial control approach, where organisations include within their defined boundaries only those activities over which they have financial control (those activities are included for 100%);
- the operational control approach, where only those activities over which an organisation has operational control are included in the defined boundaries (those activities are included for 100%).

The "control" (operational) approach should be used.

For a retailer, the control (operational) approach would typically encompass the logistic stage, the retail stage, the support stage and part of the distribution stage. Some retailers would also have part of the production and service provision stage under their control. Note that depending on the business model used by the retailer, part or all of each of those stages may not be under its control. The use stage and end-of-life stage are typically not under the control of the retailer, though, in some very specific situation (e.g. a retailer collecting back and treating the packaging of its sold products would have part of the end-of-life stage under its control).

The approach chosen by the retailer to define its Organisational boundary (which can be considered as the foreground system) shall be clearly stated and justified and the life cycle stages it encompasses clearly described.

Whatever the approach chosen to define the organizational boundary and therefore the product portfolio (goods and services) considered, the full life cycle of the product portfolio shall be included in the OEF boundary.

According to this OEFSR, no cut-off is applicable.

Each OEF study done in accordance with this OEFSR shall provide in the OEF report a diagram indicating the organizational boundary, to highlight those activities under the control of the organization and those falling into Situation 2 or 3 of the data need matrix.

All processes defined within the OEF boundaries shall be modelled by the applicant.

The applicant shall define its organisation with reference to the product portfolio through its name, kind of goods and services produced, location of operation, and NACE codes.

## 3.5. EF impact assessment

Each OEF study carried out in compliance with this OEFSR shall calculate the OEF-profile including all OEF impact categories listed in Table 6.

**Table 6: List of 16 impact categories to be used to calculate the OEF profile.**

| Impact category | Indicator | Unit | Recommended default LCIA method |
|---|---|---|---|
| Climate change*<br>- Climate change - biogenic<br>- Climate change – land use and land transformation | Radiative forcing as Global Warming Potential (GWP100) | kg $CO_2$ eq | Baseline model of 100 years of the IPCC (based on IPCC 2013) |
| Ozone depletion | Ozone Depletion Potential (ODP) | kg CFC-11 eq | Steady-state ODPs 1999 as in WMO assessment |
| Human toxicity, cancer** | Comparative Toxic Unit for humans (CTUh) | CTUh | USEtox model (Rosenbaum et al. 2008) |
| Human toxicity, non-cancer** | Comparative Toxic Unit for humans (CTUh) | CTUh | USEtox model (Rosenbaum et al. 2008) |
| Particulate matter | Impact on human health | Disease incidence | UNEP recommended model (Fantke et al. 2016) |
| Ionising radiation, human health | Human exposure efficiency relative to U235 | kBq $U^{235}$ eq | Human health effect model as developed by Dreicer et al. 1995 (Frischknecht et al. 2000) |
| Photochemical ozone formation, human health | Tropospheric ozone concentration increase | kg NMVOC eq | LOTOS-EUROS (Van Zelm et al. 2008) as applied in ReCiPe |
| Acidification | Accumulated Exceedance (AE) | mol H+ eq | Accumulated Exceedance (Seppälä et al. 2006, Posch et al. 2008) |
| Eutrophication, terrestrial | Accumulated Exceedance (AE) | mol N eq | Accumulated Exceedance (Seppälä et al. 2006, Posch et al. 2008) |
| Eutrophication, freshwater | Fraction of nutrients reaching freshwater end compartment (P) | kg P eq | EUTREND model (Struijs et al. 2009b) as implemented in ReCiPe |
| Eutrophication, marine | Fraction of nutrients reaching marine end compartment (N) | kg N eq | EUTREND model (Struijs et al. 2009b) as implemented in ReCiPe |
| Ecotoxicity, freshwater** | Comparative Toxic Unit for ecosystems (CTUe) | CTUe | USEtox model (Rosenbaum et al. 2008) |
| Land use | Soil quality index[24]<br>• Biotic production<br>• Erosion resistance<br>• Mechanical filtration<br>• Groundwater replenishment | Dimensionless (pt)<br>• kg biotic production[25]<br>• kg soil<br>• $m^3$ water<br>• $m^3$ groundwater | Soil quality index based on LANCA (EC-JRC)<br>• LANCA (Beck et al. 2010)<br>• LANCA (Beck et al. 2010)<br>• LANCA (Beck et al. 2010)<br>• LANCA (Beck et al. 2010) |
| Water use*** | User deprivation potential (deprivation-weighted water consumption) | $m^3$ world eq | Available WAter REmaining (AWARE) (Boulay et al. 2016) |
| Resource use, mineral and metals | Abiotic resource depletion (ADP ultimate reserves) | kg Sb eq | CML 2002 (Guinée et al. 2002) and van Oers et al. 2002. |
| Resource use, fossils | Abiotic resource depletion – fossil fuels (ADP-fossil)[26] | MJ | CML 2002 (Guinée et al. 2002) and van Oers et al. 2002 |

*The sub-indicators 'Climate change - biogenic' and 'Climate change - land use and land transformation' shall be reported separately if their contribution to the total climate change impact, based on the Representative Organisation results, is more than 5% each, respectively.

**Long-term emissions (occurring beyond 100 years) shall be excluded from the toxic impact categories. Toxicity emissions to this sub-compartment have a characterisation factor set to 0 in the EF LCIA (to ensure consistency). If included by the applicant in the LCI modelling, the sub-compartment 'unspecified (long-term)' shall be used.
***The results for water use might be overestimated and shall therefore be interpreted with caution. Some of the EF datasets tendered during the pilot phase and used in this OEFSR include inconsistencies in the regionalization and elementary flow implementations. This problem has nothing to do with the impact assessment method or the implementability of EF methods, but occurred during the technical development of some of the datasets. The OEFSR remains valid and usable. The affected EF datasets will be corrected by mid-2019. At that time it will be possible to review this OEFSR accordingly, if seen necessary.

The full list of normalization factors and weighting factors are available in Annex 4 - List of EF normalisation factors and weighting factors.
The full list of characterization factors (EC-JRC, 2017a) is available at this link http://eplca.jrc.ec.europa.eu/LCDN/developer.xhtml

## 3.6. Limitations

As the Retail sector is made up by very different organisations, there are several main limitations of a general OEF Retail. The OEFSR Retail provides common guidelines to the retail sector but the way different organisations apply those guidelines may not be exactly the same. For example, an organisation producing its own products will have a different way to include the impact of production than an organisation only designing the products with subcontracted manufacturing. Also, an organisation already involved in products LCA will have more detailed results regarding its products than another organisation and therefore will have a different level of precision in the values used and results.
Considering that some simplifications are often done to model the different product categories of the retailer's product portfolio, the results obtained through the OEF Retail are not intended to make statements about the product group impacts as such, nor is it intended to be used in the context of comparison or for comparative assertions among product categories to be disclosed to the public. If a retailer wants to make comparative assertions (among products) disclosed to the public, it shall follow the PEFCR specifically designed for those product groups.

[24] This index is the result of the aggregation, performed by JRC, of the 4 indicators provided by LANCA model as indicators for land use
[25] This refers to occupation. In case of transformation the LANCA indicators are without the year (a)
[26] In the ILCD flow list, and for the current recommendation, Uranium is included in the list of energy carriers, and it is measured in MJ.

Comparison of results with other organization having communicated their OEF results is allowed but not comparative assertions.

# 4. Summary of most relevant impact categories, life cycle stages, and processes

Each retailer shall reapply the hotspot procedure (see section 7.4 of the OEFSR Guidance version 6.3 for its specific case to identify the most relevant impact categoriues, life cycle stages, and processes.

The most relevant impact categories for the sector in scope of this OEFSR are the following, based on the one found for the virtual retailer (see section 3.2 - for a retailer selling a broad range of products including food and non-food):

- Climate change[27]
- Ozone depletion
- Particulate matter
- Acidification
- Eutrophication, terrestrial
- Land use
- Resource use, fossils

The most relevant life cycle stages for the sector in scope of this OEFSR are the following:

- Production stage
- Logistics
- Retail place
- Distribution
- Use stage
- Support

Note that this analysis is the result of an example virtual retailer as described in the representative organisation (section 3.2) and may be different from the actual result of a specific retailer.

Note that due to the large variability possible in the product portfolio of a retailer, the production, use and end-of-life stages of the product portfolio are excluded from the most relevant processes analysis.

[27] The total climate change as the sum of the three sub-indicators shall be reported, and the sub-indicators 'Climate change - biogenic' and 'Climate change - land use and land transformation' shall be reported separately from the total climate change for those contributing more than 5% each to the total score of climate change.

When excluding the production, use, and end-of-life stages, the most relevant impact categories for the sector in scope of this OEFSR are the following:

- Climate change[28]
- Ozone depletion
- Acidification
- Resource use, fossils

Again, note that this analysis is the result of an example virtual retailer as described in the representative organisation (section 3.2) and may be different from the actual result of a specific retailer.

The most relevant processes for the sector in scope of this OEFSR are the following (Table 7). Again, note that this analysis is the result of an example virtual retailer as described in the representative organisation (section 3.2) and may be different from the actual result of a specific retailer.

A retailer shall always recalculate the analysis of the most relevant impact categories and most relevant processes.

**Table 7: List of the most relevant processes (excluding production, use, and end-of-life stages).**

| Impact category | Processes |
|---|---|
| Climate change | Articulated lorry transport, Euro 5, total weight 28-32 t, cooled\| diesel driven, Euro 5, cooled cargo\| consumption mix, to consumer\| 28 - 32t gross weight / 21,4t payload capacity {EU-28+3} [LCI result] (from life cycle stage Logistics)<br>Electricity grid mix 1kV-60kV\| AC, technology mix\| consumption mix, at consumer\| 1kV - 60kV {EU-28+3} [LCI result] (from life cycle stages Logistics and Retail place)<br>Articulated lorry transport, Euro 4, Total weight >32 t (without fuel) diesel driven, Euro 4, cargo\| consumption mix, to consumer\| more than 32t gross weight / 24,7t payload capacity {EU-28+3} [Unit process, single operation] (from life cycle stages Logistics and Retail place)<br>Retailer place activities for one retail place over one year (from life cycle stage Retail place)<br>Thermal energy from natural gas\| technology mix regarding firing and flue gas cleaning\| production mix, at heat plant\| MJ, 100% efficiency {EU-28+3} [LCI result] (from life cycle stages Logistics, Retail place, and Support)<br>Distribution center activities for one distribution center over one year (from life cycle stage Logistics)<br>Passenger car, average\| technology mix, gasoline and diesel driven, Euro 3-5, passenger car\| consumption mix, to consumer\| engine size from 1,4l up to >2l {GLO} [LCI result] (from life cycle stage Distribution) |
| Resource use, fossils | Diesel mix at refinery\| from crude oil\| production mix, at refinery\| 10 ppm sulphur, 7.23 wt.% bio components {EU-28+3} [LCI result] (from life cycle stages Logistics, Retail place, and Distribution) |

[28] The total climate change as the sum of the three sub-indicators shall be reported, and the sub-indicators 'Climate change - biogenic' and 'Climate change - land use and land transformation' shall be reported separately from the total climate change for those contributing more than 5% each to the total score of climate change.

| | |
|---|---|
| | Electricity grid mix 1kV-60kV\| AC, technology mix\| consumption mix, at consumer\| 1kV - 60kV {EU-28+3} [LCI result] (from life cycle stages Logistics and Retail place)<br>Articulated lorry transport, Euro 5, total weight 28-32 t, cooled\| diesel driven, Euro 5, cooled cargo\| consumption mix, to consumer\| 28 - 32t gross weight / 21,4t payload capacity {EU-28+3} [LCI result] (from life cycle stage Logistics)<br>Thermal energy from natural gas\| technology mix regarding firing and flue gas cleaning\| production mix, at heat plant\| MJ, 100% efficiency {EU-28+3} [LCI result] (from life cycle stages Logistics and Retail place) |
| Acidification | Articulated lorry transport, Euro 4, Total weight >32 t (without fuel)\| diesel driven, Euro 4, cargo\| consumption mix, to consumer\| more than 32t gross weight / 24,7t payload capacity {EU-28+3} [Unit process, single operation] (from life cycle stages Logistics and Retail place)<br>Articulated lorry transport, Euro 5, total weight 28-32 t, cooled\| diesel driven, Euro 5, cooled cargo\| consumption mix, to consumer\| 28 - 32t gross weight / 21,4t payload capacity {EU-28+3} [LCI result] (from life cycle stage Logistics)<br>Electricity grid mix 1kV-60kV\| AC, technology mix\| consumption mix, at consumer\| 1kV - 60kV {EU-28+3} [LCI result] (from life cycle stages Logistics and Retail place)<br>Articulated lorry transport, Euro 3, Total weight <7.5 t (without fuel)\| diesel driven, Euro 3, cargo\| consumption mix, to consumer\| up to 7,5t gross weight / 3,3t payload capacity {EU-28+3} [Unit process, single operation] (from life cycle stages Retail place and Distribution)<br>Transoceanic ship, containers\| heavy fuel oil driven, cargo\| consumption mix, to consumer\| 27.500 dwt payload capacity, ocean going {GLO} [LCI result] (from life cycle stage Logistics)<br>Diesel mix at refinery\| from crude oil\| production mix, at refinery\| 10 ppm sulphur, 7.23 wt.% bio components {EU-28+3} [LCI result] (from life cycle stages Logistics, Retail place, and Distribution) |
| Ozone depletion | Retailer place activities for one retail place over one year (from life cycle stage Retail place)<br>Distribution center activities for one distribution center over one year (from life cycle stage Logistics) |

# 5. Life cycle inventory

The document "OEFRetail_DataCollection_TEMPLATE_2018-03-22a.xlsx" (Annex 1) is recommended as a template for data collection.

Sources of data shall always be clearly quoted.

All newly created processes shall be EF-compliant.

Sampling is not allowed.

## 5.1. List of mandatory company-specific data

**Data collection requirements for the product portfolio:**

List the amount sold annually by the retailer of each product group of the product portfolio using the relevant unit (e.g. kg / year).

**Data collection requirements for the logistics:**

**Table 8: Data collection requirements for the logistics.**

| Requirements for data collection purposes | | | Requirements for modelling purposes | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Activity data to be collected** | **Specific requirements (e.g. frequency, measurement standard, etc)** | **Unit of measure** | **Default dataset to be used and UUID and node** | **TiR** | **TeR** | **GR** | **P** | **Default DQR** |
| Transport need<br><br>Consider Truck, Train, Boat, Plane separately | Exact type and mean of transport to be identified by the OEF applicant / Combine with country specific electricity grid mix | t-km/year | Articulated lorry transport, Euro 4, Total weight >32 t (without fuel); diesel driven, Euro 4, cargo; consumption mix, to consumer EU-28+3 (Note: this is the one used in the model but the applicant shall use the one of the node which represents its specific case.)<br>938d5ba6-17e4-4f0d-bef0-481608681f57<br>http://lcdn.thinkstep.com/Node/ | 1 | 1 | 1 | 2 | 1 |
| | | | Transoceanic ship, containers; heavy fuel oil driven, cargo; consumption mix, to consumer GLO<br>6ca61112-1d5b-473c-abfa-4accc66a8a63<br>http://lcdn.thinkstep.com/Node/ | 1 | 2 | 2 | 2 | 1 |
| | | | Transoceanic ship, bulk GLO<br>ca3acef5-4bfa-494b-9899-84cf5e3c6af8<br>http://lcdn.thinkstep.com/Node/ | 1 | 2 | 2 | 2 | 1 |
| | | | Barge; technology mix, diesel driven, cargo; consumption mix, to consumer EU-28+3<br>4cfacea0-cce4-4b4d-bd2b-223c8d4c90ae<br>http://lcdn.thinkstep.com/Node/ | 1 | 1 | 1 | 2 | 1 |
| | | | Freight train, electricity traction EU-28+3<br>dbde67a3-af4f-4d60-9568-4e0ef6eaaf07<br>http://lcdn.thinkstep.com/Node/ | 1 | 1 | 1 | 2 | 1 |
| | | | Freight train, average (without fuel) EU-28+3<br>02e87631-6d70-48ce-affd-1975dc36f5be<br>http://lcdn.thinkstep.com/Node/ | 1 | 1 | 1 | 2 | 1 |
| | | | Cargo plane; technology mix, kerosene | 1 | 2 | 2 | 2 | 1 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | driven, cargo; consumption mix, to consumer GLO 1cc5d465-a12a-43da-aa86-a9c6383c78ac http://lcdn.thinkstep.com/Node/ | | | | | |
| Electricity use | Adapt to the country if known (see section 5.9) | kWh/year | Residual grid mix AC, technology mix, consumption mix, to consumer, 1kV - 60kV {EU-28+3} 8fb75312-431d-42f6-9a4f-22fa886f7fe3 http://lcdn.thinkstep.com/Node/ | 1 | 1 | 1 | 2 | 1 |
| Heat use (specify type of heat) | n/a | kWh or MJ/year | Thermal energy from natural gas technology mix regarding firing and flue gas cleaning production mix, at heat plant MJ, 100% efficiency EU-28+3 81675341-f1af-44b0-81d3-d108caef5c28 http://lcdn.thinkstep.com/Node/ | 1 | 1 | 1 | 2 | 1 |
| Ozone depletion substance leakage into the environment | Specify which substance | kg/year | E.g. Tetrafluoroethane production\| technology mix\| production mix, at plant\| 100% active substance {GLO} acfe37e4-37e8-4d95-8354-157f09f6e37c http://ecoinvent.lca-data.com/ | Not EF-compliant (data gap provided by the EC) | | | | |
| | | kg/year | E.g. Ethane, 1,1,1-trifluoro-, HFC-143a (to air) 26162114-f5b3-45b5-87c3-f0fe0ecf2bb9 E.g. Ethane, pentafluoro-, HFC-125 (to air) fe0acd60-3ddc-11dd-a3ea-0050c2490048 E.g. Ethane, 1,1,1,2-tetrafluoro-, HFC-134a (to air) fe0acd60-3ddc-11dd-a6d2-0050c2490048 | n/a | | | | |

## Data collection requirements for the retail place:

## Table 9: Data collection requirements for the retail place.

| **Requirements for data collection purposes** | | | **Requirements for modelling purposes** | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Activity data to be collected** | **Specific requirements (e.g. frequency, measurement standard, etc)** | **Unit of measure** | **Default dataset to be used and UUID and node** | **TiR** | **TeR** | **GR** | **P** | **Default DQR** |
| Electricity use | Adapt to the country if known (see section 5.9) | kWh/year | Residual grid mix AC, technology mix, consumption mix, to consumer, 1kV - | 1 | 1 | 1 | 2 | 1 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 60kV {EU-28+3} 8fb75312-431d-42f6-9a4f-22fa886f7fe3 http://lcdn.thinkstep.com/Node/ | | | | | |
| Heat use (specify type of heat) | n/a | kWh or MJ/year | Thermal energy from natural gas technology mix regarding firing and flue gas cleaning production mix, at heat plant MJ, 100% efficiency EU-28+3 81675341-f1af-44b0-81d3-d108caef5c28 http://lcdn.thinkstep.com/Node/ | 1 | 1 | 1 | 2 | 1 |
| Ozone depletion substance leakage into the environment | Specify which substance | kg/year | E.g. Tetrafluoroethane production\| technology mix\| production mix, at plant\| 100% active substance {GLO} acfe37e4-37e8-4d95-8354-157f09f6e37c http://ecoinvent.lca-data.com/ | Not EF-compliant (data gap provided by the EC) | | | | |
| | | kg/year | E.g. Ethane, 1,1,1-trifluoro-, HFC-143a (to air) 26162114-f5b3-45b5-87c3-f0fe0ecf2bb9 E.g. Ethane, pentafluoro-, HFC-125 (to air) fe0acd60-3ddc-11dd-a3ea-0050c2490048 E.g. Ethane, 1,1,1,2-tetrafluoro-, HFC-134a (to air) fe0acd60-3ddc-11dd-a6d2-0050c2490048 | n/a | | | | |

## Data collection requirements for the distribution:

## Table 10: Data collection requirements for the distribution.

| **Requirements for data collection purposes** | | | **Requirements for modelling purposes** | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Activity data to be collected** | **Specific requirements (e.g. frequency, measurement standard, etc)** | **Unit of measure** | **Default dataset to be used and UUID and node** | **TiR** | **TeR** | **GR** | **P** | **Default DQR** |
| Transport need (client) | Only accounting for those by car (excluding those by public transport or bike) | km/year | Passenger car, average; technology mix, gasoline and diesel driven, Euro 3-5, passenger car; consumption mix, to consumer GLO 1ead35dd-fc71-4b0c-9410-7e39da95c7dc http://lcdn.thinkstep.com/Node/ | 1 | 3 | 3 | 3 | 2 |
| Transport | If it is truck instead of van, | t-km/year | Articulated lorry transport, Euro 3, Total | 1 | 1 | 1 | 2 | 1 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| need (retail distribution) | then account for truck (excluding those made by public transport or bike) | | weight <7.5 t (without fuel); diesel driven, Euro 3, cargo; consumption mix, to consumer EU-28+3 aea613ae-573b-443a-aba2-6a69900ca2ff http://lcdn.thinkstep.com/Node/ | | | | | |

## Data collection requirements for the support:

## Table 11: Data collection requirements for the support.

| Requirements for data collection purposes | | | Requirements for modelling purposes | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Activity data to be collected** | **Specific requirements (e.g. frequency, measurement standard, etc)** | **Unit of measure** | **Default dataset to be used and UUID and node** | **TiR** | **TeR** | **GR** | **P** | **Default DQR** |
| Electricity use | Adapt to the country if known (see section 5.9) | kWh/year | Residual grid mix AC, technology mix, consumption mix, to consumer, 1kV - 60kV {EU-28+3} 8fb75312-431d-42f6-9a4f-22fa886f7fe3 http://lcdn.thinkstep.com/Node/ | 1 | 1 | 1 | 2 | 1 |
| Heat use (specify type of heat) | n/a | kWh or MJ/year | Thermal energy from natural gas technology mix regarding firing and flue gas cleaning production mix, at heat plant MJ, 100% efficiency EU-28+3 81675341-f1af-44b0-81d3-d108caef5c28 http://lcdn.thinkstep.com/Node/ | 1 | 1 | 1 | 2 | 1 |
| Employee commuting | Only accounting for those by car (excluding those by public transport or bike) | km/year | Passenger car, average; technology mix, gasoline and diesel driven, Euro 3-5, passenger car; consumption mix, to consumer GLO 1ead35dd-fc71-4b0c-9410-7e39da95c7dc http://lcdn.thinkstep.com/Node/ | 1 | 3 | 3 | 3 | 2 |
| Accounting, tax preparation, bookkeeping, and payroll services | Transform your current currency to USD2002 Note: US 2002 database is based on 1998 USD. Change rate in 1998: 0.9 EUR/USD. Inflation of EUR from 1998 to 2015: 1.6% per year, over 17 years. Efficiency factor of 2 (Europe in comparison with US). This gives a conversion factor of 0.424 | USD2002/ year | Thermal energy from natural gas\| technology mix regarding firing and flue gas cleaning\| production mix, at heat plant\| MJ, 100% efficiency {EU-28+3} 81675341-f1af-44b0-81d3-d108caef5c28 http://lcdn.thinkstep.com/Node/ 1.5 MJ/USD2002 | 1 | 1 | 1 | 2 | 1 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | USD 2002/EUR 2015. | | | | | | | |
| Advertising and related services | Transform your current currency to USD2002<br>Note: US 2002 database is based on 1998 USD. Change rate in 1998: 0.9 EUR/USD. Inflation of EUR from 1998 to 2015: 1.6% per year, over 17 years. Efficiency factor of 2 (Europe in comparison with US). This gives a conversion factor of 0.424 USD 2002/EUR 2015. | USD2002/ year | Thermal energy from natural gas\| technology mix regarding firing and flue gas cleaning\| production mix, at heat plant\| MJ, 100% efficiency {EU-28+3}<br>81675341-f1af-44b0-81d3-d108caef5c28<br>http://lcdn.thinkstep.com/Node/<br>3.4 MJ/USD2002 | 1 | 1 | 1 | 2 | 1 |
| Internet service providers and web search portals | Transform your current currency to USD2002<br>Note: US 2002 database is based on 1998 USD. Change rate in 1998: 0.9 EUR/USD. Inflation of EUR from 1998 to 2015: 1.6% per year, over 17 years. Efficiency factor of 2 (Europe in comparison with US). This gives a conversion factor of 0.424 USD 2002/EUR 2015. | USD2002/ year | Thermal energy from natural gas\| technology mix regarding firing and flue gas cleaning\| production mix, at heat plant\| MJ, 100% efficiency {EU-28+3}<br>81675341-f1af-44b0-81d3-d108caef5c28<br>http://lcdn.thinkstep.com/Node/<br>2.3 MJ/USD2002 | 1 | 1 | 1 | 2 | 1 |
| Legal services | Transform your current currency to USD2002<br>Note: US 2002 database is based on 1998 USD. Change rate in 1998: 0.9 EUR/USD. Inflation of EUR from 1998 to 2015: 1.6% per year, over 17 years. Efficiency factor of 2 (Europe in comparison with US). This gives a conversion factor of 0.424 USD 2002/EUR 2015. | USD2002/ year | Thermal energy from natural gas\| technology mix regarding firing and flue gas cleaning\| production mix, at heat plant\| MJ, 100% efficiency {EU-28+3}<br>81675341-f1af-44b0-81d3-d108caef5c28<br>http://lcdn.thinkstep.com/Node/<br>1.2 MJ/USD2002 | 1 | 1 | 1 | 2 | 1 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Securities, commodity contracts, investments, and related activities | Transform your current currency to USD2002<br>Note: US 2002 database is based on 1998 USD. Change rate in 1998: 0.9 EUR/USD. Inflation of EUR from 1998 to 2015: 1.6% per year, over 17 years. Efficiency factor of 2 (Europe in comparison with US). This gives a conversion factor of 0.424 USD 2002/EUR 2015. | USD2002/ year | Thermal energy from natural gas\| technology mix regarding firing and flue gas cleaning\| production mix, at heat plant\| MJ, 100% efficiency {EU-28+3}<br>81675341-f1af-44b0-81d3-d108caef5c28<br>http://lcdn.thinkstep.com/Node/<br>1.2 MJ/USD2002 | 1 | 1 | 1 | 2 | 1 |

## 5.2. List of processes expected to be run by the company (beside the mandatory company-specific data)

All the processes that are expected to be run by the company are mandatory company-specific data. Therefore, this chapter stays empty.

## 5.3. Data gaps

The most frequent data gap that will be encountered by retailers performing an OEF is the lack of available representative product in the official PEF/OEF list of secondary datasets to assess a specific product group of the product portfolio. This may be resolved by using a secondary dataset[29] as a proxy which is as close as possible to the correct representative product.

## 5.4. Data quality requirements

The data quality of each dataset and the total EF study shall be calculated and reported. The calculation of the DQR shall be based on the following formula (Equation 1):

$$\mathrm{DQR} = \frac{\overline{\mathrm{Te_R}} + \overline{\mathrm{G_R}} + \overline{\mathrm{Ti_R}} + \overline{\mathrm{P}}}{4} \qquad \text{[Equation 1]}$$

where TeR is the Technological-Representativeness, GR is the Geographical-Representativeness, TiR is the Time-Representativeness, and P is the Precision/uncertainty. The representativeness (technological, geographical and time-related) characterises to what degree the processes and

[29] Which follows the requirements of section 5.6.

products selected are depicting the system analysed, while the precision indicates the way the data is derived and related level of uncertainty.

The next chapters provide tables with the criteria to be used for the semi-quantitative assessment of each parameter. If a dataset is constructed with company-specific activity data, company-specific emission data and secondary sub-processes, the DQR of each shall be assessed separately.

### 5.4.1. Company-specific datasets

The score of criterion P cannot be higher than 3 while the score for TiR, TeR, and GR cannot be higher than 2 (the DQR score shall be ≤1.6). The DQR shall be calculated at the level-1 disaggregation before any aggregation of sub-processes or elementary flows is performed. The DQR of company-specific datasets shall be calculated as following:

1) Select the most relevant sub-processes and direct elementary flows that account for at least 80% of the total environmental impact of the company-specific dataset, listing them from the most contributing to the least contributing one.

2) Calculate the DQR criteria TeR, TiR, GR and P for each most relevant process and each most relevant direct elementary flow. The values of each criterion shall be assigned based on Table 12.

2.a) Each most relevant elementary flow consists of the amount and elementary flow naming (e.g. 40 g carbon dioxide). For each most relevant elementary flow, evaluate the 4 DQR parameters named $Te_{R\text{-}EF}$, $Ti_{R\text{-}EF}$, $G_{R\text{-}EF}$, $P_{EF}$ in Table 12. It shall be evaluated for example, the timing of the flow measured, for which technology the flow was measured and in which geographical area.

2.b) Each most relevant process is a combination of activity data and the secondary dataset used. For each most relevant process, the DQR is calculated by the applicant of the OEFSR as a combination of the 4 DQR parameters for activity data and the secondary dataset: (i) $Ti_R$ and P shall be evaluated at the level of the activity data (named $Ti_{R\text{-}AD}$, $P_{AD}$) and (ii) $Te_R$, $Ti_R$ and $G_R$ shall be evaluated at the level of the secondary dataset used (named $Te_{R\text{-}SD}$ , $Ti_{R\text{-}AD}$ and $G_{R\text{-}SD}$). As $Ti_R$ is evaluated twice, the mathematical average of $Ti_{R\text{-}AD}$ and $Ti_{R\text{-}SD}$ represents the $Ti_R$ of the most relevant process.

3) Calculate the environmental contribution of each most-relevant process and elementary flow to the total environmental impact of all most-relevant processes and elementary flows, in % (weighted using 13 EF impact categories, with the exclusion of the 3 toxicity-related ones). For example, the newly developed dataset has only two most relevant processes, contributing in total to 80% of the total environmental impact of the dataset:

- Process 1 carries 30% of the total dataset environmental impact. The contribution of this process to the total of 80% is 37.5% (the latter is the weight to be used).
- Process 1 carries 50% of the total dataset environmental impact. The contribution of this process to the total of 80% is 62.5% (the latter is the weight to be used).

4) Calculate the $Te_R$, $Ti_R$, $G_R$ and P criteria of the newly developed dataset as the weighted average of each criterion of the most relevant processes and direct elementary flows. The weight is the relative contribution (in %) of each most relevant process and direct elementary flow calculated in step 3.

5) The applicant of the OEFSR shall calculate the total DQR of the newly developed dataset using Equation 2, where $\overline{\mathrm{Te_R}}, \overline{\mathrm{G_R}}, \overline{\mathrm{Ti_R}}, \overline{\mathrm{P}}$ are the weighted average calculated as specified in point 4).

$$\mathrm{DQR} = \frac{\overline{\mathrm{Te_R}}+\overline{\mathrm{G_R}}+\overline{\mathrm{Ti_R}}+\overline{\mathrm{P}}}{4} \qquad \text{[Equation 2]}$$

NOTE: in case the newly developed dataset has most relevant processes filled in by non-EF compliant datasets (and thus without DQR), then these datasets cannot be included in step 4 and 5 of the DQR calculation. (1) The weight of step 3 shall be recalculated for the EF-compliant datasets only. Calculate the environmental contribution of each most-relevant EF compliant process and elementary flow to the total environmental impact of all most-relevant EF compliant processes and elementary flows, in %. Continue with step 4 and 5. (2) The weight of the non-EF compliant dataset (calculated in step 3) shall be used to increase the DQR criteria and total DQR accordingly. For example:

- Process 1 carries 30% of the total dataset environmental impact and is ILCD entry level compliant. The contribution of this process to the total of 80% is 37.5% (the latter is the weight to be used).
- Process 1 carries 50% of the total dataset environmental impact and is EF compliant. The contribution of this process to all most-relevant EF compliant processes is 100%. The latter is the weight to be used in step 4.
- After step 5, the parameters $\overline{\mathrm{Te_R}}, \overline{\mathrm{G_R}}, \overline{\mathrm{Ti_R}}, \overline{\mathrm{P}}$ and the total DQR shall be multiplied with 1.375.

**Table 12: How to assess the value of the DQR parameter for the processes for which company specific values are used.**

| | $P_{EF}$ and $P_{AD}$ | $Ti_{R\text{-}EF}$ and $Ti_{R\text{-}AD}$ | $Ti_{R\text{-}SD}$ | $Te_{R\text{-}EF}$ and $Te_{R\text{-}SD}$ | $G_{R\text{-}EF}$ and $G_{R\text{-}SD}$ |
|---|---|---|---|---|---|
| **1** | Measured/calculated and externally verified | The data refers to the most recent annual administration period with respect to the EF report publication date | The EF report publication date happens within the time validity of the dataset | The elementary flows and the secondary dataset reflect exactly the technology of the newly developed dataset | The data(set) reflects the exact geography where the process modelled in the newly created dataset takes place |
| **2** | Measured/calculated and internally verified, plausibility checked by reviewer | The data refers to maximum 2 annual administration periods with respect to the EF report publication date | The EF report publication date happens not later than 2 years beyond the time validity of the dataset | The elementary flows and the secondary dataset is a proxy of the technology of the newly developed dataset | The data(set) partly reflects the geography where the process modelled in the newly created dataset takes place |
| **3** | Measured/calculated/literature and plausibility not checked by reviewer OR Qualified estimate based on calculations plausibility checked by reviewer | The data refers to maximum 3 annual administration periods with respect to the EF report publication date | Not applicable | Not applicable | Not applicable |
| **4-5** | Not applicable | Not applicable | Not applicable | Not applicable | Not applicable |

## 5.5. Data needs matrix (DNM)

All processes required to model the product and outside the list of mandatory company-specific shall be evaluated using the DNM (see Table 13). The DNM shall be used by the OEFSR applicant to evaluate which data is needed and shall be used within the modelling of its OEF, depending on the level of influence the applicant (company) has on the specific process. The following three cases are found in the DNM and are explained below:

1. **Situation 1**: the process is run by the company applying the OEFSR.
2. **Situation 2**: the process is not run by the company applying the OEFSR but the company has access to (company-)specific information.
3. **Situation 3**: the process is not run by the company applying the OEFSR and this company does not have access to (company-)specific information.

**Table 13: Data Needs Matrix (DNM)[30] (for Situation 2 and option 2, disaggregated datasets shall be used).**

| | | Most relevant process | Other process |
|---|---|---|---|
| Situation 1: process run by the company applying the OEFSR | Option 1 | Provide company-specific data (as requested in the OEFSR) and create a company specific dataset partially disaggregated at least at level 1 (DQR ≤1.6).<br><br>Calculate the DQR values (for each criteria + total) | |
| | Option 2 | | Use default secondary dataset in OEFSR, in aggregated form (DQR ≤3.0).<br><br>Use the default DQR values |
| Situation 2: process not run by the company applying the OEFSR but with access to (company-)specific information | Option 1 | Provide company-specific data (as requested in the OEFSR) and create a company specific dataset partially disaggregated at least at level 1 (DQR ≤1.6).<br><br>Calculate the DQR values (for each criteria + total) | |
| | Option 2 | Use company-specific activity data for transport (distance), and substitute the sub-processes used for electricity mix and transport with supply-chain specific EF compliant datasets (DQR ≤3.0).<br><br>Re-evaluate the DQR criteria within the product specific context | |
| | Option 3 | | Use company-specific activity data for transport (distance), and substitute the sub-processes used for electricity mix and transport with supply-chain specific EF compliant datasets (DQR ≤4.0).<br><br>Re-evaluate the DQR criteria within the product specific context |
| Situation 3: process not run by the company applying the OEFSR and without access to (company)-specific information | Option 1 | Use default secondary dataset, in aggregated form (DQR ≤3.0).<br><br>Re-evaluate the DQR criteria within the product specific context | |
| | Option 2 | | Use default secondary dataset in OEFSR, in aggregated form (DQR ≤4.0)<br><br>Use the default DQR values |

[30] The options described in the DNM are not listed in order of preference

### 5.5.1. Processes in situation 1

For each process in situation 1 there are two possible options:

- The process is in the list of most relevant processes as specified in the OEFSR or is not in the list of most relevant process, but still the company wants to provide company specific data (option 1);
- The process is not in the list of most relevant processes and the company prefers to use a secondary dataset (option 2).

**Situation 1/Option 1**

For all processes run by the company and where the company applying the OEFSR uses company specific data. The DQR of the newly developed dataset shall be evaluated as described in section 5.4.1.

**Situation 1/Option 2**

For the non-most relevant processes only, if the applicant decides to model the process without collecting company-specific data, then the applicant shall use the secondary dataset listed in the OEFSR together with its default DQR values listed here.

If the default dataset to be used for the process is not listed in the OEFSR, the applicant of the OEFSR shall take the DQR values from the metadata of the original dataset.

### 5.5.2. Processes in situation 2

When a process is not run by the company applying the OEFSR, but there is access to company-specific data, then there are three possible options:

- The company applying the OEFSR has access to extensive supplier-specific information and wants to create a new EF-compliant dataset[31] (option 1);
- The company has some supplier-specific information and want to make some minimum changes (option 2);
- The process is not in the list of most relevant processes and the company prefers to use a secondary dataset (option 3).

**Situation 2/Option 1**

For all processes run by the company and where the company applying the OEFSR uses company specific data. The DQR of the newly developed dataset shall be evaluated as described in section 5.4.1.

**Situation 2/Option 2**

[31] The review of the newly created dataset is optional

Company-specific activity data for transport are used and the sub-processes used for electricity mix and transport with supply-chain specific EF compliant datasets are substituted starting from the default secondary dataset provided in the OEFSR.

The applicant of the OEFSR shall make the DQR values of the dataset used context-specific by re-evaluating $Te_R$ and $Ti_R$, using Table 14. The criteria $G_R$ shall be lowered by 30%[32] and the criteria P shall keep the original value.

**Situation 2/Option 3**

Company-specific activity data for transport are used and the sub-processes used for electricity mix and transport with supply-chain specific EF compliant datasets are substituted starting from the default secondary dataset provided in the OEFSR.

In this case, the applicant of the OEFSR shall recalculate the DQR for the processes by taking the DQR values from the dataset and lowering the parameter $G_R$ by 30%.

**Table 14: How to assess the value of the DQR criteria when secondary datasets are used.**

| | TiR | TeR | $G_R$ |
|---|---|---|---|
| **1** | The EF report publication date happens within the time validity of the dataset | The technology used in the EF study is exactly the same as the one in scope of the dataset | The process modelled in the EF study takes place in the country the dataset is valid for |
| **2** | The EF report publication date happens not later than 2 years beyond the time validity of the dataset | The technologies used in the EF study is included in the mix of technologies in scope of the dataset | The process modelled in the EF study takes place in the geographical region (e.g. Europe) the dataset is valid for |
| **3** | The EF report publication date happens not later than 4 years beyond the time validity of the dataset | The technologies used in the EF study are only partly included in the scope of the dataset | The process modelled in the EF study takes place in one of the geographical regions the dataset is valid for |
| **4** | The EF report publication date happens not later than 6 years beyond the time validity of the dataset | The technologies used in the EF study are similar to those included in the scope of the dataset | The process modelled in the EF study takes place in a country that is not included in the geographical region(s) the dataset is valid for, but sufficient similarities are estimated based on expert judgement |
| **5** | The EF report publication date happens later than 6 years after the time validity of the dataset | The technologies used in the EF study are different from those included in the scope of the dataset | The process modelled in the EF study takes place in a different country than the one the dataset is valid for |

[32] In situation 2, option 2 it is proposed to lower the parameter $G_R$ by 30% in order to incentivize the use of company specific information and reward the efforts of the company in increasing the geographic representativeness of a secondary dataset through the substitution of the electricity mixes and of the distance and means of transportation.

### 5.5.3. Processes in situation 3

When a process is not run by the company applying the OEFSR and the company does not have access to company-specific data, there are two possible options:

- It is in the list of most relevant processes (situation 3, option 1)
- It is not in the list of most relevant processes (situation 3, option 2)

**Situation 3/Option 1**

In this case, the applicant of the OEFSR shall make the DQR values of the dataset context-specific by re-evaluating $Te_R$, $Ti_R$ and $G_r$, using Table 14. The criteria P shall keep the original value.

**Situation 3/Option 2**

For the non-most relevant processes, the applicant shall use the corresponding secondary dataset listed in the OEFSR together with its DQR values.

If the default dataset to be used for the process is not listed in the OEFSR, the applicant of the OEFSR shall take the DQR values from the metadata of the original dataset.

## 5.6. Which datasets to use?

The secondary datasets to be used by the applicant are those listed in this OEFSR. Whenever a dataset needed to calculate the OEF-profile is not among those listed in this OEFSR, then the applicant shall choose between the following options (in hierarchical order):

- Use an EF-compliant dataset available on one of the following nodes:
  - http://eplca.jrc.ec.europa.eu/EF-node/
  - http://lcdn.blonkconsultants.nl
  - http://ecoinvent.lca-data.com
  - http://lcdn-cepe.org
  - https://lcdn.quantis-software.com/PEF/
  - http://lcdn.thinkstep.com/Node/
- Use an EF-compliant dataset available in a free or commercial source.
- Use another EF-compliant dataset considered to be a good proxy. In such case this information shall be included in the "limitation" section of the OEF report.
- Use an ILCD-entry level-compliant dataset. In such case this information shall be included in the "data gap" section of the OEF report.
- Use an ILCD-entry level-compliant dataset that has been modelled according to the modelling requirements included in the Guidance version 6.3. In such case this information shall be included in the "limitations" section of the OEF report.

Name of secondary dataset and UUID can be found in the associated file "OEFSR-Retail_SecondaryDatasets_2017-12-22.xlsx" as well as on the nodes listed in Table 15.

**Table 15: List of the package containing the PEF/OEF compliant datasets.**

| Package name | Provider | Node |
|---|---|---|
| Energy and transport | Thinkstep | http://lcdn.thinkstep.com/Node/ |
| Packaging | Thinkstep | http://lcdn.thinkstep.com/Node/ |
| Agrofood | Quantis | https://lcdn.quantis-software.com/PEF/ |
| Minerals and Metals | Thinkstep | http://lcdn.thinkstep.com/Node/ |
| Chemicals for Paint | CEPE ecoinvent | http://lcdn-cepe.org |
| Others | Quantis | https://lcdn.quantis-software.com/PEF/ |
| Chemicals | ecoinvent | http://ecoinvent.lca-data.com/ |
| End of Life | Thinkstep | http://lcdn.thinkstep.com/Node/ |
| Feed | Fefac | http://lcdn.blonkconsultants.nl/Node/ |
| Incineration | Thinkstep | http://lcdn.thinkstep.com/Node/ |
| Plastics | Thinkstep | http://lcdn.thinkstep.com/Node/ |
| Textiles | Cycleco | https://node.cycleco.eu/node/ |
| Electronics | Thinkstep | http://lcdn.thinkstep.com/Node/ |

Note that currently background LCI databases are not containing generic processes (datasets) for all possible items of interest and therefore proxies (e.g., materials of a home fridge used as a proxy for materials for industrial refrigeration system) often need to be used to model the impacts of what one actually wants to model[33]. This is a source of uncertainty in the results of any OEF that needs to be kept in mind.

Within the interpretation process, one needs to identify in an iterative way the proxies that make the largest uncertainty and refine them as much as practically possible (within time and data availability constraints) to bring them as close as possible to the actual process that needs to be modelled.

## 5.7. How to calculate the average DQR of the study

In order to calculate the average DQR of the EF study, the applicant shall calculate separately the $Te_R$, $Ti_R$, $G_R$ and P for the EF study as the weighted average of all most relevant processes, based on their relative environmental contribution to the total single score (excluding the 3 toxicity-related ones). The calculation rules explained in chapter 5.4 shall be used.

[33] Giving time permits, a retailer is invited to replace proxies contributing significantly to overall impacts by unit processes modelled to represent correctly the product or process under study (based in priority on existing PEFCR).

## 5.8. Allocation rules

Allocations are applied typically for transports, distribution centre and supermarket infrastructure, water and energy consumption. Allocation may also occur in factories producing different co-products, both for in-house and out-of-house products.

Allocation among co-products should be based on a case by case analysis (indeed, the most relevant allocation may be different in a dairy products factory, in a meat factory, and in a paper factory).

Table 16 provides allocation rules to be used by default.

**Table 16: Allocation rules.**

| Process | Allocation rule | Modelling instructions |
|---|---|---|
| Waste | Considered to be produced without impact. | |
| Co-products (at the point of division) | Economic allocation should be applied if no more relevant approach is identified. | The value used in the economic allocation should be based on a 3 years average value. |
| Product handling | Mass allocation. | |
| Storage | Volume-time allocation. | See sections 6.2 and 6.3 of this document for detailed explanations. |
| Transport | If primary data about load is not available or if several different products are transported in the same truck without clear indication of which product is the main driver of the need for transport, then:<br>• if truck load is limited by the maximum payload, mass allocation shall be used, and<br>• if truck load is limited by volume availability, then volume based allocation shall be used, and<br>when the limitation is due to a sum of products from different size and shape on a single pallet, | |

| | | |
|---|---|---|
| | allocation should be done by "horizontal" area used. | |
| Distribution centre and supermarket infrastructure, water and energy consumption as well as chilled or cold storage at user | Allocation based on volume and duration should be used. | Alternative approaches may be used but justification on why it is better than volume and duration shall be provided. |

## 5.9. Electricity modelling

The guidelines in this section shall only be used for the processes where company-specific information is collected (situation 1 / option 1, situation 2 / option 1 of the DNM).

The following electricity mix shall be used in hierarchical order:

(i) Supplier-specific electricity product shall be used if:

(a) available, and

(b) the set of minimum criteria to ensure the contractual instruments are reliable is met.

(ii) The supplier-specific total electricity mix shall be used if:

(a) available, and

(b) the set of minimum criteria that to ensure the contractual instruments are reliable is met.

(iii) As a last option the 'country-specific residual grid mix, consumption mix' shall be used (available at http://lcdn.thinkstep.com/Node/). Country-specific means the country in which the life cycle stage occurs. This may be an EU country or non-EU country. The residual grid mix characterizes the unclaimed, untracked or publicly shared electricity. This prevents double counting with the use of supplier-specific electricity mixes in (i) and (ii).

Note: if for a country, there is a 100% tracking system in place, case (i) shall be applied.

Note: for the use stage, the consumption grid mix shall be used.

The environmental integrity of the use of supplier-specific electricity mix depends on ensuring that contractual instruments (for tracking) reliably and uniquely convey claims to consumers. Without this, the OEF lacks the accuracy and consistency necessary to drive product/corporate electricity procurement decisions and accurate consumer (buyer of electricity) claims. Therefore, a set of minimum criteria that relate to the integrity of the contractual instruments as reliable conveyers of

environmental footprint information has been identified. They represent the minimum features necessary to use supplier-specific mix within OEF studies.

Set of minimal criteria to ensure contractual instruments from suppliers:

A supplier-specific electricity product/mix may only be used when the applicant ensures that any contractual instrument meets the criteria specified below. If contractual instruments do not meet the criteria, then 'country-specific residual grid mix, consumption mix' shall be used in the modelling.

A contractual instrument used for electricity modelling shall:

1. Convey attributes:
    - Convey the energy type mix associated with the unit of electricity produced.
    - The energy type mix shall be calculated based on delivered electricity, incorporating certificates sourced and retired on behalf of its customers. Electricity from facilities for which the attributes have been sold off (via contracts or certificates) shall be characterized as having the environmental attributes of the country residual consumption mix where the facility is located.
2. Be a unique claim:
    - Be the only instruments that carry the environmental attribute claim associated with that quantity of electricity generated.
    - Be tracked and redeemed, retired, or cancelled by or on behalf of the company (e.g. by an audit of contracts, third-party certification, or may be handled automatically through other disclosure registries, systems, or mechanisms).
3. Be as close as possible to the period to which the contractual instrument is applied.

Modelling 'country-specific residual grid mix, consumption mix':

Datasets for residual grid mix, per energy type, per country and per voltage have been purchased by the European Commission and are available in the dedicated node (http://lcdn.thinkstep.com/Node/). In case the necessary dataset is not available, an alternative dataset shall be chosen according to the procedure described in section above. If no dataset is available, the following approach may be used: Determine the country consumption mix (e.g. X% of MWh produced with hydro energy, Y% of MWh produced with coal power plant) and combined them with LCI datasets per energy type and country/region (e.g. LCI dataset for the production of 1MWh hydro energy in Switzerland):

- Activity data related to non-EU country consumption mix per detailed energy type shall be determined based on:
    - Domestic production mix per production technologies
    - Import quantity and from which neighbouring countries
    - Transmission losses

- Distribution losses
- Type of fuel supply (share of resources used, by import and / or domestic supply)

These data may be found in the publications of the International Energy Agency (IEA).

- Available LCI datasets per fuel technologies in the node. The LCI datasets available are generally specific to a country or a region in terms of:
  - Fuel supply (share of resources used, by import and / or domestic supply),
  - Energy carrier properties (e.g. element and energy contents)
  - Technology standards of power plants regarding efficiency, firing technology, flue-gas desulphurisation, NOx removal and de-dusting.

If the consumed electricity comes from more than one electricity mix, each mix source shall be used in terms of its proportion in the total kWh consumed. For example, if a fraction of this total kWh consumed is coming from a specific supplier a supplier-specific electricity mix shall be used for this part. See below for on-site electricity use.

<u>On-site electricity generation:</u>

If on-site electricity production is equal to the site own consumption, two situations apply:

- No contractual instruments have been sold to a third party: the own electricity mix (combined with LCI datasets) shall be modelled.
- Contractual instruments have been sold to a third party: the 'country-specific residual grid mix, consumption mix' (combined with LCI datasets) shall be used.

If electricity is produced in excess of the amount consumed on-site within the defined system boundary and is sold to, for example, the electricity grid, this system can be seen as a multifunctional situation. The system will provide two functions (e.g. product + electricity) and the following rules shall be followed:

- If possible, apply subdivision.
- Subdivision applies both to separate electricity productions or to a common electricity production where you can allocate based on electricity amounts the upstream and direct emissions to your own consumption and to the share you sell out of your company (e.g. if a company has a wind mill on its production site and export 30% of the produced electricity, emissions related to 70% of produced electricity should be accounted in the OEF study.
- If not possible, direct substitution shall be used. The country-specific residual consumption electricity mix shall be used as substitution[34].

[34] For some countries, this option is a best case rather than a worst case.

- Subdivision is considered as not possible when upstream impacts or direct emissions are closely related to the product itself.

## 5.10. Climate change modelling

The impact category 'climate change' shall be modelled considering three sub-categories:

1. Climate change – fossil: This sub-category includes emissions from peat and calcination/carbonation of limestone. The emission flows ending with '(fossil)' (e.g., 'carbon dioxide (fossil)'' and 'methane (fossil)') shall be used if available.
2. Climate change – biogenic: This sub-category covers carbon emissions to air ($CO_2$, CO and $CH_4$) originating from the oxidation and/or reduction of biomass by means of its transformation or degradation (e.g. combustion, digestion, composting, landfilling) and $CO_2$ uptake from the atmosphere through photosynthesis during biomass growth – i.e. corresponding to the carbon content of products, biofuels or aboveground plant residues such as litter and dead wood. Carbon exchanges from native forests[35] shall be modelled under sub-category 3 (incl. connected soil emissions, derived products, residues). The emission flows ending with '(biogenic)' shall be used.

   A simplified modelling approach shall be used when modelling the foreground emissions: Only the emission 'methane (biogenic)' is modelled, while no further biogenic emissions and uptakes from atmosphere are included. When methane emissions can be both fossil or biogenic, the release of biogenic methane shall be modelled first and then the remaining fossil methane.
3. Climate change – land use and land transformation: This sub-category accounts for carbon uptakes and emissions ($CO_2$, CO and $CH_4$) originating from carbon stock changes caused by land use change and land use. This sub-category includes biogenic carbon exchanges from deforestation, road construction or other soil activities (incl. soil carbon emissions). For native forests, all related $CO_2$ emissions are included and modelled under this sub-category (including connected soil emissions, products derived from native forest[36] and residues), while their $CO_2$ uptake is excluded. The emission flows ending with '(land use change)' shall be used. For land use change, all carbon emissions and removals shall be modelled following the modelling guidelines of PAS 2050:2011 (BSI 2011) and the supplementary document PAS2050-1:2012 (BSI 2012) for horticultural products. PAS 2050:2011 (BSI 2011): Large emissions of

[35] Native forests – represents native or long-term, non-degraded forests. Definition adapted from table 8 in Annex V C(2010)3751 to Directive 2009/28/EC.

[36] Following the instantaneous oxidation approach in IPCC 2013 (Chapter 2).

GHGs can result as a consequence of land use change. Removals as a direct result of land use change (and not as a result of long-term management practices) do not usually occur, although it is recognized that this could happen in specific circumstances. Examples of direct land use change are the conversion of land used for growing crops to industrial use or conversion from forestland to cropland. All forms of land use change that result in emissions or removals are to be included. Indirect land use change refers to such conversions of land use as a consequence of changes in land use elsewhere. While GHG emissions also arise from indirect land use change, the methods and data requirements for calculating these emissions are not fully developed. Therefore, the assessment of emissions arising from indirect land use change is not included.

The GHG emissions and removals arising from direct land use change shall be assessed for any input to the life cycle of a product originating from that land and shall be included in the assessment of GHG emissions. The emissions arising from the product shall be assessed on the basis of the default land use change values provided in PAS 2050:2011 Annex C, unless better data is available. For countries and land use changes not included in this annex, the emissions arising from the product shall be assessed using the included GHG emissions and removals occurring as a result of direct land use change in accordance with the relevant sections of the IPCC (2006). The assessment of the impact of land use change shall include all direct land use change occurring not more than 20 years, or a single harvest period, prior to undertaking the assessment (whichever is the longer). The total GHG emissions and removals arising from direct land use change over the period shall be included in the quantification of GHG emissions of products arising from this land on the basis of equal allocation to each year of the period[37].

1) Where it can be demonstrated that the land use change occurred more than 20 years prior to the assessment being carried out, no emissions from land use change should be included in the assessment.

2) Where the timing of land use change cannot be demonstrated to be more than 20 years, or a single harvest period, prior to making the assessment (whichever is the longer), it shall be assumed that the land use change occurred on 1 January of either:

- the earliest year in which it can be demonstrated that the land use change had occurred; or

[37] In case of variability of production over the years, a mass allocation should be applied.

- on 1 January of the year in which the assessment of GHG emissions and removals is being carried out.

The following hierarchy shall apply when determining the GHG emissions and removals arising from land use change occurring not more than 20 years or a single harvest period, prior to making the assessment (whichever is the longer):

1. where the country of production is known and the previous land use is known, the GHG emissions and removals arising from land use change shall be those resulting from the change in land use from the previous land use to the current land use in that country (additional guidelines on the calculations can be found in PAS 2050-1:2012);
2. where the country of production is known, but the former land use is not known, the GHG emissions arising from land use change shall be the estimate of average emissions from the land use change for that crop in that country (additional guidelines on the calculations can be found in PAS 2050-1:2012);
3. where neither the country of production nor the former land use is known, the GHG emissions arising from land use change shall be the weighted average of the average land use change emissions of that commodity in the countries in which it is grown.

Knowledge of the prior land use can be demonstrated using a number of sources of information, such as satellite imagery and land survey data. Where records are not available, local knowledge of prior land use can be used. Countries in which a crop is grown can be determined from import statistics, and a cut-off threshold of not less than 90% of the weight of imports may be applied. Data sources, location and timing of land use change associated with inputs to products shall be reported.

Soil carbon storage shall not be modelled.

The sum of the three sub-categories shall be reported.

The sub-category 'Climate change-biogenic' shall be reported separately (because its contribution to the total climate change impact, based on the Representative Organisation results, is more than 5%).

The sub-category 'Climate change-land use and land transformation' shall be reported separately (because its contribution to the total climate change impact, based on the Representative Organisation results, is more than 5%).

## 5.11. Modelling of wastes and recycled content

The waste of products used during the manufacturing, distribution, retail, the use stage or after use shall be included in the overall modelling of the life cycle of the organisation. Overall, this should be modelled and reported at the life cycle stage where the waste occurs.

This section gives guidelines on how to model the end-of-Life of products as well as the recycled content.

The Circular Footprint Formula (Equation 3) is used to model the end-of-Life of products as well as the recycled content and is a combination of "material + energy + disposal", i.e.:

**Material** $(1 - R_1)E_V + R_1 \times \left(AE_{recycled} + (1 - A)E_V \times \frac{Q_{Sin}}{Q_p}\right) + (1 - A)R_2 \times \left(E_{recyclingEoL} - E_V^* \times \frac{Q_{Sout}}{Q_P}\right)$

**Energy** $(1 - B)R_3 \times (E_{ER} - LHV \times X_{ER,heat} \times E_{SE,heat} - LHV \times X_{ER,elec} \times E_{SE,elec})$

**Disposal** $(1 - R_2 - R_3) \times E_D$

[Equation 3]

With the following parameters:

**A:** allocation factor of burdens and credits between supplier and user of recycled materials.

**B:** allocation factor of energy recovery processes: it applies both to burdens and credits.

**$Qs_{in}$:** quality of the ingoing secondary material, i.e. the quality of the recycled material at the point of substitution.

**$Qs_{out}$:** quality of the outgoing secondary material, i.e. the quality of the recyclable material at the point of substitution.

**$Q_p$:** quality of the primary material, i.e. quality of the virgin material.

**$R_1$:** it is the proportion of material in the input to the production that has been recycled from a previous system.

**$R_2$:** it is the proportion of the material in the product that will be recycled (or reused) in a subsequent system. R2 shall therefore take into account the inefficiencies in the collection and recycling (or reuse) processes. R2 shall be measured at the output of the recycling plant.

**$R_3$:** it is the proportion of the material in the product that is used for energy recovery at EoL.

**$E_{recycled}$ ($E_{rec}$):** specific emissions and resources consumed (per unit of analysis) arising from the recycling process of the recycled (reused) material, including collection, sorting and transportation process.

**$E_{recyclingEoL}$ ($E_{recEoL}$):** specific emissions and resources consumed (per unit of analysis) arising from the recycling process at EoL, including collection, sorting and transportation process.

**$E_v$:** specific emissions and resources consumed (per unit of analysis) arising from the acquisition and pre-processing of virgin material.

**$E^*_v$:** specific emissions and resources consumed (per unit of analysis) arising from the acquisition and pre-processing of virgin material assumed to be substituted by recyclable materials.

**EER:** specific emissions and resources consumed (per unit of analysis) arising from the energy recovery process (e.g. incineration with energy recovery, landfill with energy recovery, …).

**$E_{SE,heat}$ and $E_{SE,elec}$:** specific emissions and resources consumed (per unit of analysis) that would have arisen from the specific substituted energy source, heat and electricity respectively.

**ED:** specific emissions and resources consumed (per unit of analysis) arising from disposal of waste material at the EoL of the analysed product, without energy recovery.

**$X_{ER,heat}$ and $X_{ER,elec}$:** the efficiency of the energy recovery process for both heat and electricity.

**LHV:** Lower Heating Value of the material in the product that is used for energy recovery.

# 6. Life cycle stages

## 6.1. Product portfolio production stage[38]

Both the production and service provision of in-house and other products are included in this stage. Thus, some activities will be included within the organisational boundary while others will not. Some details of this life cycle stage are presented in Figure 5 below.

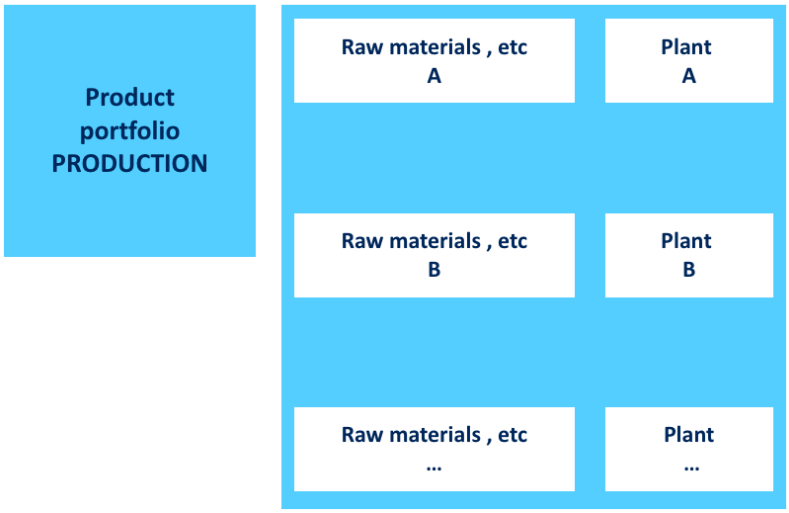


**Figure 5: Details for product portfolio production life cycle stage.**

Activities from raw material acquisition through processing and production per plant (or processing site) are included in this life cycle stage.

The production of all products included in the product portfolio shall be taken into account.

For the out-of-house products, generic datasets should be used for the production of the product (see section 5.6 for the selection of the datasets and follow the DNM).

Whenever there is a PEFCR available, it shall be used to represent that product in the product portfolio. If no PEFCR exist, for food products, the PEF/OEF method (PEF/OEF Guide, and PEFCR/OEFSR

[38] This stage typically covers « Raw material acquisition and pre-processing » as well as « Manufacturing ».

Guidance) and the ENVIFOOD Protocol should be used as references. In case of contrasting requirements, the former prevails over the latter.

Packaging shall be included in the modelling of the impact of each representative product. All packaging, including primary, secondary and tertiary packaging shall be included (but paying attention to avoid double counting – in case for example tertiary packaging would already be included in transportation datasets). Packaging may be already included in the default dataset used to model the production of the product. If information is available and deemed necessary (typically for in-house products), packaging should be modelled based on observed materials, measured weights and based on processes from generic databases.

In case the retailer produces in-house products, then the production stage modelling is a process that is run by the company and the rules of situation 1 of the DNM shall be followed. The modeling shall be based on primary data collected in the manufacturing plants to model the product production (energy and water consumption, material inputs, equipment and building and emissions and wastes, all of this reported per unit of product). For in-house products, existing PEFCRs shall be used in case available (e.g., in-house meat production).

The applicant shall report the DQR for all the datasets used for the most relevant processes, the new ones created, and other processes in situation 1 of the DNM.

## 6.2. Logistics stage

Logistics typically comprises the transportation from factories to distribution centres, the distribution centres, and the transportation from the distribution centres to the retail places. The logistics associated with the products are included in this stage. Transport to warehouses/distribution centres, between warehouses and distribution centres and the transport from the warehouses/distribution centres are included as shown in Figure 6 below. In addition, sorting, transport and handling in the warehouse are included in this life cycle stage.

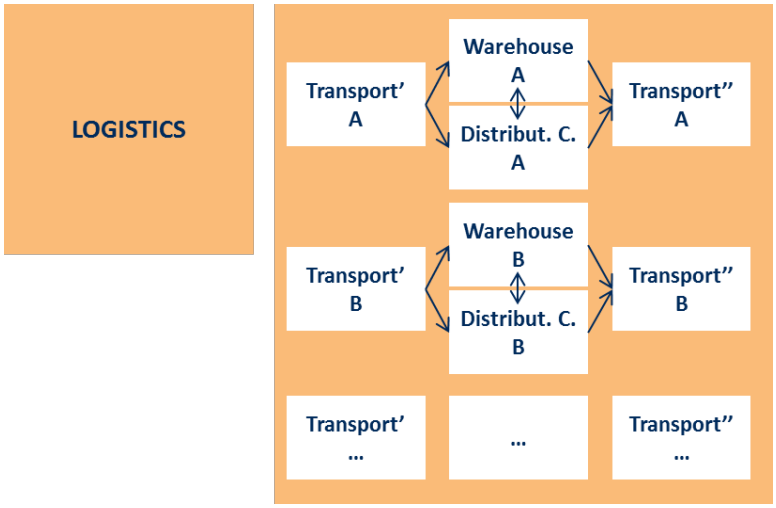


**Figure 6: Details for the logistics life cycle stage.**

A warehouse is described as a physical building that solely stores products whereas a distribution centre is a physical building that may store products but it is mainly where product sorting and distribution to consumers occurs.

Primary data for the amount of product transport, type of transport (e.g., rail or truck, truck size, ambient, chilled or frozen transport, electricity or diesel powered train) and average distance between a distribution centre and a retailer should be considered for the modelling. In case such data is not available, the following default shall be used for the transport for the logistics stage.

For suppliers located within Europe:

- 130 km by truck; and
- 240 km by train; and
- 270 km by ship (barge).

For all suppliers located outside Europe:

- 1000 km by truck, for the sum of distances from harbour/airport to factory outside and inside Europe; and
- 18000 km by ship (transoceanic container) or 10'000 km by plane (cargo).
- If producers country (origin) is known: the adequate distance for ship and airplane should be determined using https://www.searates.com/services/distances-time/ or https://co2.myclimate.org/en/flight_calculators/new .

In case it is unknown if the supplier is located within or outside Europe, the transport shall be modelled as supplier being located outside Europe.

The transport from a distribution centre to another distribution centre shall be included, based on primary data on the amount of products transported, the distance between the distribution centres and the transport mode used.

Impacts associated with packaging used during logistics (e.g. plastic wrap around the pallet) shall be included, but paying attention to avoid double counting in case it was already included in the production stage.

All the distribution centres shall be modelled through primary data and including: building (including parking) production and end-of-life; equipment and machinery production, use (except energy already considered in the total energy consumption) and end-of-life; energy and water consumption; refrigerant gas leakages (emissions plus production of replacement refrigerant gas). In case such data is not available, the default data presented below shall be used.

- Infrastructure and building: a distribution centre is a 30000 $m^2$ building, 5 m high, and with a 30000 $m^2$ parking. Fridges and freezers equipment (production and end-of-life) shall be considered for DCs that contains cooling systems. Default data for fridge or freezer production of 1 $m^3$ external volume and an internal storage space of 210 L (15 years lifetime): 20 kg iron, 1.5 kg aluminium, 7.8 kg compressor, 0.01 kg copper, 0.06 kg cables, 0.3 kg glass, 6 kg plastic, 1 kg oil, 4 kg insulating foam, 1.1 kg water, 0.04 kg pollutant (using mercury as proxy). Packaging: 4 kg cardboard, 0.5 kg plastic film (LDPE), along with a 50 g paper notice.
- Energy consumption: the storage energy consumption is 30 kWh/$m^2$·year and 360 MJ bought (= burnt in boiler) or 10 $Nm^3$ natural gas/$m^2$·year (if using the value per $Nm^3$, do not forget to consider emissions from combustion and not only production of natural gas). For DCs that contain cooling systems an additional energy use for the chilled or frozen storage is 40 kWh/$m^3$·year (with an assumption of 2 m high for the fridges and freezers). For DCs with both ambient and cooled storage: 20% of the area of the DC is chilled or frozen. Note: the energy for chilled or frozen storage is only the energy to “keep cool”.
- Refrigerant gases consumption and leakages for DCs that contains cooling systems: gas content in fridges and freezers is 0.29 kg R404A per $m^2$. A 10% annual leakage is considered. For the portion of refrigerant gases remaining in the equipment at end-of-life, 5% is emitted at end-of-life and the remaining fraction is treated as hazardous waste.
- Water: 365 $m^3$ of water is used per year for activities such as cleaning, lawn irrigation, etc. The production of this amount of tap water as well as its treatment in wastewater treatment plant shall be considered.
- Allocation of the DC space-time per product (if needed): The distribution centre impact per product is calculated using an allocation based on the total storage capacity of the distribution centre. An average distribution centre can store 60000 $m^3$ of product, being 48’000 $m^3$ for ambient storage and 12000 $m^3$ for chilled or frozen storage (assuming 50% of the 30000 $m^2$ building is dedicated to storage on 4 m high). Storage during 52 weeks, i.e., 3120000 $m^3$-

weeks/year. The total storage capacity shall be allocated with the following storage volumes and times:

- For ambient products: 4 times the product volume * stored 4 weeks
- For chilled products: 3 times the product volume * stored 1 week
- For frozen products: 2 times the product volume * stored 4 weeks

**Table 17: Logistics stage.**

| Requirements for data collection purposes | | | Requirements for modelling purposes | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Activity data to be collected** | **Specific requirements (e.g. frequency, measurement standard, etc)** | **Unit of measure (for the amount)** | **Default dataset to be used and UUID and node Default values to be used to calculate the amount** | **TiR** | **TeR** | **GR** | **P** | **Default DQR** |
| Transport need<br><br>Consider Truck, Train, Boat , Plane separately | Exact type and mean of transport to be identified by the OEF applicant / Combine with country specific electricity grid mix | t-km/year | Articulated lorry transport, Euro 4, Total weight >32 t (without fuel) ; diesel driven, Euro 4, cargo; consumption mix, to consumer EU-28+3<br>938d5ba6-17e4-4f0d-bef0-481608681f57<br>http://lcdn.thinkstep.com/Node/<br>130 km if in EU; 1'000 km if outside EU, utilisation ratio of 64% | 1 | 1 | 1 | 2 | 1 |
| | | | Transoceanic ship, containers; heavy fuel oil driven, cargo; consumption mix, to consumer GLO<br>6ca61112-1d5b-473c-abfa-4accc66a8a63<br>http://lcdn.thinkstep.com/Node/<br>18'000 km if outside EU | 1 | 2 | 2 | 2 | 1 |
| | | | Transoceanic ship, bulk GLO<br>ca3acef5-4bfa-494b-9899-84cf5e3c6af8<br>http://lcdn.thinkstep.com/Node/<br>18'000 km if outside EU | 1 | 2 | 2 | 2 | 1 |
| | | | Barge; technology mix, diesel driven, cargo; consumption mix, to consumer EU-28+3<br>4cfacea0-cce4-4b4d-bd2b-223c8d4c90ae<br>http://lcdn.thinkstep.com/Node/<br>270 km if in EU | 1 | 1 | 1 | 2 | 1 |
| | | | Freight train, electricity traction EU-28+3<br>dbde67a3-af4f-4d60-9568-4e0ef6eaaf07<br>http://lcdn.thinkstep.com/Node/<br>240 km if in EU | 1 | 1 | 1 | 2 | 1 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Freight train, average (without fuel) EU-28+3<br>02e87631-6d70-48ce-affd-1975dc36f5be<br>http://lcdn.thinkstep.com/Node/<br>240 km if in EU | 1 | 1 | 1 | 2 | 1 |
| | | | Cargo plane; technology mix, kerosene driven, cargo; consumption mix, to consumer GLO<br>1cc5d465-a12a-43da-aa86-a9c6383c78ac<br>http://lcdn.thinkstep.com/Node/<br>10'000 km if outside EU | 1 | 2 | 2 | 2 | 1 |
| Electricity use | Adapt to the country if known (see section 5.9) | kWh/year | Residual grid mix AC, technology mix, consumption mix, to consumer, 1kV - 60kV {EU-28+3}<br>8fb75312-431d-42f6-9a4f-22fa886f7fe3<br>http://lcdn.thinkstep.com/Node/<br>30 kWh/m2-y | 1 | 1 | 1 | 2 | 1 |
| Heat use (specify type of heat) | n/a | kWh or MJ/year | Thermal energy from natural gas technology mix regarding firing and flue gas cleaning production mix, at heat plant MJ, 100% efficiency EU-28+3<br>81675341-f1af-44b0-81d3-d108caef5c28<br>http://lcdn.thinkstep.com/Node/<br>360 MJ/m2-y | 1 | 1 | 1 | 2 | 1 |
| Ozone depletion substance leakage into the environment | Specify which substance | kg/year | E.g. Tetrafluoroethane production\| technology mix\| production mix, at plant\| 100% active substance {GLO} (used as approximation of R404A)<br>acfe37e4-37e8-4d95-8354-157f09f6e37c<br>http://ecoinvent.lca-data.com/<br>0.29 kg R404A per m2; a 10% annual leakage is considered; for the portion of refrigerant gases remaining in the equipment at end-of-life, 5% is emitted at end-of-life and the remaining fraction is treated as hazardous waste | Not EF-compliant (data gap provided by the EC) | | | | |
| | | kg/year | E.g. Ethane, 1,1,1-trifluoro-, HFC-143a (to air)<br>26162114-f5b3-45b5-87c3-f0fe0ecf2bb9<br>E.g. Ethane, pentafluoro-, HFC-125 (to air)<br>fe0acd60-3ddc-11dd-a3ea-0050c2490048 | n/a | | | | |

| | | | | |
|---|---|---|---|---|
| | | | E.g. Ethane, 1,1,1,2-tetrafluoro-, HFC-134a (to air)<br>fe0acd60-3ddc-11dd-a6d2-0050c2490048<br>0.29 kg R404A per m2; a 10% annual leakage is considered; for the portion of refrigerant gases remaining in the equipment at end-of-life, 5% is emitted at end-of-life and the remaining fraction is treated as hazardous waste<br>R404A is composed of 52% 1,1,1-trifluoroethane, 44% pentafluoroethane and 4% R134a | |

The applicant shall report the DQR for all the datasets used for the most relevant processes, the new ones created, and other processes in situation 1 of the DNM.

The waste of products during the logistics stage shall be included in the modelling.

## 6.3. Retail stage

This stage includes all sales methods used by a retailer. Figure 7 shows the retail place system boundary, which shall be adapted according to the activities of the retailer conducting the study. Shopping malls and shops are “brick and mortar” stores where the retailer sells products to its clients. Tele-commerce indicates any sale that is conducted through catalogues and telephones while e-commerce indicates all sales that are performed in a virtual manner (i.e., online). Self pick-up is when the customer purchases a product online but then drives to a physical building to pick up the product.


**Figure 7: Details for the retail place life cycle stage.**

The retail place shall be modelled including the following elements: building production and end-of-life, equipment production and end-of-life, energy consumption, water consumption, refrigerant gases leakages (emissions and production of replacement gas), repacking activities (new packaging production and end-of-life), losses treatment and other services at the retail place. Primary data shall be collected also to assess the e-commerce: building, energy consumption, number of servers required for the activity and other IT equipment (if controled by the company).

Other services at the retail place correspond to services sold by the retailer that are physically located at the retail places, e.g., gas station, printing centre or banking services. For such services, the impacts related to the production and end-of-life of the infrastructure and the equipment necessary for the service brought back to one year of use, as well as their use during one year shall be included in the retail place life cycle stage. Particular attention shall be paid for the modelling of these services as the products they sell are modelled in the product production, use and end-of-life stages while the services are modelled in the retail place. For instance, the paper used by the printing service is considered as the other products of the retailer but the printing of this paper is part of the service. This means that the paper production is considered in the product production stage, the printing of this paper is considered at the retail place stage, the use stage of the paper printed is considered to have no impact and the treatment of the printed paper at its end-of-life is included in the end-of-life stage. In comparison with this, the printing paper sold as paper by the retailer will have a use stage as it will be printed at home. Regarding the gas station, the production of the gas shall be included in the product production stage, the sale of the gas in the retail place stage (through the gas station activity) and its combustion is included in the use stage (no end-of-life as no product remains after combustion).

The impact of services included in the modelling may be limited as the scope of services included in the modelling may be limited (e.g. the impacts of travels sold by travel agencies part of the retailer may not be included in the scope modelled for the travel agencies).

Primary data should be used to model the retail place. In case no such data is available, the default data listed below and in Table 18 shall be used.

- Infrastructure: A retail centre shall be modelled as a 2000 $m^2$ building with 4000 $m^2$ parking (the value for parking includes both employees and clients parking as well as all infrastructures such as the access road, area for delivery, etc.)
- Fridges and freezers in case of cooling: 60 $m^2$ fridges and 60 $m^2$ freezer, 2 m high, i.e., 240 $m^3$ fridges measured as external volume with 50% being “internal storage volume” (= 120 $m^3$). Default data for fridge or freezer production of 1$m^3$ external volume and an internal storage space of 210 L (15 years lifetime): 20 kg iron, 1.5 kg aluminium, 7.8 kg compressor, 0.01 kg

copper, 0.06 kg cables, 0.3 kg glass, 6 kg plastic, 1 kg oil, 4 kg insulating foam, 1.1 kg water, 0.04 kg pollutant (using mercury as proxy). Packaging: 4 kg cardboard, 0.5 kg plastic film, along with a 50 g paper notice.

- Energy consumption[39]: A general energy consumption of 300 kWh/$m^2$·year for the entire building surface. For retail specialized in non-food/non-beverage products: 150 kWh/$m^2$·year for the entire building surface. For retail specialized in food/beverage products: 400 kWh/$m^2$·year for the entire building surface plus energy consumption for chilled and frozen storage of 1900 kWh/$m^2$·year and 2700 kWh/$m^2$·year respectively.
- Refrigerant gases: Gas content in fridges and freezers is 0.29 kg R404A per $m^2$. The production and end-of-life, as well as the leakages shall be considered and 10% annual leakage. For the portion of refrigerant gases remaining in the equipment at end-of-life, 5% are assumed to be emitted at end-of-life and the remaining fraction is treated as hazardous waste.
- Water: 3'650 $m^3$ of water is used per year for activities such as cleaning, customer bathrooms, lawn irrigation, etc. The production of this amount of tap water as well as its treatment in wastewater treatment plant shall be considered.
- Allocation of the retail space-time per product: A retail place can store 2'000 $m^3$ of products (assuming 50% of the 2'000 $m^2$ building is covered by shelves of 2 m high) during 52 weeks, i.e., 104000 $m^3$-weeks/year. The total storage capacity shall be allocated with the following storage volumes and times:
    - For ambient products: 4 times the product volume * stored 4 weeks
    - For chilled products: 3 times the product volume * stored 2 weeks
    - For frozen products: 2 times the product volume * stored 4 weeks
- Repacking: consuming about 3 t plastic film (LDPE) per supermarket per year. The production and end-of-life (100% recycling) of LDPE packaging film shall be considered. This represent a default value of 0.47 g LDPE film / kg of product[40].

[39]Derived from table 17, p. 59, of the PERIFEM and ADEME "Guide sectorial 2014: Réalisation d'un bilan des emissions de gaz à effet de serre pour distribution et commerce de detail".

[40]The virtual retailer considered for the OEF retail screening sells about 6370 tons products per supermarket per year.

## Table 18: Retail stage.

| Requirements for data collection purposes | | | Requirements for modelling purposes | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Activity data to be collected** | **Specific requirements (e.g. frequency, measurement standard, etc)** | **Unit of measure (for the amount)** | **Default dataset to be used and UUID and node<br>Default values to be used to calculate the amount** | **TiR** | **TeR** | **GR** | **P** | **Default DQR** |
| Electricity use | Adapt to the country if known (see section 5.9) | kWh/year | Residual grid mix AC, technology mix, consumption mix, to consumer, 1kV - 60kV {EU-28+3}<br>8fb75312-431d-42f6-9a4f-22fa886f7fe3<br>http://lcdn.thinkstep.com/Node/<br>Generic value of 300 kWh/m2•year for the entire building surface.<br>For retail specialized in non-food/non-beverage products: 150 kWh/m2•year for the entire building surface.<br>For retail specialized in food/beverage products: 400 kWh/m2•year for the entire building surface plus energy consumption for chilled and frozen storage of 1900 kWh/m2•year and 2700 kWh/m2•year respectively. | 1 | 1 | 1 | 2 | 1 |
| Heat use (specify type of heat) | n/a | kWh or MJ/year | Thermal energy from natural gas technology mix regarding firing and flue gas cleaning production mix, at heat plant MJ, 100% efficiency EU-28+3<br>81675341-f1af-44b0-81d3-d108caef5c28<br>http://lcdn.thinkstep.com/Node/<br>0 MJ/m2-y | 1 | 1 | 1 | 2 | 1 |
| Ozone depletion substance leakage into the environment | Specify which substance | kg/year | E.g. Tetrafluoroethane production\| technology mix\| production mix, at plant\| 100% active substance {GLO} (used as approximation of R404A)<br>acfe37e4-37e8-4d95-8354-157f09f6e37c<br>http://ecoinvent.lca-data.com/<br>0.29 kg R404A per m2; a 10% annual leakage is considered; for the portion of refrigerant gases remaining in the equipment at end-of-life, 5% is emitted at end-of-life and the remaining fraction is treated as hazardous waste | Not EF-compliant (data gap provided by the EC) | | | | |
| | | kg/year | E.g. Ethane, 1,1,1-trifluoro-, HFC-143a (to air)<br>26162114-f5b3-45b5-87c3-f0fe0ecf2bb9<br>E.g. Ethane, pentafluoro-, HFC-125 (to air)<br>fe0acd60-3ddc-11dd-a3ea-0050c2490048<br>E.g. Ethane, 1,1,1,2-tetrafluoro-, HFC-134a (to air)<br>fe0acd60-3ddc-11dd-a6d2-0050c2490048<br>0.29 kg R404A per m2; a 10% annual leakage is considered; for the portion of refrigerant gases remaining in the equipment at end-of-life, 5% is emitted at end-of-life and the remaining fraction is treated as hazardous waste<br>R404A is composed of 52% 1,1,1-trifluoroethane, 44% pentafluoroethane and 4% R134a | n/a | | | | |

To model the impact and credits of treating the losses at retailer, in case no primary data exist for the losses at retailer, then the loss rates of Annex 3 shall be used as default.

The applicant shall report the DQR for all the datasets used for the most relevant processes, the new ones created, and other processes in situation 1 of the DNM.

The waste of products during the retail stage shall be included in the modelling.

## 6.4. Distribution stage ("last mile" of products)

This stage includes the following:

- Distribution of the sold product performed by the retailer (e.g., home delivery)
- Transport of the sold product by the client (e.g., by own car)

Primary data should be used for distribution modelling. In case no such data is available, the following default data shall be used.

- 62%: 5 km, by passenger car.
- 5%: 5 km round trip, by van.
- 33%: no impact modelled.

Impacts associated with packaging used during distribution (e.g. plastic bag or cardboard box used for home delivery by van) shall be included, but paying attention to avoid double counting in case it was already included in the production stage, logistics or retailer stage.

**Table 19: Distribution stage.**

| **Requirements for data collection purposes** | | | **Requirements for modelling purposes** | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Activity data to be collected** | **Specific requirements (e.g. frequency, measurement standard, etc)** | **Unit of measure (for the amount)** | **Default dataset to be used and UUID and node<br>Default values to be used to calculate the amount** | **TiR** | **TeR** | **GR** | **P** | **Default DQR** |
| Transport need (client) | Only accounting for those by car (excluding those by public transport or bike) | km/year | Passenger car, average; technology mix, gasoline and diesel driven, Euro 3-5, passenger car; consumption mix, to consumer<br>1ead35dd-fc71-4b0c-9410-7e39da95c7dc<br>http://lcdn.thinkstep.com/Node/<br>5 km | 1 | 3 | 3 | 3 | 2 |
| Transport need (retail distribution) | If it is truck instead of van, then account for truck (excluding those made by public transport or bike) | t-km/year | Articulated lorry transport, Euro 3, Total weight <7.5 t (without fuel) ; diesel driven, Euro 3, cargo; consumption mix, to consumer | 1 | 1 | 1 | 2 | 1 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | aea613ae-573b-443a-aba2-6a69900ca2ff<br>http://lcdn.thinkstep.com/Node/<br>5 km round trip, with utilisation ratio of 20% | | | | | |

The applicant shall report the DQR for all the datasets used for the most relevant processes, the new ones created, and other processes in situation 1 of the DNM.

The waste of products during the distribution stage shall be included in the modelling.

### 6.4.1. Specificities for e-commerce

E-commerce can influence the logistics, retail place and distribution life cycle stages.

E-commerce can be defined as the purchase and sale of goods and/or services via electronic channels such as the Internet. Four types of e-commerce can be typically distinguished: B2B (Business-to-Business), B2C (Business-to-Consumer), C2B (Consumer-to-Business), and C2C (Consumer-to-Consumer).

For e-commerce, the 'logistics' stage and the 'distribution of sold products to the client' stage are often directly connected as there is in general no physical retail place in between. When primary data about transport are not known, the following default data shall be used.

- 250 km round trip, by van (lorry <7.5t, EURO 3, utilisation ratio of 20%; UUID aea613ae-573b-443a-aba2-6a69900ca2ff)

In general, the influence of e-commerce should be implicitly correctly captured in the OEF as its influence on those life cycle stages should be captured in the data collected to model those life cycle stages.

However, when doing the assessment, one needs to pay particular attention to make sure that the product take-back is correctly captured. The percentage of products that cycle multiple times through the logistics-, (retail place-) and distribution-life cycle stages before entering the use phase (due to the take-back system) is typically higher for B2C e-commerce than for retail formulas with physical retail places.

## 6.5. Use stage

This life cycle stage includes the use stage impacts of the products sold. The use stage includes the use of materials, energy and the emissions associated with goods/services occurring downstream of the organisational boundary in relation to the product portfolio. The use stage is included for products for which it is feasible to establish a use stage scenario. Note that not all products have use impacts

and for some of them it may not be possible to determine a typical use, as too many uses are possible. In this latter case, no use stage impact may be considered for the product. Clear justifications shall be provided in case where the use life cycle stage is excluded. The use stage of the products shall include the use stage impacts of all product sold during the year but on their entire lifetime: for instance for a fridge, if its lifetime is 15 years, then the use stage impacts of that fridge sold shall be the cumulated impacts over the 15 years of its lifetime.

In case there is an existing PEFCR for the products for which the use stage needs to be modelled, the retailer shall use the use stage assumptions and data provided through the relevant PEFCR. If no such document exists, default data listed in Annex 2 and Annex 3 shall be used. If no PEFCR exist nor is the product listed in Annex 2 or Annex 3, for food products, the PEF/OEF Guide and the PEFCR/OEFSR Guidance and the ENVIFOOD Protocol should be used as references. In case of contrasting requirements, the former (i.e. the PEF/OEF Guide and PEFCR/OEFSR Guidance) prevails over the latter.

For the use stage the consumption grid mix shall be used. The electricity mix shall reflect the ratios of sales between EU countries/regions. To determine the ratio a physical unit shall be used (e.g. number of pieces or kg of product). Where such data are not available, the average EU consumption mix (EU-28 +EFTA), or region representative consumption mix, shall be used.

The applicant shall report the DQR for all the datasets used for the most relevant processes, the new ones created, and other processes in situation 1 of the DNM.

The waste of products during the use stage shall be included in the modelling.

## 6.6. End-of-life stage

The end-of-life stage is a life cycle stage that in general includes the waste of the product portfolio in scope, such as the food waste, primary packaging, or the product left at its end of use.

The end-of-life stage includes the treatment of products and their packaging occurring downstream of the organisational boundary in relation to the product portfolio.

The default end-of-life scenarios presented in Table 20 should be used as a guidance when no better data or information is available. In case a specific PEFCR exists for a product category listed in Table 20, the end-of-life rules presented in that PEFCR prevail over the ones mentioned in Table 20 for that specific product category.

**Table 20: Default end-of-life scenario that should be considered.**

| **Product** | **End-of-life per product category ("average" means the average scenario for this packaging defined in the OEFSR Guidance Annex C)**<br>*"no product end-of-life" refers to the fraction of the product that is consumed. However there is still an end-of-life to be modelled for the fraction of food that is wasted (using the loss rates presented in Annex 3). |
|---|---|
| Apples | No product end-of-life. Plastic packaging average end-of-life fate |
| Meat and meat alternatives | Use assumptions of the PEFCR Red meat (as a placeholder, consider no product end-of-life. Plastic packaging 100% trashed) |
| Milk | Use assumptions of the PEFCR Dairy |
| Pasta | Use assumptions of the PEFCR Pasta |
| Sunflower oil | No product end-of-life. Glass packaging average end-of-life fate, plastic and aluminium packaging trashed |
| Frozen pizza | No product end-of-life. Cardboard with plastic layer packaging 100% trashed |
| Chocolate bar | No product end-of-life. Cardboard and aluminium packaging average end-of-life fate |
| Chips | No product end-of-life. Laminated pouch 100% trashed |
| Roast and ground coffee | Use assumptions of the latest draft PEFCR Coffee |
| Beer | Use assumptions of the PEFCR Beer |
| Bottled water | Use assumptions of the PEFCR Packed water |
| Cigarettes | Cigarette butt (plastic) 100% to trash. Packaging components (aluminium, cardboard, plastic) 100% to trash (as consumed "on the go" → no recycling) |
| Dog food | Use assumptions of the PEFCR Pet food |
| Goldfish | Product end-of-life not considered. Packaging (plastic bag and water) average end-of-life fate |
| T-shirt | Use assumptions of the PEFCR T-shirt (as a placeholder, consider T-shirt 100% to trash assumed. Cardboard and plastic packaging average end-of-life fate) |
| Leather shoes | Use assumptions of the PEFCR Footwear or Leather |
| Jewel | Jewel recycling. Plastic packaging average end-of-life fate |
| Paint | Use assumptions of the PEFCR Paint |
| Office chair | Chair 100% trashed. Corrugated board packaging average end-of-life fate |
| Refrigerator | Fridge dismantled and metals recycled, plastics trashed. Refrigerant gas leakage (5% assumed). Corrugated board, plastic and paper packaging average end-of-life fate |
| Plate | Plate landfilled. Corrugated board and paper packaging average end-of-life fate |
| Cell phone | Phone recycling (metals recycled, plastic trashed). Cardboard, plastic and paper average end-of-life fate |

| | |
|---|---|
| Toner cartridge | Cartridge recycling (metals recycled, plastic trashed). Laminated pouch 100% trashed |
| Printing paper | Paper product and packaging average end-of-life fate |
| DVD | DVD plastic and paper and plastic packaging average end-of-life fate |
| Playball | Playball 100% trashed. No packaging |
| Toy | Toy 100% trashed. Cardboard average end-of-life fate |
| Aspirin | No product end-of-life. Aluminium, plastic and cardboard packaging average end-of-life fate |
| Laundry detergent | Use assumptions of the PEFCR Detergent |
| Automotive oil | Used oil disposed to hazardous waste incineration. Plastic packaging 100% trashed |
| Battery | Use assumptions of the PEFCR Battery (as a placeholder, consider product recycling (metals recycling); plastic packaging average end-of-life fate) |
| Roses | Roses composting. Plastic packaging average end-of-life fate |
| Fertilizers | Product recycling (metals recycling). Plastic packaging average end-of-life fate |
| Reusable shopping bag | Plastic product average end-of-life fate. No packaging |
| Gas station | Considered in retail place stage |
| Gasoline | No end-of-life for product, no packaging |
| Printing centre | Considered in retail place stage |
| Printed paper | Paper product and packaging average end-of-life fate |
| ATM | Considered in retail place stage |
| Commercial space rented | End-of-life for building should be considered in the dataset for the building (that should consider production, use, maintenance and end-of-life) |
| Utility vehicle | For the car: plastic trashed, metals recycled. No packaging |

If no better data exist, the following simplified assumptions should be used:

- Laminated pouches (plastic and aluminium): 0% recycling
- WEEE: dismantled and metals are 100% recycled and plastic 0% recycled
- Solvents, paints, used oils: hazardous waste incineration without energy recovery
- Non-packaging plastics: 0% recycling
- Green wastes (typically garden waste, excluding kitchen waste that is included in food waste): 100% composting
- Food wastes: 50% trashed (i.e., incinerated and landfilled), 25% composting, 25% methanization
- Eaten food: no further "end-of-life" considered

And plastic bags should be considered for all wastes:

- Polypropylene bag for trash and Polypropylene bag for recycled waste (except green waste and food waste): 6.7 g/kg waste (1 g plastic per L of bag (35 g plastic for a 35 L bag, own measurement); The average municipal solid waste density is 150 kg/$m^3$).
- Polypropylene bag for recycled green waste and food waste: 2.5 g/kg waste (1 g plastic per L of bag (35 g plastic for a 35 L bag, own measurement). The average green/food waste density is 400 kg/$m^3$).

The transport from collection place to end-of-life treatment is included in the landfill, incineration and recycling datasets tendered by the EC.

The following values shall be used to model the transport at end-of-life (if not already included in the dataset):

- Consumer transport from home to sorting place: 1 km by passenger car (UUID 1ead35dd-fc71-4b0c-9410-7e39da95c7dc).
- Transport from collection place to methanization: 100 km by truck (>32 t, EURO 4; UUID 938d5ba6-17e4-4f0d-bef0-481608681f57).
- Transport from collection place to composting: 30 km by truck (lorry <7.5t, EURO 3 with UUID aea613ae-573b-443a-aba2-6a69900ca2ff).

The applicant shall report the DQR for all the datasets used for the most relevant processes, the new ones created, and other processes in situation 1 of the DNM.

The end of life shall be modelled using the formula, default parameters and guidance provided in chapter 'End of life modelling' of this OEFSR together with the default parameters listed in the Annex C of the OEFSR Guidance version 6.3.

## 6.7. Support activity stage

This stage includes all support activities that are necessary for the retailer. Some details of this life cycle stage are presented in Figure 8 below.

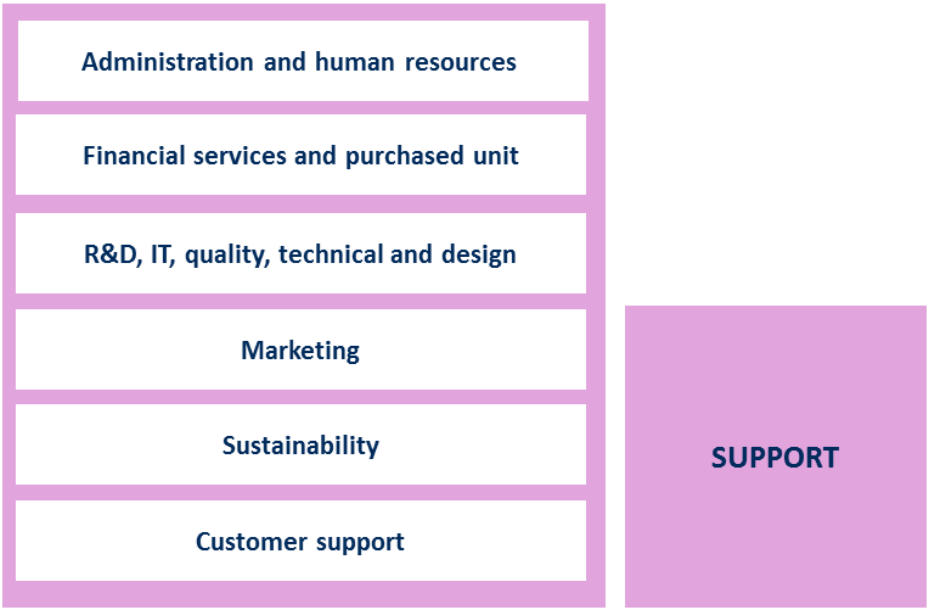


**Figure 8: Details for the support life cycle stage.**

Support modelling should be based on as many as possible primary data (see the document "OEFRetail_DataCollection_TEMPLATE_2018-03-22a.xlsx" – Annex 1). In case no primary data is available, the following approach may be used.

Impacts associated with services (such as security, accounting, IT, legal affairs, retailer marketing, etc.) associated with the entire activity from DC to user may be assessed through their costs and using the US environmental input/output LCA database ("US EIOLCA DB"). These services are assumed to represent an equivalent of 0.45 Euros / kg of product.

The costs may be distributed as follows:

- 10% for accounting (using the process "accounting, tax preparation, bookkeeping, and payroll services");
- 50% for marketing (using the process "advertising and related services");
- 10% for IT services (using the process "internet service providers and web search portals");
- 20% for legal affairs (using the process "legal services");
- 10% for security (using the process "securities, commodity contracts, investments, and related activities").

Marketing material (such as printing of catalogues and flyers for tele-commerce and shop retailers) is also part of this life cycle stage.

For each of these services, if primary data is available on the building, energy consumption, IT equipment, transports that are related to these activities, these data shall be considered for the modelling. If no such data exist, the above approach based on expenses may be considered and Input/Output databases may be used to assess the impacts related to these expenses[41].

**Table 21: Support activity stage.**

| Requirements for data collection purposes | | | Requirements for modelling purposes | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Activity data to be collected** | **Specific requirements (e.g. frequency, measurement standard, etc)** | **Unit of measure (for the amount)** | **Default dataset to be used and UUID and node<br>Default values to be used to calculate the amount** | **TiR** | **TeR** | **GR** | **P** | **Default DQR** |
| Electricity use | Adapt to the country if known (see section 5.9) | kWh/year | Residual grid mix AC, technology mix, consumption mix, to consumer, 1kV - 60kV {EU-28+3}<br>8fb75312-431d-42f6-9a4f-22fa886f7fe3<br>http://lcdn.thinkstep.com/Node/<br>0 kWh/year | 1 | 1 | 1 | 2 | 1 |
| Heat use (specify type of heat) | n/a | kWh or MJ/year | Thermal energy from natural gas technology mix regarding firing and flue gas cleaning production mix, at heat plant MJ, 100% efficiency EU-28+3<br>81675341-f1af-44b0-81d3-d108caef5c28<br>http://lcdn.thinkstep.com/Node/<br>0 MJ/year | 1 | 1 | 1 | 2 | 1 |
| Employee commuting | Only accounting for those by car (excluding those by public transport or bike) | km/year | Passenger car, average; technology mix, gasoline and diesel driven, Euro 3-5, passenger car; consumption mix, to consumer<br>1ead35dd-fc71-4b0c-9410-7e39da95c7dc<br>http://lcdn.thinkstep.com/Node/<br>30 km per day (roundtrip) x 250 days per year x 60% by car, per employee | 1 | 3 | 3 | 3 | 2 |

[41] Indeed, the reason to collect expenditure on services is to model the impacts of services where the only information we know is the amount of money spent

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Accounting, tax preparation, bookkeeping, and payroll services | Transform your current currency to USD2002<br>Note: US 2002 database is based on 1998 USD. Change rate in 1998: 0.9 EUR/USD. Inflation of EUR from 1998 to 2015: 1.6% per year, over 17 years. Efficiency factor of 2 (Europe in comparison with US). This gives a conversion factor of 0.424 USD 2002/EUR 2015. | USD2002/ year | Thermal energy from natural gas\| technology mix regarding firing and flue gas cleaning\| production mix, at heat plant\| MJ, 100% efficiency {EU-28+3}<br>81675341-f1af-44b0-81d3-d108caef5c28<br>http://lcdn.thinkstep.com/Node/<br>1.5 MJ/USD2002<br>0.045 Euros / kg of product | 1 | 1 | 1 | 2 | 1 |
| Advertising and related services | Transform your current currency to USD2002<br>Note: US 2002 database is based on 1998 USD. Change rate in 1998: 0.9 EUR/USD. Inflation of EUR from 1998 to 2015: 1.6% per year, over 17 years. Efficiency factor of 2 (Europe in comparison with US). This gives a conversion factor of 0.424 USD 2002/EUR 2015. | USD2002/ year | Thermal energy from natural gas\| technology mix regarding firing and flue gas cleaning\| production mix, at heat plant\| MJ, 100% efficiency {EU-28+3}<br>81675341-f1af-44b0-81d3-d108caef5c28<br>http://lcdn.thinkstep.com/Node/<br>3.4 MJ/USD2002<br>0.225 Euros / kg of product | 1 | 1 | 1 | 2 | 1 |
| Internet service providers and web search portals | Transform your current currency to USD2002<br>Note: US 2002 database is based on 1998 USD. Change rate in 1998: 0.9 EUR/USD. Inflation of EUR from 1998 to 2015: 1.6% per year, over 17 years. Efficiency factor of 2 (Europe in comparison with US). This gives a conversion factor of 0.424 USD 2002/EUR 2015. | USD2002/ year | Thermal energy from natural gas\| technology mix regarding firing and flue gas cleaning\| production mix, at heat plant\| MJ, 100% efficiency {EU-28+3}<br>81675341-f1af-44b0-81d3-d108caef5c28<br>http://lcdn.thinkstep.com/Node/<br>2.3 MJ/USD2002<br>0.045 Euros / kg of product | 1 | 1 | 1 | 2 | 1 |
| Legal services | Transform your current currency to USD2002<br>Note: US 2002 database is based on 1998 USD. Change rate in 1998: 0.9 | USD2002/ year | Thermal energy from natural gas\| technology mix regarding firing and flue gas cleaning\| production mix, at heat plant\| MJ, 100% efficiency {EU-28+3}<br>81675341-f1af-44b0-81d3-d108caef5c28 | 1 | 1 | 1 | 2 | 1 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | EUR/USD. Inflation of EUR from 1998 to 2015: 1.6% per year, over 17 years. Efficiency factor of 2 (Europe in comparison with US). This gives a conversion factor of 0.424 USD 2002/EUR 2015. | | http://lcdn.thinkstep.com/Node/<br>1.2 MJ/USD2002<br>0.090 Euros / kg of product | | | | | |
| Securities, commodity contracts, investments, and related activities | Transform your current currency to USD2002<br>Note: US 2002 database is based on 1998 USD. Change rate in 1998: 0.9 EUR/USD. Inflation of EUR from 1998 to 2015: 1.6% per year, over 17 years. Efficiency factor of 2 (Europe in comparison with US). This gives a conversion factor of 0.424 USD 2002/EUR 2015. | USD2002/ year | Thermal energy from natural gas\| technology mix regarding firing and flue gas cleaning\| production mix, at heat plant\| MJ, 100% efficiency {EU-28+3}<br>81675341-f1af-44b0-81d3-d108caef5c28<br>http://lcdn.thinkstep.com/Node/<br>1.2 MJ/USD2002<br>0.045 Euros / kg of product | 1 | 1 | 1 | 2 | 1 |

The applicant shall report the DQR for all the datasets used for the most relevant processes, the new ones created, and other processes in situation 1 of the DNM.

The waste of products during the support activity stage shall be included in the modelling.

### 6.7.1. Employees related activities

Employees related activities include commuting, business travels, canteens and sanitary water.

If primary data is available on employees-related activities (e.g. commuting), those shall be used (see the document "OEFRetail_DataCollection_TEMPLATE_2018-03-22a.xlsx" – Annex 1).

If no such data is available, default data provided below should be used.

Commuting: Each employee is assumed to commute 30 km per day (roundtrip) (for car, bus and train) and 250 days per year. We assumed that 60% of them commute by car, 20% take the bus, 15% the train, and 5% go to work walking. As a matter of simplification a cut-off is used and the impacts from employees taking the bus, the train and walking are neglected.

Business travels: 5% of the employees are assumed to travel on 100 km by car per week for work. 1% of the employees are assumed to take the plane once a week on 1000 km. Note: These values are first approximation for the distribution/retail sector.

Canteen: All employees are assumed to eat once per day at the canteen and 250 days per year. As a first approximation, their menu (excluding the losses) is considered to be 200 g pasta, 100 g meat (using pork as a default) and a 250 ml bottle of water. It is assumed that the amount actually eaten by the employees corresponds to 2/3 of what is prepared. Food losses are treated like any food losses. Dishes production, end-of-life and washing are included (plates and glasses). Note that if the canteen is part of the foreground system, the person making its assessment should be able to get primary data about the food & beverage served in the canteen. When this data is not available (or if the employees take their lunch outside of the company canteen) the data suggested above should be used as a first simplified approximation while waiting for more detailed menu dataset(s) (such as average breakfast, average lunch, average diner, with vegetarian options, etc.) within background life cycle inventory databases. The employees working at canteens are assumed to correspond to 1% of the total number of employees of the retailer. They have themselves employees' related activities, i.e., commuting, business travels, canteen and sanitary water.

Sanitary water: It is assumed that (5x4.5L (peeing) + 2x9L (poohing) + 10x0.25L (washing hands) + 2L (drinking) =) 45 L water are used per employee per day, 250 days per year. The production of this amount of tap water as well as its treatment in wastewater treatment plant should be considered.

Employees related activities may be put in each of the life cycle stages, or, if deemed more practical (for example due to data availability), all grouped in the support activity life cycle stage.

## 6.8. Other modelling issues

Green areas (lawn around the factories, around the shopping center, around the parking lot, etc.) shall be included in the modelling (as green areas) if belonging to the company.

Parking areas shall also be included in the model. Attention is to be given whether the parking surface is green (natural) or concrete/bitumen.

When the greens areas and parking areas are shared among companies, only a fair fraction should be allocated to the company, representing the fraction typically used by this company as opposite to other companies (e.g. in proportion to the number of cars used, etc.).

Green areas and parking areas should be included in the life cycle stage where they belong (e.g. if a green area and a parking are around the distribution center, they should be included in the logistic stage).

Green areas and parking areas are land occupation but may also be land transformation.

When cleaning agents are used in the different buildings, if no specific information about those cleaning agents are available, they may be modelled, as a first approximation, as average "chemical organic".

Buildings that are owned by the organisation but rented to other companies shall be included in the OEF (but, for the sake of clarity, may be reported separately from other results). Impacts of those buildings such as infrastructure, water and energy use, etc. should be accounted for. However, impacts of organizations (e.g. employees activities) rented those buildings do not need to be accounted for.

Capital goods shall use the actual expected lifetime as timeframe for the allocation. In case the expected lifetime is unknown, the following values should be used by default: 50 years for buildings; 10 years for furniture; 4 years for electronic equipment.

# 7. OEF results

## 7.1. OEF profile

The applicant shall calculate the OEF profile of its organisation in compliance with all requirements included in this OEFSR. The following information shall be included in the OEF report:

- full life cycle inventory;
- characterised results in absolute values, for all impact categories (including toxicity; as a table);
- normalised and weighted result in absolute values, for all impact categories (including toxicity; as a table);
- the aggregated single score in absolute values.

## 7.2. Additional technical information

The final result may be expressed, in addition to the basic reference of 1 year, using a different reference, for example per amount of product consumed (but also per product sold, per revenue, per employee, etc.). In such case, this information shall be reported under this section about “additional technical information”.

## 7.3. Additional environmental information

*Biodiversity is considered as relevant for this OEFSR.* Indeed, biodiversity is a relevant information in the context of most retailers (at least for those having food and beverage, or fibre based products – it might be less relevant for those focusing, for example, on appliances). This information can be very complex. At minima, the retailer shall report the fraction (mass based and value based, on an annual basis) of its product portfolio that is following a responsible sourcing from a biodiversity perspective

(e.g. certified organic or other responsible sourcing program). This information shall be reported under this section about “additional environmental information”. The responsible sourcing schemes considered shall be reported.

Retail facilities may have impact on biodiversity that is not captured in the PEF/OEF LCIA. The state of biodiversity around the sites under control may be assessed and reported in this section. If the state of biodiversity around the sites under control is reported, the methodology used to assess the state of biodiversity should be described.

## 7.4. Interpretation

All impact categories shall be considered for the assessment, as the results can vary when conducting studies for different types of retailers (e.g. food or non-food specificities). The impact categories identified as being “most relevant” should be subject to a special care in interpretation.

Zoom may be done on life cycle stages that are specific to the organisation or even specific to certain business units of this organisation in order to increase the interest of the organisation management or the management of specific business units to the results.

The concept of most relevant impact categories and most relevant stages may be done for the overall organisation results as well as for the parts under direct control of the organisation or even for those parts that are part of a specific business unit.

As an example, the most relevant impact categories found in the screening study for a virtual retailer (which is a “general” retailer - “selling a bit of everything”) are listed in Table 22.

**Table 22: Most relevant impact categories found for the virtual retailer.**

| Logistics, retail place, distribution and support | Full life cycle (including the product portfolio production, use and end-of-life) |
|---|---|
| • Climate change<br>• Ozone depletion<br>• Acidification<br>• Resource use, fossils | • Climate change<br>• Ozone depletion<br>• Particulate matter<br>• Acidification<br>• Eutrophication, terrestrial<br>• Land use<br>• Resource use, fossils |

Though no benchmark is provided for retailers, for the sake of internal benchmark (such as for tracking reports), retailers may track their environmental footprint in relation to some relevant indicator,

specific to each sector, such as the environmental footprint divided by the turnover. This internal benchmark may be made for different activities of the retailer.

Results could also be compared to target values (such as refrigerant loss values, km driven per product, energy consumption per $m^2$-y, etc.).

The retailer may also assess (and report) the fraction of "environmentally friendly"[42] products within the different product categories of the product portfolio. Such information, if reported, shall be reported under the section for additional information. This information should be reported in addition to the fraction (mass based and value based, on an annual basis) of its product portfolio that is following a responsible sourcing from a biodiversity perspective (e.g. certified organic or other responsible sourcing program) which is reported under additional information.

An example of analysis is to identify whether the hotspots identified for the different impact categories are within or outside of the products from responsible sourcing.

### 7.5. Reporting and disclosure

OEF information can typically be used for internal information, decision making, strategy planning, improvement tracking, or as an input into other stakeholder's management system. OEF can also be used for external reporting such as CSR report, CDP, ISO 14001 certification, etc.

Reporting per life cycle stage shall be done as well as per clusters (e.g. (i) for product portfolio related (production, use and end-of-life) and (ii) for logistics, retail place, distribution, and support). It is suggested to also report biodiversity proxy (e.g. % of products from responsible sourcing).

Evolution of values (on a year by year basis) should be explained.

The limitations of the OEF shall be clearly stated and described.

## 8. Verification

The verification of an EF study/report carried out in compliance with this OEFSR shall be done according to all the general requirements included in Section 8 of the latest version of the OEFSR Guidance and the requirements listed below.

The verifier(s) shall verify that the EF study is conducted in compliance with the most recent version of this OEFSR.

[42] « Environmentally friendly » is understood here as a product that has an environmental footprint lower than the environmental footprint of the benchmark of that product category. This only applies for products covered by a PEFCR.

These requirements will remain valid until an EF verification scheme is adopted at European level or alternative verification approaches applicable to EF studies/report are included in existing or new policies.

## 8.1. Specific requirements for the verification

The verification of an EF study/report carried out in compliance with this OEFSR shall be done according to all the general requirements included in Section 8 of the OEFSR Guidance version 6.3 and the requirements listed below.

The verifier(s) shall verify that the EF study is conducted in compliance with this OEFSR.

These requirements will remain valid until an EF verification scheme is adopted at European level or alternative verification approaches applicable to EF studies/report are included in existing or new policies.

The verifier(s) shall validate the accuracy and reliability of the quantitative information used in the calculation of the study. As this can be highly resource intensive, the following requirements shall be followed:

- the verifier shall check if the correct version of all impact assessment methods was used. For each of the most relevant impact categories, at least 50% of the characterisation factors (for each of the most relevant EF impact categories) shall be verified, while all normalisation and weighting factors of all ICs shall be verified. In particular, the verifier shall check that the characterisation factors correspond to those included in the EF impact assessment method the study declares compliance with[43];
- all the newly created datasets shall be checked on their EF compliancy (for the meaning of EF compliant datasets refer to Annex H of the OEFSR Guidance). All their underlying data (elementary flows, activity data and sub processes) shall be validated;
- for at least 70% of the most relevant processes in situation 2 option 2 of the DNM, 70% of the underlying data shall be validated. The 70% data shall including all energy and transport sub processes for those in situation 2 option 2;
- for at least 60% of the most relevant processes in situation 3 of the DNM, 60% of the underlying data shall be validated;
- for at least 50% of the other processes in situation 1, 2 and 3 of the DNM, 50% of the underlying data shall be validated.

[43] Available at: http://eplca.jrc.ec.europa.eu/LCDN/developer.xhtml

In particular, it shall be verified for the selected processes if the DQR of the process satisfies the minimum DQR as specified in the DNM.

The selection of the processes to be verified for each situation shall be done ordering them from the most contributing to the less contributing one and selecting those contributing up to the identified percentage starting from the most contributing ones. In case of non-integer numbers, the rounding shall be made always considering the next upper integer.

These data checks shall include, but should not be limited to, the activity data used, the selection of secondary sub-processes, the selection of the direct elementary flows and the CFF parameters. For example, if there are 5 processes and each one of them includes 5 activity data, 5 secondary datasets and 10 CFF parameters, then the verifier(s) has to check at least 4 out of 5 processes (70%) and, for each process, (s)he shall check at least 4 activity data (70% of the total amount of activity data), 4 secondary datasets (70% of the total amount of secondary datasets), and 7 CFF parameters (70% of the total amount of CFF parameters), i.e. the 70% of each of data that could be possible subject of check.

Finally, verifiers should check at least a sample of invoices of certified products, and verify that there is a chain of custody in place, if relevant.

The verification of the EF report shall be carried out by randomly checking enough information to provide reasonable assurance that the EF report fulfils all the conditions listed in section 8 of the OEFSR Guidance.

## 9. References

CDP. https://www.cdp.net/fr.

ENVIFOOD Protocol. (2013). European food sustainable consumption & production round table. Available at http://www.food-scp.eu/node/25.

European Commission. (2008). Statistical Classification of Economic Activities in the European Community, Rev. 2 (2008).

http://ec.europa.eu/eurostat/ramon/nomenclatures/index.cfm?TargetUrl=DSP_NOM_DTL_VIEW&StrNom=NACE_REV2&StrLanguageCode=EN&IntPcKey=18510944&IntKey=18510944&StrLayoutCode=HIERARCHIC&IntCurrentPage=1

European Commission. (2013). 2013/179/EU: Commission Recommendation of 9 April 2013 on the use of common methods to measure and communicate the life cycle environmental performance of products and organisations. Annex III: Organisation Environmental Footprint (OEF) Guide. Official Journal of the European Union, L 124, Volume 56, May 4th, 2013.

http://eur-lex.europa.eu/JOHtml.do?uri=OJ:L:2013:124:SOM:EN:HTML

European Commission, Joint Research Centre (JRC), Institute for Prospective Technological Studies (IPTS) (2013a). JRC Scientific and Policy Reports. Best Environmental Management Practice in the Retail Trade Sector. European Union, 2013.

ISO 14001 (2015). Environmental management systems – Requirements with guidance for use.

ISO 14040 (2006). Environmental management – Life cycle assessment – Principles and framework.

ISO 14044 (2006). Environmental management – Life cycle assessment – Requirements and guidelines.

ISO 14046 (2014). Environmental management – Water footprint – Principles, requirements and guidelines.

ISO/TS 14072 (2014). Environmental management – Life cycle assessment – Requirements and guidelines for organizational life cycle assessment.

OLCA (2015). Guidance on organizational life cycle assessment. UNEP-SETAC Life Cycle Initiative.

# 10. Annexes

## 10.1. Annex 1 – Data collection

The following document "OEFRetail_DataCollection_TEMPLATE_2018-03-22a.xlsx" may be used as a template for the data collection for foreground data.

## 10.2. Annex 2 - Default data for modelling the use stage

The following tables shall be used unless better data is available. The data provided is based on assumptions, except if specified otherwise.

**Table A1: Default assumptions for use stage.**

| Product | Use stage assumptions per product category |
|---|---|
| Meat, fish, eggs | Chilled storage. Cooking: 10 minutes in frying pan (75% on gas and 25% electricity), 5 grams sunflower oil (incl. its life cycle) per kg product. Dishwashing of frying pan. |
| Milk | Chilled storage, drunken cold in 200 ml glass (i.e., 5 glasses per L milk), incl. glass life cycle and dishwashing. |
| Pasta | Per kg pasta cooked in pot with 10 kg water, 10 min boiling (75% on gas and 25% electricity). Boiling phase: 0.18 kWh per kg of water, Cooking phase: 0.05 kWh per minute of cooking. |
| Frozen dishes | Frozen storage. Cooked in oven 15 minutes at 200°C (incl. a fraction of a stove, a fraction of a baking sheet). Baking sheet rinsing: 5 L water. |
| Roast and ground coffee | 7 g roast and ground coffee per cup<br>Filter coffee preparation in a filter coffee machine: machine production and end-of-life (1.2 kg, 4380 uses, with 2 cups/use), paper filter (2 g/use), electricity consumption (33 Wh/cup) and water consumption (120 ml/cup).<br>Machine rinsing/washing: 1 L cold water per use, 2 L hot water per 7 uses, decanter dishwashing (every 7 uses)<br>Cup (mug) production and end-of-life and dishwashing<br>Source: based on PEFCR Coffee (draft as of Feb 1, 2015) |

| | |
|---|---|
| Beer | Cooling (see next table), drunk in 33 cl glass (i.e., 3 glasses per L beer), glass production, end-of-life and dishwashing. For now: glass is excluded in the beer PEFCR. |
| Bottled water | Chilled storage. Storage duration: 1 day. 2.7 glasses per L water drunk, 250 gram glass production, end-of-life and dishwashing. |
| Pet food | Pet food dish production, end-of-life and dishwashing |
| Goldfish | Electricity and water use and treatment for the aquarium (43 kWh and 468 L per year). Goldfish feed production (1 g/day, assumed 50% fish meal, 50% soybean meal). Lifetime of the goldfish assumed to be 7.5 years. |
| T-shirt | Washing machine, tumble dryer use and ironing. 52 washing at 41 degree, 5.2 tumble drying (10%) and 30 times ironing per T-shirt.<br>Washing machine: 70 kg, 50% steel, 35% plastic, 5% glass, 5% aluminium, 4% copper, 1% electronics, 1560 cycles (=loads) within its lifetime. 179 kWh and 8700 L water for 220 cycles at 8 kg load (based on http://www.bosch-home.com/ch/fr/produits/laver-et-s%C3%A9cher/lave-linge/WAQ28320FF.html?source=browse) being 0.81 kWh and 39.5 L/cycle, as well as 70 ml laundry detergent/cycle.<br>Tumble dryer: 56 kg, same composition share and lifetime as for washing machine assumed. 2.07 kWh/cycle for 8 kg clothes load. |
| Paint | Paint brush production (see PEFCR of paints). |
| Cell phone | 2 kWh/year for the charge, 2 years lifetime. |
| Laundry detergent | Use of a washing machine (see T-shirt data for washing machine model). 70 ml laundry detergent assumed per cycle, i.e., 14 cycles per kg detergent. |
| Automotive oil | 10% losses during use assessed as hydrocarbons emissions to water. |

Default assumptions (always based on assumptions, except if specified otherwise):

**Table A2: Default assumptions to model.**

| Product | Assumptions common for several product categories |
|---|---|
| Ambient storage (at home) | Ambient storage at home is considered, for the sake of simplification, as having no impact. |
| Chilled storage (in a fridge, at home) | Storage time: product dependent. As default 7 days storage in fridge (ANIA and ADEME 2012).<br>Storage volume: assumed to be 3x the actual product volume<br>Energy consumption: 0.0037 kWh/L (i.e., "the storage volume") - day (ANIA and ADEME 2012).<br>Fridge production and end-of-life considered (assuming 15 years of lifetime). |
| Chilled storage (at the pub/restaurant) | The fridge at the pub is assumed to consume 1400 kWh/ yr (Heineken green cooling expert, 2015). 100% of this energy consumption is assumed to be for the cooling of beer. The throughput of the fridge is assumed to be 40hl/ yr. This means 0.035 kWh/ l for pub / supermarket cooling for the full storage time.<br>Fridge production and end-of-life considered (assuming 15 years of lifetime). |
| Frozen storage (in a freezer, at home) | Storage time: 30 days in freezer (based on ANIA and ADEME 2012).<br>Storage volume: assumed to be 2x the actual product volume.<br>Energy consumption: 0.0049 kWh/L (i.e., "the storage volume") - day (ANIA and ADEME 2012).<br>Freezer production and end-of-life considered (assuming 15 years of lifetime): assumed similar to fridge. |
| Fridge | Fridge size: assumed to 1 m3 (external volume, measured as a rectangular cuboid including space lost due to protuberances, for example to calculate its space use in a DC or in a truck during delivery) and with an internal storage space of 210 L.<br>Material composition: 20 kg iron, 1.5 kg aluminium, 7.8 kg compressor, 0.01 kg copper, 0.06 kg cables, 0.3 kg glass, 6 kg plastic, 1 kg oil, 4 kg insulating foam, 1.1 kg water, 0.04 kg pollutant (using mercury as proxy). Packaging is assumed to be made of 4 kg cardboard, 0.5 kg plastic film, along with a 50 g paper notice.<br>Fridge maintenance: assumed to be 12 washings per year (with 1 L water and 1 g soap for each washing).<br>Refrigerant gas: about 100 g R134a/fridge and 1% leakage (IPCC/TEAP 2005) (note that when the fridge is used as a proxy for cooling infrastructure in DCs and retailer, the refrigerant gas production and leakage should be removed to avoid |

| | |
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| | double counting with the values used directly in the modelling of DCs and retailer). |
| Cooking (at home) | Cooking: 1 kWh/h use (derived from consumptions for induction stove (0.588 kWh/h), ceramic stove (0.999 kWh/h) and electric stove (1.161 kWh/h) all from (ANIA and ADEME 2012).<br>Backing in oven: electricity considered: 1.23 kWh/h (ANIA and ADEME 2012). |
| Dishwashing (at home) | Dishwasher use: 15 L water, 10 g soap and 1.2 kWh per washing cycle (Kaenzig and Jolliet 2006).<br>Dishwasher production and end-of-life considered (assuming 1500 cycle per lifetime).<br>When dishwashing is done by hand, one assumes an equivalent of 0.5 L of water and 1 g of soap for the value above of 2.5% (with a scaling in terms of water use and soap, using the % above). The water is assumed to be warmed by natural gas, considering a delta T of 40 °C and an efficiency of energy from natural gas heating to water heat of 1/1.25 (meaning that to heat the 0.5 L of water one needs to use 1.25 * 0.5 * 4186 * 40 = 0.1 MJ of "Heat, natural gas, at boiler"). |
| Dishwasher | Material composition: 10 kg plastic, 20 kg steel, 15 kg aluminium, 3 kg electronic components, 0.1 kg printed wiring board. Packaging is assumed to be 10 kg cardboard and 2 kg plastic.<br>A fraction of a cycle is allocated depending on the dish size (assumptions):<br>○ 20% for a pot, a baking dish or a frying pan<br>○ 14.3% for a medium pan<br>○ 10% for a small pan or a vase<br>○ 5% for a drip filter decanter, a pet food dish or an ashtray<br>○ 3.3% for a bowl<br>○ 2.5% for a glass, a mug, a tea cup or a normal plate<br>○ 1.67% for a small plate or an espresso cup<br>○ 0.5% for each cutlery piece |
| Small equipment to be considered | Frying pan: 1 kg steel and 200 g plastic. Lifetime: 500 uses<br>Cooking pot: 1 kg steel and 100 g plastic. Lifetime: 1500 uses<br>Glass: 260 g glass. Lifetime: 365 uses<br>Baking sheet: 200 g steel. Lifetime: 780 uses<br>Cup: 260 g ceramic. Lifetime: 365 uses<br>Pet food dish: 200 g plastic. Lifetime: 3650 uses |

| | |
|---|---|
| | Polypropylene plastic bag for general trash: 6.7 g PP per kg of waste (35 g plastic for a 35 L bag, own measurement; average municipal solid waste density is 150 kg/m3)<br>Polypropylene plastic bag for recycled green waste and food waste: 2.5 g PP per kg of waste (35 g plastic for a 35 L bag, own measurement). The average green/food waste density is 400 kg/m3) |

## 10.3. Annex 3 - Default loss rates per type of product

Default loss rates per type of product during distribution and at consumer (including restaurant, etc.) (assumptions, unless specified otherwise). Out of simplification, the values for restaurant are considered the same as for consumer at home.

**Table A3: Default loss rates.**

| **Retail trade sector** | **Category** | **Loss rate (incl. broken products but not products returned to manufacturer) during distribution (overall consolidated value for transportation, storage and retail place)** | **Loss rate at consumer (including restaurant, etc.)** |
|---|---|---|---|
| Food | Fruits and vegetables | 10% (FAO 2011) | 19% (FAO 2011) |
| | Meat and meat alternatives | 4% (FAO 2011) | 11% (FAO 2011) |
| | Dairy products | 0.5% (FAO 2011) | 7% (FAO 2011) |
| | Grain products | 2% (FAO 2011) | 25% (FAO 2011) |
| | Oils and fats | 1% (FAO 2011) | 4% (FAO 2011) |
| | Prepared/processed meals (ambient) | 10% | 10% |
| | Prepared/processed meals (chilled) | 5% | 5% |

| | | | |
|---|---|---|---|
| | Prepared/processed meals (frozen) | 0.6% (primary data based on Picard – oral communication from Arnaud Brulaire) | 0.5% (primary data based on Picard – oral communication from Arnaud Brulaire) |
| | Confectionery | 5% | 2% |
| | Other foods | 1% | 2% |
| Beverages | Coffee and tea | 1% | 5% |
| | Alcoholic beverages | 1% | 5% |
| | Other beverages | 1% | 5% |
| Tobacco | | 0% | 0% |
| Pet food | | 5% | 5% |
| Live animals | | 0% | 0% |
| Clothing and textile | | 10% | 0% |
| Footwear and leather goods | | 0% | 0% |
| Personal accessories | Personal accessories | 0% | 0% |
| Home and professional supplies | Home hardware supplies | 1% | 0% |
| | Furniture, furnishings and decor | 0% | 0% |
| | Electrical household appliances | 1% | 0% |
| | Kitchen merchandise | 0% | 0% |
| | Information and communication equipment | 1% | 0% |
| | Office machinery and supplies | 1% | 0% |

| | | | |
|---|---|---|---|
| Cultural and recreational goods | Books, newspapers and paper/paper supplies | 1% | 0% |
| | Music and videos | 1% | 0% |
| | Sporting equipment and gadgets | 0% | 0% |
| | Other cultural and recreational goods | 1% | 0% |
| Healthcare | | 5% | 5% |
| Cleaning/hygiene products, cosmetics and toiletries | | 5% | 5% |
| Fuels, gases, lubricants and oils | | 1% | 0% |
| Batteries and power | | 0% | 0% |
| Plants and garden supplies | Flowers, plants and seeds | 10% | 0% |
| | Other garden supplies | 1% | 0% |
| Other goods | | 0% | 0% |
| Gas station | Gas station products | 1% | 0% |

Food losses at distribution centre, during transport and at retail place, and at home: assumed to be 50% trashed (i.e., incinerated and landfilled), 25% composting, 25% methanisation.

Product losses (excluding food losses) and packing/repacking/unpacking at distribution centre, during transport and at retail place: Assumed to be 100% recycled.

Other waste generated at distribution centre, during transport and at retailer (outside food and product losses) such as repacking/unpacking are assumed to follow the same end-of-life treatment as for home waste.

Liquid food wastes (as for instance milk) at consumer (including restaurant, etc.) are assumed to be poured in the sink and therefore treated in the wastewater treatment plant.

## 10.4. Annex 4 – List of EF normalisation and weighting factors

### 10.4.1. Normalisation factors for Environmental Footprint

Global normalisation factors are applied within the EF. The normalisation factors as the global impact per person are used in the EF calculations.

**Table A4: EF normalisation factors.**

| Impact category | Unit | Normalisation factor | Normalisation factor per person | Impact assessment robustness | Inventory coverage completeness | Inventory robustness | Comment |
|---|---|---|---|---|---|---|---|
| **Climate change** | kg $CO_{2\ eq}$ | 5.35E+13 | 7.76E+03 | I | II | I | |
| **Ozone depletion** | kg CFC-11 $_{eq}$ | 1.61E+08 | 2.34E-02 | I | III | II | |
| **Human toxicity, cancer** | CTUh | 2.66E+05 | 3.85E-05 | II/III | III | III | |
| **Human toxicity, non-cancer** | CTUh | 3.27E+06 | 4.75E-04 | II/III | III | III | |
| **Particulate matter** | disease incidence | 4.39E+06 | 6.37E-04 | I | I/II | I /II | NF calculation takes into account the emission height both in the emission inventory and in the impact assessment. |
| **Ionising radiation, human health** | kBq $U^{235}{}_{eq}$ | 2.91E+13 | 4.22E+03 | II | II | III | |
| **Photochemical ozone formation, human health** | kg NMVOC $_{eq}$ | 2.80E+11 | 4.06E+01 | II | III | I/II | |
| **Acidification** | mol $H+_{eq}$ | 3.83E+11 | 5.55E+01 | II | II | I/II | |
| **Eutrophication, terrestrial** | mol N $_{eq}$ | 1.22E+12 | 1.77E+02 | II | II | I/II | |
| **Eutrophication, freshwater** | kg P $_{eq}$ | 1.76E+10 | 2.55E+00 | II | II | III | |
| **Eutrophication, marine** | kg N $_{eq}$ | 1.95E+11 | 2.83E+01 | II | II | II/III | |
| **Land use** | pt | 9.20E+15 | 1.33E+06 | III | II | I I | The NF is built by means of |

| | | | | | | | |
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| | | | | | | | regionalised CFs. |
| **Ecotoxicity, freshwater** | CTUe | 8.15E+13 | 1.18E+04 | II/III | III | III | |
| **Water use** | $m^3$ world $_{eq}$ | 7.91E+13 | 1.15E+04 | III | I | II | The NF is built by means of regionalised CFs. |
| **Resource use, fossils** | MJ | 4.50E+14 | 6.53E+04 | III | I | II | |
| **Resource use, minerals and metals** | kg Sb $_{eq}$ | 3.99E+08 | 5.79E-02 | III | | | |

### 10.4.2. Weighting factors for Environmental Footprint

**Table A5: EF weighting factors.**

| | Aggregated weighting set | Robustness factors | Calculation | **Final weighting factors** |
|---|---|---|---|---|
| **WITHOUT TOX CATEGORIES** | (50:50) | (scale 1-0.1) | | |
| | A | B | C=A*B | C scaled to 100 |
| Climate change | 15.75 | 0.87 | 13.65 | **22.19** |
| Ozone depletion | 6.92 | 0.6 | 4.15 | **6.75** |
| Particulate matter | 6.77 | 0.87 | 5.87 | **9.54** |
| Ionizing radiation, human health | 7.07 | 0.47 | 3.3 | **5.37** |
| Photochemical ozone formation, human health | 5.88 | 0.53 | 3.14 | **5.1** |
| Acidification | 6.13 | 0.67 | 4.08 | **6.64** |
| Eutrophication, terrestrial | 3.61 | 0.67 | 2.4 | **3.91** |
| Eutrophication, freshwater | 3.88 | 0.47 | 1.81 | **2.95** |
| Eutrophication, marine | 3.59 | 0.53 | 1.92 | **3.12** |
| Land use | 11.1 | 0.47 | 5.18 | **8.42** |
| Water use | 11.89 | 0.47 | 5.55 | **9.03** |
| Resource use, fossils | 9.14 | 0.6 | 5.48 | **8.92** |
| Resource use, minerals and metals | 8.28 | 0.6 | 4.97 | **8.08** |

## 10.5. Annex 5 - Check-list for the OEF study

Each OEF study shall include this annex, completed with all the requested information.

**Table A6: Check-list for the OEF study.**

| ITEM | Included in the study (Y/N) | Section | Page |
|---|---|---|---|
| Summary | | | |
| General information about the product portfolio | | | |
| General information about the company | | | |
| Diagram with system boundary and indication of the processes according to DNM | | | |
| List and description of processes included in the system boundaries | | | |
| List of co-products, by-products and waste | | | |
| List of activity data used | | | |
| List of secondary datasets used | | | |
| Data gaps | | | |
| Assumptions | | | |
| Scope of the study | | | |
| (sub)category to which the organization belongs (if applicable) | | | |
| DQR calculation of each dataset | | | |

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| used for the most relevant processes and new ones created | | | |
| DQR (of each criteria and total) of the study | | | |

## 10.6. Annex 6 - Critical review report of the OEFSR

**Table A7: Comments and answers of the critical review.**

| Index of the comment | Reviewer name | Page | Chapter, sub-chapter | Paragraph, figure, table... | Comment, Including justification when needed | Type of the comment Ge. General Ed. Editorial Te. Technical | Suggestion of redaction, contribution | Follow up of the comment by the TS | Ok / not Ok by the reviewers | Follow up of the comment by the TS | Final closure |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Ugo Pretato | All | All | All | Several sections and paragraphs of the document shall be still finalized | Ed | Remove all grey texts, editing notes and yellow parts. See also other editorial comments in track changes made in the enclosed file OEFSR-Retail_DraftOEFSR_2016-10-04a_UP | Most inputs made in track change directly in the document have been considered (BTW - thanks a lot for them). Several grey text have been remobed. Editing notes are yet left as most of the are addressed to the Commission. They will be removed once the topics will have been treated by the Comission. | Ok | | |
| 2 | Jan Dörrich | General | General | General | In general the document is quite comprehensive and comprehensible. Nevertheless for a retailer who is already | Ge | - | Thanks for your input | Ok | | |

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| | | | | | familiar with the principles of LCA and footprint there is the question of the objective of such a document. In my opinion the purpose of this process has to be better highlighted at the beginning in some paragraphs. The outcome that products (for food retailers) have the highest overall impact is well known, also that e.g meat has the highest footprint. As for my part we did already many LCAs for products, logistics and packaging and with my knowledge I would rather focus on the reduction of the footprint of products. I talked to Hanna Schreiber the other day and understand the purpose of the paper now (holistic approach) but for other companies it should be more explicit what the benefit is when you do such an analysis.<br>This could be:<br>- Getting to know your hot spots in the life cycle better (actually only relevant for companies who have no/very few previous knowledge).<br>- Setting up accepted impact categories which are acknowledged on a broad basis.<br>A preferable objective "comparison with other companies of the same | | | | | | |

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| | | | | | branch" is in my point of view completly unrealisitc (at least for food retailers who offer some 20.000 articles and unless you don't have primary data of each article). There is not such a thing as a reference product for a category which can be used for an extrapolation. The variation within products is too high to make a serious prediction. | | | | | | |
| 3 | Ugo Pretato | 12 | 1 | L. 155-160 | The introduction chapter misses some elements required by the OEFSR template (Annex B of the OEF guidance), i.e. how the OEFSR shall be used for different OEF applications. | Ed | Add to the introduction a clear statement on how the OEFSR may, should or shall be used depending on in-house/external applications and whether comparisons and comparative assertions are allowed or not (see also comments 6 and 9). | This is described in the second paragraph of section 4.3 | Ok | | |
| 4 | Ugo Pretato | 13 | 3 | L. 200 | Besides the OEF guide and OEF pilot guidance, there are a number of issue papers on horizontal aspects that shall be followed where appropriate for the product or sector. A few of them are listed in the project information table (page 2) but a more | Ge | List all finalized issue papers applicable to these OEFSR and make sure appropriate reference to them is made throughout the document. As | This will be done at the end (in 2017) since most of the issue papers will - normally - be included in the final version of the PEF/OEF Gudiance. Therefore, a | Ok, to be double - checked in the final version 2017 | Done (reference to final guidance is done) | Accepted |

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| | | | | | comprehensive identification is needed | | a minimum the list should include the followings:<br>- biodiversity 2.3<br>- biogenic carbon 2.2<br>- electricity modelling 12<br>- use stage 5.1 | reference to the final Guidance should be enough. | | | |
| 5 | Jan Dörrich | 14 | 3.1 | 206 | Interesting that you include services in this study. For me retail and services are very different fields but I see the similarities. | Ge | Matter of definition, no further input needed | Noted | Ok | | |
| 6 | Ugo Pretato | 17 | 4.3 | L. 297-300 | The OEFSR are a bit ambiguous and contradicting regarding the possibility of comparison among retailers. 4.3 and 7.1.2 seems to allow external applications with comparisons, whereas in 7.1.7 p.28 it is said that "results obtained through the OEF Retail..are not intended to be used in the context of comparison". A clear position shall be expressed in the document. | Ge | Clarify the use of these OEFSR in the context of internal/external applications. Given the high variabilities in the product portfolios of the retail sector and the related uncertainties, the reviewer recommends to prevent any kind of comparisons/comparative assertions between retail companies based on the OEF results. OEF applications should be limited to in- | Noted.<br><br>There is a subtle political game going on here. Let see how this will evolve in 2017 and if we can make it more precise.<br><br>Can be discussed<br><br>A sentence was added in the benchmarking section about the issue of comparison/comparative assertion<br><br>Add reference to EMAS / CSR? | Ok for this initial clarification in the benchmarking section. To be further discussed in the final version 2017 | We made it clear through the sentence "Comparison with other organization having communicated their OEF is allowed but not comparative assertions." (added in the limitation) | Accepted |

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| | | | | | | | house hotspot analysis, performance tracking, external communicatio n without comparisons as well as to complement EMAS and other CSR reporting instruments. The role of OEF in bringing the value chain perspective to EMAS and CSR should be also emphasized and better developed in the OEFSR | | | | |
| 7 | Ugo Pretato | 17 | 4.4 and 11 | L. 305-306 and 1039-1042 | it is unclear why the OEFSR deviate from the OEF guidance about direct vs. indirect separation of activities. Chapter 7.1.4 actually defines system boundaries with a clear separation between Organisational and OEF boundaries | Te | Clarify the sentence | Two separate things:<br>i) Chater 7.1.4 does not - IMHO - clarifies the separation between Organization and OEF boundaries for retailer;<br>ii) the TS decided not to apply the OEF Guide distinction of direct vs indirect and we therefore simply state it clearly here. | Well, at least chapte r 7.1.4. says that the entire system of figure 2 corres ponds to OEF bound aries, while organi zationa l bound aries | | |

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| | | | | | | | | | are a subsystem identified via equity shhare or control approaches… anyway Ok. | | |
| 8 | Ugo Pretato | 18 | 6 | L 322-325 | The justification to not establish benchmark and performance classes is too generic | Ge | Provide more arguments in support of the impossibility to fix a benchmark. Explain the reasons why the virtual retailer of the screening study cannot be used as a benchmark | Noted. This is an OEFSR. The TS decided to have it focus on the rules and not adding too much text about the reasoning on how we came to those rules. The TS considers that the current justification is enough. | Ok | | |
| 9 | Emmanuelle Neyroumande | 18 | 7.1.1 | line 332 | It is contradictory to claim that "This OEFSR is not meant to be used as a basis for comparative assertions" and in line 297 to write: "while it is mandatory for external applications with comparisons" . This needs clarification. I agree with the recommendation though, it is better to avoid external communication with assertions. It is not possible to compare products footprint which | Ge | Clarify at the onset (e.g. 4.3. Reasoning for development of this OEFSR) what is allowed or not, and add what comparative assertion means. Also add that assertive comparison over time for the same | The sentence about comparison over time has been now added in the section 6.<br><br>It was decided with the TS and the Commission that this OEFSR is not meant for comparative assertion. However, | Ok | | Accepted |

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| | | | | | don't have a PEFCR, and Organisations which don't have the same scope. Yet it is possible to compare progress over time as proposed in the document Guidance_ Organizations_4.0, paragraph 3.15.2 OEF performance tracking report: "OEF communication may take the form of an OEF performance tracking report, which allows for the comparison of an OEF Profile of the same organisation over time with respect to its original or previous OEF Profile." | | Organisation is permitted | since it is not possible to forbid comparative assertions, then one prefers that someone doing a comparative assertion follows this OEFSR rather than not follow it. That is why both statements are included. The following statement was added in section 6 "This OEFSR is not meant to be used as a basis for comparative assertions (per the TS suggestion), however, shall someone want to do a comparison or comparative assertions between organizations, it is encouraged to use this OEFSR as a basis for calculation rather than not use it."<br><br>Note: This OEFSR is | | | |

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| | | | | | | | | about making calculation rules. The policy context in which this OEFSR can be used is beyond the scope of this OEFSR. | | | |
| 10 | Ugo Pretato | 21 | 7.1.3 | Bullet points list | The list should include some typical services, i.e. intangible products, as in Table 2 of the screening report., e.g. printing services, banking, real estate, car washing, car rental, etc. | Te | Replace the bulllet point "other" with relevant examples of services that may be provided by a retailer. | Accepted | Ok | | |
| 11 | Jan Dörrich | 21 | 7.1.3 | line 393 | Where are cleaning products included (detergents)? "cosmetic and toilet articles"? | Te | Add clarification | Accepted Added | Ok | | |
| 12 | Ugo Pretato | 22 | 7.1.3 | Approach to assess product portfolio, L. 420-425 | The reviewer feels that alternative methods based on I/O or hybrid approaches are not necessary in this case, as process based data are 1) sufficiently available for characterizing product portfolios, 2) of higher quality and able to meet DQR established for OEF studies and 3) more in line with the scope of an OEF study. | Te | Delete the option to use I/O or hybrid methods or provide stronger arguments in support of these methods | Accepted with modifications. Example added where I/O can be more practical (e.g. for services) | Ok | | |
| 13 | Ugo Pretato | 24 | 7.1.4 | Figure 2 | The system boundary diagram is very basic. While it is acknowledged that defining a detailed system boundary to cover all kind of retailers is not feasible, at least some examples of typical processes should be displayed. In | Ge | i) Expand system boundary diagrams to encompass key processes within the Organisational and OEF boundaries. | i) This is provided in section 7.2.5 ii) Accepted | Ok | | |

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| | | | | | addition, two different diagrams are required for Organisational and OEF boundaries. | | ii) As additional suggestion, the life cycle stage "production and service provision" could be renamed to "product portfolio production" to better capture the upstream scope of the activities therein covered. | | | | |
| 14 | Jan Dörrich | 24 | 7.1.4 | line 493 | "The “control” approach is preferred to the “equity share” approach because it is better suited to environmental performance measurement and management, as explicitly recognised in existing guidance documents such as ISO 14069 and the GHG Protocol."<br>You talk about the control approach but want to include the whole LC as system boundary. As a retailer we have no or very little influence on some stages. Actually the objective of the report is to include all processes, no matter if we have control of them or not (at least when it comes to products). This should be clear in "Defining the system boundaries". | Ge | Add clarification | I see the missundersta nding. We do want to include the full LC of products and services, but only for those products and services which are captured by the "control" approach (e.g. if your food company owns 5% share in L'Oreal, if you define your system based on the control approach, you will exclude the products of L'Oreal from your system; however, if | Ok | | |

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| | | | | | | | | you use the equity share approach, then you will habe to include 5% of the L'Oreal product portfolio; whatever the system considered to identify which products are part of your system, you will have to include the full LC of your products considered). This was clarified (attempted) | | | |
| 15 | Ugo Pretato | 25 | 7.1.5.1 | Biodiversity L. 517-522 | Since an OEF study requires consideration on environmental impacts at facility level, the reviewer believes that also site interactions with biodiversity should be addressed in the OEFSR. For instance, any retail places, factories or warehouses closeby protected areas or areas with high biodiversity value should assess their potential impacts on biodiversity and report them under additional environmental information. | Ge | Add biodiversity assessment at site level, at least on any protected area near the site or any critical species with habitats potentially affected by retail operations, e.g. IUCN Red List species or national conservation lists. See for suggestions the GRI G4 guidelines, indicators | Though this could be interesting, considering the complexity of an OEF and the already difficulty to achieve a compliance to all requirements, it was decided to focus the biodiversity assessment on the product portfolio (which was shown to be largely dominant in the screening as compared | Ok | | |

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| | | | | | | | EN11 to EN14. | to the facility level). However, to consider this input, a comment is added in the additional information. | | | |
| 16 | Ugo Pretato | 26-27 and 50-52 | 7.1.5.2.1, 7.1.5.2.2 and Annex V. | General | The entire section on normalization is a bit confused. It is unclear whether the two approaches are alternative or not. Moreover, the combined method in 7.1.5.2.2 considers a damage approach with an assessment at endpoint level which is not supported by the general PEF-OEF methodology. In any case, additional impact assessment methods shall be justified with rationale and background information. In defining the most relevant impact categories, one should also consider communication criteria, e.g. including humantox in the list may not be appropriate in case the OEF results are meant for external communication. | Ge | Clarify which is the established approach to normalization. In case alternative approaches are also recommended, provide robust justifications for their selection. Depending on the OEF application, consider communication criteria in the definition of most relevant impact categories. | This section will be revisited once the final decision at the TAB/SC/JRC/EC level will be done on the updated list of impact categories and normalization/weighting scheme to be made PEF/OEF mandatory in PEF/OEF version 2. Indeed, shall the new normalization/weighting scheme proposed by JRC (and supported by the TAB/SC) be satisfactory, we can simplify section 7.1.5.2 by simply refering to the official approach. | To be further reviewed in the final version 2017 | We finally simply apply the normalization and weighting approach recommended by the PEF/OEF | Accepted |

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| 17 | Jan Dörrich | 26 | 7.1.5.2.1 | line 531 | "Identification of the most relevant impact categories for a retailer" - This paragraph sounds a little abstract. Maybe it is possible to give some reference for relevant impact categories for the most important sectors. | Ge | Add clarification | Same issue as above. We will revisit this paragraph once the new approach for impact categories / normalization / weighting will be available. TO BE REVISITED | Ok | | |
| 18 | Emmanuelle Neyroumande | 27 | 7.1.6 | line 559 | Better to follow the common PEF language and keep the title "Additional Environmental Information", especially as now biodiversity proxy have been added. Also, the Guidance document for Organizations 4.0 recommends "All the background information concerning the rationale for the selection the additional environmental information shall be provided in Annex XI to the OEFSR." This means that additional (environmental) information can be added. For biodiversity it shall be added whenever a proxy exists as in comment 22 | Ed | Replace title "Additional Information" by "Additional Environmental Information". Potentially add rationale in Annex XI | The reason to rename this section is that this section does not only address additional environmental information but also additional information that are not about impact categories. The alternative would be to create two sections: once for additonal environmental information and one for additional information that are not environmental. Then we could group them under once section that is "additional | Ok to keep as is | | Accepted |

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| | | | | | | | | information", whcih is in fact this section. | | | |
| 19 | Emmanuelle Neyroumande | 27 | 7.1.6 | line 560 | It is not the case that "No additional environmental information shall be reported systematically in this section." since biodiversity proxy has been added line 513-516, which is highly supported by the reviewer. These changes will also need to be reflected under the interpretation and communication paragraphs | Ed | Replace sentence "No additional environmental information shall be reported systematically in this section" by "At minima, the retailer shall report the fraction (mass based and value based, on an annual basis) of its product portfolio that is following a responsible sourcing from a biodiversity perspective (e.g. certified organic or other responsible sourcing program). This information shall be reported in additional information section." | Accepted. Section rephrased | Partially OK: the sentence added before the text "Additional information can be reported in this section. For example,..." leaves a doubt about the compulsary nature of the reporting. Suggest to delet and start directly with "Biodiversity is a releva | Thanks. Actually, on our TS meeting on Nov 15, 2016, we agreed to remove that sentence "Additional information can be reported in this section. For example,..." . So now we are more aligned with your suggestion | Accepted |

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| 20 | Ugo Pretato | 27 | 7.1.6 | L. 566-568 | The results expressed in different references or indexes shall not be reported under additional environmental information. Here for example biodiversity impacts should be reported. | Ed | Move this information elsewhere, e.g. to 7.1.2. Add other examples of possible metrics, e.g. results per revenue, per n. of employees, etc. | See explanation above. This section is indeed not only about environmental information but about all types of additional information (envronmental or not environmental ).<br><br>Suggestion of additional reference acepted and added | Ok | | |
| 21 | Ugo Pretato | from 27 to 31 | 7.1.7, 7.2.1, 7.2.2 | General | The overall description of data gaps, data quality requirements and foreground data collection needs improvement:<br>- the procedure for applying the Datasets Needs Matrix (DNM) and for defining the DQR for the different situations and options is not described,<br>- rules for calculating DQR of newly created datasets or for re- | Ge | Review these sections focusing on providing clear and more schematic rules and requirements. The reviewer recommends NOT to follow the DNM approach, but to apply the classic OEF | ok, thanks for the suggestion. This section will be revisited once the discussion about DQR / DNM will have ripened a bit based on the experience of simpler pilots (since our pilot is more | To be further reviewed in the final version 2017 | The new draft has been aligned with the new template. If you see anything that can be improved, please do not hesitate to let us know | Accepted, but see further aspects in new comment 46 |

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| | | | | | calculating DQR of existing secondary datasets are not specified.<br>- in general, all these sections on data collections and DQR provide little requirements but rather suggestions or general indications that look overall vague and not completely useful to guide the OEF applicants. | | guide requirements, as allowed by the pilot phase rules (see FAQ section of the EC wiki, chapter 4).<br>The DNM approach looks more suitable for PEF applications and for increasing unbiasedness and transparency in case of comparisons or even comparative assertions. If the goals of these OEFSR do not include comparisons among different retail companies, the DNM approach is not essential.<br>In case the TS prefers to adopt the DNM approach anyway, the procedure, the application rules and the different situations and options with the related DQR | on the complex side). TO BE REVISITED (preference of reviewer for the orginal approach - a bit more simple for such a complex pilot) | | | |

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| | | | | | | | calculations shall be systematically explained. | | | | |
| 22 | Emmanuelle Neyroumande | 28 | 7.2 | line 600 | Modular approach is clear but there are inconsistencies with the data collection template. It misses information potentially in the system boundary like the end of life (line 500: "e.g. a retailer collecting back and treating the packaging of its sold products would have part of the end-of-life stage under its control") . Also, the data collection under "support" is lacking the details which are needed , as mentioned in line 870 "For each of these services, if primary data is available on the building, energy consumption, IT equipment, transports that are related to these activities, these data shall be considered for the modelling. If no such data exist, the expenses may be considered and Input/Output databases may be used to assess the impacts related to these expenses (as shown in Annex I). " So primary data is still the preferred option. Finally, further primary data for the marketing of the retailer is missing, like flyers and catalogues which have a significant footprint. It is somewhat | Te | Align better data collection template with text requirements. e.g. add a tab "end of life" to consider closed loop systems. Add under the tab "support" primary data collection on the building, energy consumption, IT equipment, transports related to support activities. Add also the paper use for marketing purposes (flyers, catalogue), printing and distribution.Why not also include "green areas" as described under "other modelling issues" in 7.2.5.9? | Accepted<br>'- green area and parkinga added in the different tabs<br>'- Material for marketing added in the support (but by desire of trying to keep it simply, the other list is not added - but can always be added under "others")<br>'- Take back system info added in the RETAIL place TAB | Partially ok. Sentence added under Support: "Material (specify) for marking purpose" not clear enough + typo. Suggest to rephrase similar to the "OTHERS" line: "Material for marketing purpose ( paper for catalogues,..etc) (PLEASE SPECIFY)" and | Ok. XLS file modified as suggested | Accepted |

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| | | | | | mentioned in line 772 "Tele-commerce indicates any sale that is conducted through catalogues and telephones " but not assessed. | | | | indeed mass (usually Kg) is a good proxy. To be further discussed in the final version 2017 | | |
| 23 | Ugo Pretato | 31 | 7.2.3 and Annex III | L. 681-686 | It is acknowledged that the final OEFSR will have to refer to the official secondary datasets provided by the Commission. However it is likely they will not be sufficient to cover all data needs of the retail sector. This section therefore should provide complementary information. | Ge | Make sure the final version lists all the secondary datasets acquired by the Commission. Provide complementary background datasets to be used for processes not covered by the Commission's list. ADDITIONAL NOTE: In the reviewer's opinion, the list of background datasets of interest for the retail sector shall include all "representative product" datasets of the PEFCR of the pilot | Accepted with modifications. Indeed, this section will be revisited once the PEF/OEF LCI DB will be available. For the moment, the text of this section was improved / completed to go in the direction suggested by the reviewer. TO BE REVISITED | To be further reviewed in the final version 2017 | Since the OEF of a retail can potentially use all datasets of the commission, we decided not to list the datasets but simply to refer to the link where the datasets can be found (Table 4) | Accepted |

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| | | | | | | | phase: Such datasets should be primarily used to characterize the product portfolio production, but also where relevant the use and end-of-life of the sold products, if the latter are included in the OEF boundaries. The RP datasets should be hence fully referenced and accompanied by the DQR calculation at the level of each individual DQR parameter. | | | | |
| 24 | Ugo Pretato | 32 | 7.2.4 | L. 699-700 | "Allocation..should be based on a case by case analysis" is a vague and generic statement that should be avoided because OEFSRs shall provide clear rules. | Ed | Remove this statement. The allocation rules to be applied in factories are anyway described in the subsequent lines. | Accepted with modifications | Ok | | |
| 25 | Ugo Pretato | 33-34 | 7.2.5.1 | L. 733-737 | The secondary data hierarchy for out-of-house products should be the following: | Te | Modify the text accordingly | Accepted with modifications. "PEF method" has been clarified | Ok | | |

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| | | | | | 1) Representative products datasets of existing PEFCR,<br>2) Other datasets within the list provided by the Commission, if available<br>3) Other datasets outside the list, but meeting the established DQR values (e.g. <3.0 for most relevant processes, < 4.0 for other processes)<br><br>Unclear also what is the "PEF method" mentioned at line 735 | | | | | | |
| 26 | Ugo Pretato | 34-38 | 7.2.5 and subhe adings | Gener al | The procedure for modellling primary data collection shall apply the electricity modelling rules identified in the related issue paper released in January 2016 v.12. This is especially important for activities under the control of the retail company, e.g. situations 1 and 2 of the DNM | Te | Add a reference to the issue paper for modelling electricity use horizontally across the OEF boundaries. Specify rules for on site electricity generation | Accepted with modifications By refering to the Guidance, this requirement will be implicitely made since all issue papers will be reported in the Guidance. A sentence was explicitely added for the electricty that should follow the Guidance for the modeling. | Ok | | |
| 27 | Ugo Pretato | 34-38 | 7.2.5 and subhe adings | Gener al | The OEFSR lack rules for modelling capital goods, especially in activities under the control of the retail company (logistics, retail place). The template in Annex II requires data colllection for e.g. buildings but no explanations are given | Te | Add modelling rules for capital goods, especially for items and activities that are significant within the Organisational or OEF boundaries. | Accepted with modifications (and put in section 7.2.5.9) | Ok | | |

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| | | | | | about the attribution of impacts to the unit of analysis | | The reviewer recommends to use a linear approach based on a fixed service life (e.g. 50 y for buildings, 10 y for furniture, 4 y for PC/laptops). For instance, this means the manufacturing impacts of a 55-years building do not contribute anymore to the OEF. In this way consistency is ensured between OEF applications over time, e.g. for performance tracking purposes. | | | | |
| 28 | Emmanuelle Neyroumande | 35 | 7.2.5.3 | 772 | Printing as a service under 790 does not cover Flyers and catalogues. Add printing of catalogues and flyers for tele-commerce and shop retailers here or under "marketing" in "support" | Te | Add printing of catalogues and flyers for tele-commerce and shop retailers in 7.2.5.3 or under "marketing" in 7.2.5.7 "support activity". Adjust with comment 22 accordingly. | Accepted | see comment 22 | | Accepted |

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| 29 | Ugo Pretato | 38 | 7.2.5.5. | L.852-857 | Some clarifications look necessary for the use stage modelling:<br>- the reference to default data in Annex I is unclear, as these seem more related to distribution and EoL;<br>- in case specific PEFCR are not available, the main guidance to be followed should be the issue paper on use stage modelling;<br>- OEFSR should give guidance on modelling use phase for items in the product portfolio not addressed in the issue paper, e.g. white goods, furniture, recreational goods, car services, etc. For these products, the OEFSR should specify which options allowed by the issue paper are selected for the use phase modelling, for instance on classifying product-dependent and product-independent processes, applying delta approaches and other aspects. | Te | Expand the paragraph and add modelling rules for a broader range of products | - Annex I includes the use stage modeling<br>'- It is specifically writen tha the issue paper on use stage should be used in priority: so I am confused about the comment<br><br>'- About providing more guidance on how to model the use stage, we did so in the use stage Annex / paper. However, this is what we consider already what we should do since at the end it should be an information available in default secondary datasets (e.g. we should not only have default secondary datasets on the production of fridges but also on the use of fridge, same for | Ok. The last point to be further discussed once the default secondary datasets will be available and to be further reviewed in the final OEFSR version 2017 | About the last point, we still consider that it is not part of the OEF retail to provide guidance about the modelling of the use stage of all products in the world but more an information that should be available in the Commission official list of datasets. What we did is to provide some guidance (and this was taken by the commission to be included in the official new OEF Guidance). | Accepted |

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| | | | | | | | | Tshirt, etc.). We consider that what we did in Annex I is a good compromise. | | | |
| 30 | Ugo Pretato | 41 | 7.2.5.6 | Table 1 | Unclear description of EoL scenario for commercial spaces rented. The table refers to the EoL of a building which is a rather different concept. | Te | Clarify what is meant in the scope of "commercial space rented" and describe a proper EoL scenario | Accepted. Clarification added | Ok | | |
| 31 | Ugo Pretato | 41 | 7.2.5.7 | L. 880-886 | The use of I/O data for modelling support activities should be not recommended because not in line with the scope of OEF studies (see also comment 12) | Ge | It is recommended to delete references to I/O data. If not, provide default I/O datasets to characterize the impact of support activities. | Not accepted. For services, I/O may be better than process based LCI | Ok, but in this case default I/O datasets or data sources shall be provided. To be further discussed in the final version 2017 | Since the OEF is not about comparative assertion but mainly about learning about its own footprint, we consider that using up-to.date data may be more appropriate than using prescriptive data. So we prefer to refer to I/O data in general but without specifying which one. We still suggest to use the US EIOLCA DB but without specifying the version. | Accepted, since support activities are not environmentally relevant for the whole system |

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| 32 | Ugo Pretato | 42 | 7.2.5.9 | L. 894-896 | The sentence "the elementary flow representing best the type of green area shall be selected in the LCA model" is unclear. | Te | Provide the list of elementary flows representative of possible green areas. The list should be incorporated in the data collection template of Annex II | The list depends on the LCI DB used / software used (maybe all will have the same list once we will all use the PEF LCIA). So making a list is actually not practical (e.g. if JRC releases an updated version of the PEF LCIA CF that include a more complete / corrected list of EF for land use, then the OEFSR Retail draft would become obsolete).<br>I added in the data collection template as well as in the OEFSR that green areas and parking areas are land occupation but may also be land transformation. | Ok | | |
| 33 | Ugo Pretato | 43 | 7.3 | General | This chapter is useless. OEFSR should not refer to specific software or commercial tools | Ge | Remove the content | Not accepted. See note that explain why we suggest to have this section added. | Ok, understood | | |

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| 34 | Emmanuelle Neyroumande | 42 | 7.4.2 | 911 | This paragraph refers to chapter 7.1.5.2 “Evaluation of the most relevant impact categories”. Yet both exercises are not the same. In particular, the methodology regarding hotspot and most relevant life cycle stages, which are to inform the communication phase, are missing. In the Guidance-organisations-4.0, it says "A hotspot can be identified at different levels of granularity: impact category, life cycle stage, process or elementary flow" and also"Additional hotspots may be identified by the TS" , which refers to additional environmental information. | Ge | Clearly separate selection of the relevant impact categories for the analysis from those identified as most relevant during the interpretation phase. Potentially move para under 7.1.5.2 and lines 921 - 923 ("The concept of most relevant impact categories and most relevant stages can be done for the overall organisation results as well as for the parts under direct control of the organisation or even for those parts that are part of a specific business unit.") under 7.4.2 to make a coehrent paragraph. Add text around most relevant hotspot and life cycle stage | Accepted with modification. This section 7.4.2 is about the most relevant impact categories. I added another section about the hotspots and most relevant impact categories, saying that these should be assessed for the most relevant impact categories but also considering the two indicators about % of products from responsible sourcing and % of products that are environmentally friendly that are reported under additional information. | Partially ok. It is fine to add those points in a separate section on hotspot and most relevant life cycle stages, but the wording should refer to the impact measured and not to the proxy (as impact categories don't focus on the methodology either). In this context, the fraction of “environmentally | We have aligned the document with the template of the new Guidance and hotspot analysis. | There is no section on hotspots anymore?<br><br>ANSWER FROM THE TS: Yes, the hotspots have been evaluated in the remodeling phase and used to identify the most relevant impact categories and processes which are reported in the OEFSR draft (e.g. Table 7 for the most relevant processes).<br><br>. |

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| | | | | | | | identification. Integrate biodiversity as relevant hotspot. | | friendly ” products is not a proxy of an impact and should be removed. Finally, hotspot and life cycle stage identification is to be done overall, not per impact category. I thus suggest the following phrasing under 7.4.3 "The hotspots and most relevant life cycle stages should be identified based | | Accepted |

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| | | | | | | | | | on the impact categories identified as “most relevant” as well as considering the information (if reported in additional information) on "biodiversity" "<br>To be further discussed in the final version 2017 | | |
| 35 | Ugo Pretato | 44 | 7.5 | General | The whole chapter on interpretation is a bit vague and littlle developed. The following elements should be added or expanded:<br>- indications on how to perform hotspot analysis and identification of relevant impact contributions (see also previous comment 34), | Ge | Expand the content as suggested | Noted.<br>Link to EMAS / CSR has been discussed and it was decided not to enter in that in this OEFSR.<br>Other suggestion to be discussed | To be further reviewed in the final version 2017 | No significant change. We can live with the current document. | Accepted |

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| | | | | | - a list of most common uncertainties in the retail sector and indications for their assessment,<br>- additional examples of possible metrics and links to EMAS and CSR tools | | | | | | |
| 36 | Emmanuelle Neyroumande | 43 | 7.5 | 930-932 | "The retailer may also assess (and report) the fraction of "environmentally friendly" products within the different product categories of the product portfolio. Such information, if reported, shall be reported under the section for additional information." This sentence belongs rather under additional (environmental) information paragraph 7.1.6 . Also, insure coherence with the biodiversity proxy " responsible sourcing from a biodiversity perspective (e.g. certified organic or other responsible sourcing program). " | Te | Move sentence to 7.1.6, specify difference/complementarity with biodiversity proxy | So these are two different things: what is mandatory to report is the % of products that is from a responsible source. Now, it is a different thing if a product has a lower footprint than the bendhmark of that product category.<br>I completed the text of this section (and under additional information) to try to clarify this | Ok | | Accepted |
| 37 | Ugo Pretato | 44-46 | 8 and subheadings | General | The whole section on reporting and communication is still to be developed. | Ge | Add information and requirements on reporting and communication, including findings from communication tests performed by Carrefour, Colruyt and Decathlon | To be revisited once we are finished with the communication testing. | To be further reviewed in the final version 2017 | The document is aligned with the template in the new version of the Guidance. | Accepted |

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| 38 | Emmanuelle Neyroumande | 45 | 8.3 | General | The modular approach of the life cycle stages should also serve as reference for the communication phase. It is not clear that Carrefour did it. Also,as consumers are already aware of labels regarding biodiversity, it is recommended to add additional environmental information with the biodiversity proxy in communication vehicules. Indeed, it is possible as per Guidance_organizations_4.0 "D.2 Communication-related requirements: "It is subject to the Technical Secretariat to identify whether additional requirements are required and if so these shall be drafted within the PEFCR." | Te | Encourage communication per life cycle stage, as per the data collection template. Add biodiversity proxy as part of the communication vehicules testing and/or recommendations. | Accepted Added in section 8 | Ok | | Accepted |
| 39 | Ugo Pretato | 47 | 9 | General | The whole section on verification is still to be developed. | Ge | Add verification requirements based on the indications of OEF guide and differentiating between different OEF applications | To be revisited once we are finished with the verification testing. | To be further reviewed in the final version 2017 | The document is aligned with the template in the new version of the Guidance. | Accepted |
| 40 | Ugo Pretato | 47 | 10 | General | The reference list is incomplete | Ed | Add key ISO standards mentioned throughout the document (e.g. ISO 14001, 14040-44, 14072), the | Accepted | Ok | | |

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| | | | | | | | ENVIFOOD protocol and other relevant literature | | | | |
| 41 | Ugo Pretato | 48 | Annex II | Data collection template | The data collection template, although very helpful, shows the following areas of improvement:<br>- the list of mandatory substances or elementary flows in the foreground system is not developed, e.g. there are sections for reporting air or water emissions but without a default list of mandatory substances;<br>- the terminology is sometimes not in line with the ILCD nomenclature rules (e.g. there are generic electricity or natural gas input flows, generic water use flow etc.)<br>- secondary datasets to complement primary activity data are missing | Te | Improve the template as suggested | Thak you for the suggestion.<br>The list of datasets / EF to be revisited once we know the exact PEF LCI DB / LCIA.<br>However, it is already pretty big, so additional input may start to "scare" users?<br>To be discussed on what the priorities are. | To be further discussed and reviewed in the final version 2017 | We decided not to list secondary datasets since in fact an OEF of a retail can potentially use the full list of EC datasets. However, the list of datasets used in the remodeling has been specified in the following document (OEFSR-Retail_SecondaryDatasets_2017-12-22.xlsx) | Accepted, but see further aspects in new comments 46- 47 |
| 42 | Jan Dörrich | 48 | Annex II | Data collection template | Data collection sheet (support): Why are the following infos needed?<br>- Amount spent for marketing<br>- Amount spent for legal accounting<br>- Amount spent for legal affairs | Ge | Add clarification | Accepted. Explanation added.<br>This is to model the impacts of services where the only thing we know is the amount of money spent | Ok | | |
| 43 | Ugo Pretato | 49 | Annex IV | L. 1067-1077 | The last paragraphs on LCA tools and software providers are outside the scope of the OEFSR | Ed | Delete paragraphs | Not accepted Several new assessors got confused on the connection between the | Ok, understood | | |

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| | | | | | | | | rules / PEF data (LCI and LCIA) and the actual modeling. This section aims at clarifying this. | | | |
| 44 | Ugo Pretato | 53 | Annex VI | General | The screening study presentation should be expanded | Ge | Add to Annex VI at least the following information:<br>- executive summary of the screening study,<br>- impact assessment and normalized results of the representative virtual organization (after the remodelling exercize)<br>In addition make sure that the full screening report will be available with the OEFSR | Not accepted These information are already present in the screening study report. In order to reduce the amount of text it was deemed not useful to repeat text between documents. | Ok, as long as the screening report remains publicly available. | | |
| 45 | Ugo Pretato | 61 | Annex VII | 12.7.3 | The executive summary of Decathlon supporting study is missing | Ge | Add main findings and recommendations for OEFSR from Decathlon study | We will add it once available | To be further reviewed in the final version 2017 | Supporting studies have been removed based on the template of the new Guidance. | Accepted |

New comments (on the doc "OEFSR-Retail_DraftOEFSR_2018-01-19a.docx")

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| 46 | Ugo Pretato | 41 | 4 | table 3 | The list of most relevant processes in table 3 seems incomplete. The most relevant impact | Te | Add missing processes | Accepted. The most relevant processes are | Ok | | |

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| | | | | | categories declared in the OEFSR include also particulate matter, eutrophication and land use, therefore the relevant processes contributing to such IC should be documented in table 3 | | | only for the core stages of the retailer (i.e. excluding the production, use and end-of-life). This is now clarified in the draft. | | | |
| 47 | Ugo Pretato | 44 | 5.1 | general | The list of mandatory company-specific data required for the OEF has only the amount of product groups sold annually in the product portfolio. What about the other processes found relevant for the impact categories (e.g. electricity consumption at the retail place, transportation, etc.)? Moreover, no foreground elementary flows are required under 5.1, although some of them may affect some relevant impact categories (e.g. refrigerants losses or water emissions). These elementary flows should be also clearly identified in the data collection template, i.e. the substances of interest should be pre-defined in the template | Te | Explain and if necessary add items to the list of mandatory company data | Accepted. It was a misunderstanding of the template. The processes you ask for were into section 5.2. I have now brought them back to section 5.1. | Ok | | |
| 48 | Emmanuelle Neyroumande | 65 | 5.10 | general | As I already highlighted in the Intermediate Paper draft PEFCR, this description of carbon flow omits to take into account below-ground biomass carbon flows in land-use. It is not explicitly mentined under "land- | Te | Precise in line 1348, "other soil activities (incl. soil carbon emissions)", that land-use covers agriculture and forestry | Noted. This section is a direct copy-paste from the Guidance document and is not meant to be modified. I suggest to | Not accepted. Tthe missing carbon flow (below- | Accepted. Limitation added // Finally removed as the Commission did not accept this limitation | |

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| | | | | | transformation", but is probably encompassed in "all emissions". Below-ground biomass can be as or even more important than above ground biomass. By omitting to take this into account in land-use it creates a bias. It would be important to detail the land-use flows, besides soil-carbon, especially as cimate-smart agriculture and forestry are developping | | practices, and add below-ground biomass emissions next to "soil carbon emissions". If, forsome reson, adding this is not possible, then add a pragraph mentioning that this is a gap, and add it as voluntary reporting under additionnal environmental information. | bring this comment directly to the European Commission. | ground biomass emission in land-use) should at least be mentioned as such, in order to clealry set the limitation of the methodology. The Intermediate Paper PEFCR has mentioned this limitation. | | |
| 49 | Emmanuelle Neyroumande | 92 | 8.1 | General | There is no means proposed to verify allegations on "product portfolio that is following a responsible sourcing from a biodiversity perspective", if it is not reported in the communication vehicle | Te | In order to ensure that calculation regarding % of certified products (biodiversity proxy) is accurate, if it is not 100% verified as a part of the communication vehicule claim, verifiers | Accepted. This requirement has been added in the verification chapter. | OK | | |

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| | | | | | | | should check at least a sample of invoices of certified products, and verify that there is a chain of custody in place, if relevant. | | | | |

--END—