Product Environmental Footprint Category Rules (PEFCRs)

Prepared Pet Food for Cats and Dogs

Updated DRAFT for use in the supporting studies

8 March 2016

*Prepared by the **Technical Secretariat**:*

*The European Pet Food Industry Federation **(FEDIAF), C&D Foods**, the French Pet Food Association for Dogs, Cats, Birds and Other Domestic Pets (**FACCO**, Chambre Syndicale des Fabricants d'Aliments pour Chiens, Chats, Oiseaux et autres Animaux Familiers), **Mars PetCare Europe**, **Nestlé Purina PetCare Europe**, **saturn petcare gmbh**, and **Quantis***

PROJECT INFORMATION	
Project Title	Product Environmental Footprint Category Rules (PEFCRs): Prepared pet food for cats and dogs
Leading organisation	The European Pet Food Industry Federation (FEDIAF)
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Quantis Project team	Angela Adams, Project Manager and Life Cycle Analyst (angela.adams@quantis-intl.com), **main contact** Xavier Bengoa, Interim Project Manager (xavier.bengoa@quantis-intl.com) Xun Liao, Senior Analyst (xun.liao@quantis-intl.com) Carole Dubois, Business Leader Single Market for Green Products (SMGP) (carole.dubois@quantis-intl.com) Sébastien Humbert, Life Cycle Assessment Expert, quality control (sebastien.humbert@quantis-intl.com)
Technical Secretariat	C&D Foods: Clare McEnroe, Gert-Jan Krom and Yves Gaudouen FACCO: Hélène Dugué FEDIAF: Julien Taïeb Mars PetCare Europe: Imme Deecke Nestlé Purina PetCare Europe: Pascale Bensman saturn petcare gmbh: Ariane Wehrmaker Quantis: Angela Adams, Xavier Bengoa, Xun Liao, Carole Dubois and Sébastien Humbert
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This report has been prepared by:

Quantis Switzerland

Innovation Park EPFL, Bât. D
CH – 1015 Lausanne
Switzerland
Tel: +41 21 693 91 92
E-mail: info@quantis-intl.com
Web: www.quantis-intl.com

Executive Summary

Through its initiative, “Building the Single Market for Green Products”, the European Commission aims to harmonize the communication of environmental performances of products and organisations for producers and consumers alike. Member States and the private sector are encouraged to test two life cycle assessment (LCA)-based methods developed by the European Commission's Joint Research Centre (JRC) to measure the environmental performance of products and organisations throughout their life cycles known as the Product Environmental Footprint (PEF) and the Organisation Environmental Footprint (OEF), respectively.

The European Commission launched a three-year pilot testing period for both the non-food and food sectors through a multi-stakeholder process to develop product-specific rules, Product Environmental Footprint Category Rules (PEFCRs), and organisation-specific rules, Organisation Environmental Footprint Sector Rules (OEFSRs), as well as to test communication vehicles for a few specific sectors and products.

In May 2014, the European Commission approved the pilot project to develop PEFCRs for prepared pet food for cats and dogs. The Technical Secretariat (TS) charged with developing the PEFCRs is composed of the following organisations: FEDIAF, C&D Foods, FACCO, Mars PetCare Europe, Nestlé Purina PetCare Europe, saturn petcare gmbh and Quantis.

The product category for this PEFCR is prepared pet food for cats and dogs which includes the full life cycle (cradle to grave) for complete meals for cats and dogs sold in any market for the following four sub-categories: wet cat food, dry cat food, wet dog food and dry dog food. Thus, four screening studies were conducted for each of these products that also serve as the virtual representative products for this PEFCR. Hotspots and relevant impact categories were determined for each sub-category as part of the screening study.

The system boundaries that will be considered include the following life cycle stages: ingredients, packaging production, pet food manufacturing, distribution, use and packaging end-of-life. The bills of materials (BOMs) and packaging splits used for each representative product were determined based on primary data from pet food manufacturers and from European market statistics.

This PEFCR provides detailed guidance on the use of primary and secondary data, data quality requirements, allocation rules, as well as which impact categories shall be included when assessing a PEF of pet food for cats and dogs.

The PEFCR shall enable comparative assessment of different products from the same sub-category. The use of the present PEFCR is optional for PEF guide in-house applications; it is recommended for external applications without comparison/comparative assertions; and it is mandatory for external applications with comparisons/comparative assertions.

66 # Acronyms and abbreviations

B2B	business to business
B2C	business to consumer
BOM	bill of material
CO_2	carbon dioxide
CPA	Classification of Products by Activity
DC	distribution centre
EF	Environmental Footprint
ELCD	European reference Life Cycle Database
EOL	end of life
FACCO	Chambre Syndicale des Fabricants d'Aliments pour Chiens, Chats, Oiseaux et autres Animaux Familiers (the French Pet Food Association for Dogs, Cats, Birds and Other Domestic Pets)
FEDIAF	European Pet Food Industry Federation
g	gram
ILCD	International Reference Life Cycle Data System
ISO	International Organization for Standardization
JRC	Joint Research Centre
kcal	kilocalories
kg	kilogram
km	kilometre
LCA	Life Cycle Assessment
LCI	Life Cycle Inventory
NACE	Nomenclature statistique des activités économiques dans la Communauté européenne
OEF	Organisation Environmental Footprint
OEFSRs	Organisation Environmental Footprint Sector Rules
PCRs	Product Category Rules
PEF	Product Environmental Footprint
PEFCRs	Product Environmental Footprint Category Rules
SMGP	Single Market for Green Products
t	tonne (1'000 g)
tkm	tonne kilometre
TS	Technical Secretariat

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Glossary

This glossary defines key terms used in this PEFCR. Many of the terms are based on the PEF Guide (European Commission, 2013) unless otherwise noted. For further clarifications, please refer to the PEF Guide.

Activity data	This term refers to information that is associated with input or output processes while modelling life cycle inventories. In the PEF guidelines, these data are also called "non-elementary flows". Activity data are multiplied by an LCI to derive the environmental footprint associated with a process or an operation. Examples of activity data include amount of wheat used, kilowatt-hours of electricity used, distance travelled, etc. (Galatola and James, 2015)
Background system	This term refers to those processes in the product life cycle for which no direct access to specific information is possible. The background process is outside the direct influence of the producer or service operator of the analysed system/product (Galatola and James, 2015)
Cradle to grave	An assessment, including raw material extraction, processing, distribution, storage, use, and disposal or recycling stages. All relevant inputs and outputs are considered for all of the stages of the life cycle.
Downstream	Occurring along a product supply chain after the point of referral.
Dry pet food	Pet food with a moisture content of 14% or less (long-standing industry definition)
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 (Galatola and James, 2015)
Foreground system	This term refers to those processes in the product life cycle for which direct access to specific information is available. For example, the producer's site and other processes operated by the producer or its contractors (e.g. goods transport, head-office services, etc.) belong to the foreground processes (Galatola and James, 2015)
Input	Product, material or energy flow that enters a unit process. Products and materials include raw materials, intermediate products and co-products. (International Organisation for Standardization (ISO) 14040:2006)
Life cycle	Consecutive and interlinked stages of a product system, from raw material acquisition or generation from natural resources to final disposal. (ISO 14040:2006)
Life cycle approach	Takes into consideration the spectrum of resource flows and environmental interventions associated with a product or organisation from a supply chain perspective, including all stages from raw material acquisition through processing, distribution, use, and end-of-life processes, and all relevant related environmental impacts (instead of focusing on a single issue).
Life cycle assessment	Compilation and evaluation of the inputs, outputs and the potential environmental impacts of a product system throughout its life cycle. (ISO 14040:2006)

Life cycle inventory dataset	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 could be a unit process dataset or an aggregated dataset (also called system process).
Metabolizable Energy (ME)	Metabolizable energy is the digestible energy minus the energy lost in urine and fermentable gases (NRC 2006).
Output	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)
Primary data	Data from specific process within the supply-chain of the company applying the PEFCR. Such data may take the form of activity data, or LCI dataset. Primary data are site-specific or producer specific (if multiple sites for a same product). Primary data may be obtained through meter readings, purchase records, utility bills, engineering models, direct monitoring, mass balance, stoichiometry, or other methods for obtaining data from specific processes in the value chain of the company applying the PEFCR. Also called "specific data" (Galatola and James, 2015)
Primary packaging	Material that immediately covers the product. For example, primary packaging can consist either of a can, a lid and a label. Note that some consider the label to be secondary packaging.
Representative product	The “representative product” may or may not be a real product that one can buy on the EU market. Especially when the market is made up of different technologies, the “representative product” can be a virtual (non-existing) product built, for example, from the average EU sales-weighted characteristics of all technologies around. A PEFCR may include more than one representative product if appropriate.
Secondary data	Data not from specific process within the supply-chain of the company applying the PEFCR. This refers to data that is not directly collected, measured, or estimated, but rather sourced from a third-party life-cycle-inventory database or other sources. Secondary data includes industry-average data (e.g., from published databases, government statistics, literature studies, and industry associations), financial data, proxy data, and other generic data. Primary data that go through a modelling or aggregation step are considered as secondary data.
Secondary packaging	Packaging or containment of a primary package. Packaging for multipacks and their labels are also considered to be secondary packaging.
System boundary	Definition of aspects included or excluded from the study. For example, for a “cradle-to-grave” EF analysis, the system boundary should include all activities from the extraction of raw materials through the processing, distribution, storage, use, and disposal or recycling stages.
System boundary diagram	Graphic representation of the system boundary defined for the PEF study.
Tertiary packaging	Packaging conceived so as to facilitate handling and transport of a number of sales units or grouped packaging in order to prevent physical handling and transport damage.
Unit of analysis	The unit of analysis defines the qualitative and quantitative aspects of the function(s) and/or service(s) provided by the product being evaluated; the

	unit of analysis definition answers the questions “what?”, “how much?”, “how well?”, and “for how long?”
Upstream	Occurring along the supply chain of purchased goods/services prior to entering the system boundary.
Wet pet food	Pet food with a moisture content of 60% or more.

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187 ## How to read this document

188 This draft document includes different types of information:

189 • Notes addressed to the reader are presented in orange boxes, as shown below:

Note	This document is based on the template provided in "Guidance for the implementation of the EU Product Environmental Footprint (PEF) during the Environmental Footprint (EF) Pilot Phase. Version 4.0." (European Commission, 2014). Please take into account that, at this stage of the project, the aim is to develop draft PEFCRs. This is the reason why some sections of the template are currently empty.

190

191 Original text included in the template provided by the European Commission is in grey, as shown
192 below (European Commission, 2014):

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

196

197 Recommendations provided in the PEF Guide (European Commission, 2013) or the Guidance for the
198 Implementation of the EU PEF during the EF Pilot Phase (European Commission, 2014) are presented
199 in purple boxes, as shown below:

According to the European Commission (2014):

The PEF screening is necessary because it helps focussing data collection activities and data quality priorities for the PEFCR supporting study. The screening shall be carried out by the Technical Secretariat based on the "representative product".

The objective of the screening is to pre-identify the following key information:

- Most relevant life cycle stages;
- Most relevant processes;
- Preliminary indication about the most relevant life cycle impact categories;
- Data quality needs;
- Preliminary indication about the definition of the benchmark for the product category/sub-categories in scope.

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1. Introduction

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

This PEFCR shall be used in parallel with the PEF Guide. Where the requirements in this PEFCR are in line with but at the same time more specific than those of the PEF Guide, such specific requirements shall be fulfilled.

The use of the present PEFCR is optional for PEF guide in-house applications, it is recommended for external applications without comparison/comparative assertions, while it is mandatory for external applications with comparisons/comparative assertions.

2. General information about the PEFCR

2.1. Technical Secretariat

The technical secretariat (TS) responsible for the development of the PEFCRs for prepared pet food for cats and dogs is composed of the following organisations and representatives:

1. FEDIAF (Coordinator): Julien Taïeb
2. C&D Foods: Clare McEnroe, Gert-Jan Krom and Yves Gaudouen
3. FACCO: Hélène Dugué
4. Mars PetCare Europe: Imme Deecke
5. Nestlé Purina PetCare Europe: Pascale Bensman
6. saturn petcare gmbh: Ariane Wehrmaker
7. Quantis: Angela Adams, Xavier Bengoa, Xun Liao, Carole Dubois and Sébastien Humbert

The TS was also supported by the following two members of the FEDIAF Environmental Sustainability Task Force: Lautaro Cintolesi (Nestlé Purina Petcare Europe) and Christian Schünemann (Royal Canin).

2.2. Consultation and stakeholders

The development of this PEFCR can be followed on the dedicated page for the PEFCR for prepared pet food for cats and dogs through this main page:

- https://webgate.ec.europa.eu/fpfis/wikis/display/EUENVFP/

The process of developing PEFCRs is open and transparent for all stakeholders which may include, but are not limited to, material suppliers, manufacturers, trade associations, purchasers, users, consumers, government representatives, non-governmental organizations (NGOs), public agencies and, when relevant, independent parties and certification bodies (European Commission, 2014).

Stakeholders are invited to participate in the PEFCR development via a virtual consultation process through the EF virtual consultation Forum. Stakeholder comments are accepted for a 30-day period after each consultation is launched and all comments will be addressed publically via this Forum.

Additionally, stakeholders are encouraged to participate in two public physical meetings throughout the pilot testing period: one at the beginning of the PEFCR process (mainly to discuss the PEFCR scope) and one at the end of the process (mainly to discuss the final PEFCR).

Figures regarding the number of participants for each consultation and the number of registered stakeholders for this pilot are provided in Table 1 below.

Table 1 Consultations and stakeholders

Item	Dates	Number of participants	Number of stakeholders
First virtual consultation	9 October – 7 November 2014	1	25
First physical consultation	24 October 2014	11	25
Second virtual consultation	24 July – 21 August 2015	3	70

Note	Additional statistics will be added to this table at a later date.

2.3. Date of publication and expiration

Version number: Draft version for use in the supporting studies

Date of publication/revision: 8 March 2016

Date of expiration: N/A

2.4. Geographic region

This PEFCR, while prepared using European data where available, could be applied globally.

2.5. Languages of the PEFCRs

This PEFCR has been written in English. It is not foreseen to make this document available in other languages. However, should others translate the document and should there be any discrepancy between different translations of these PEFCRs, the English version prevails over all other versions.

3. Methodological inputs and compliance

The PEFCR has been prepared in conformance with the following documents:

- 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. Also called as "Product Environmental Footprint (PEF) Guide";
- European Commission (2014). Environmental Footprint Pilot Guidance document. Guidance for the implementation of the EU Product Environmental Footprint (PEF) during the Environmental Footprint (EF) Pilot Phase, v. 4.0, May 2014. Also called as "PEF Guidance (2014)"
- JRC (2015). Baseline Approaches for the Cross-Cutting Issues of the Cattle Related Product Environmental Footprint Pilots in the Context of the Pilot Phase 2013-2016. European Commission, Joint Research Centre, Institute for Environment and Sustainability, Sustainability Assessment Unit

The TS identified several existing guidance documents and other useful publications which are summarized in Appendix A.

4. PEFCR review and background information

4.1. PEFCR review panel

[Provide the name, contact information and affiliation of the chair and the other members of the review panel]

4.2. Review requirements for the PEFCR document

The critical review is essential to ensure that the PEFCR:

- Is consistent with the guidance provided in the PEF Guide and the PEFCR guidance (version 4.0);
- Is written in a format that can be understood and used by anyone with a technical background without any experience in environmental footprinting to conduct a PEF study;
- Complements the PEF guide requirements with additional requirements specific to the particularities of the life cycle for pet food for cats and dogs;
- Provides guidance to conduct a compliant PEF study and clearly specifies the most relevant impact categories and additional environmental information for pet foods;
- Enables comparisons and comparative assertions in all cases when it is considered feasible, relevant and appropriate.

4.3. Reasoning for development of PEFCR

The current PEFCR aims to provide detailed instructions on how to evaluate the environmental impacts of prepared pet food for cats and dogs sold in Europe, applying a harmonised approach, in order to obtain comparable results.

4.4. Conformance with the PEFCR Guidance

The first draft PEFCR has been prepared in conformance with the "Guidance for the Implementation of the EU PEF during the Environmental Footprint (EF) pilot phase - Version 4.0".

Note	To be completed after the review.

5. PEFCR scope

The product category for this PEFCR is prepared pet food for cats and dogs which is defined as follows:

- **Complete prepared pet food, either wet or dry in its respective packaging, intended for oral feeding of cats and dogs without any additional production steps**

The full life cycle (cradle to grave) for complete pet food, wet or dry, sold in any market for cats and dogs are within the scope of this PEFCR. Additionally, this PEFCR could also be used to assess partial life cycle impacts of products included in this category.

Per EU Regulation No 767/2009, complete pet food is considered to be pet food that, by reason of its composition, is sufficient for a daily ration.

While the scope of this PEFCR is relatively narrow, the main function of the product is to provide complete meals to satisfy the daily nutritional requirements of a cat or dog, but alternative technologies (production of wet and dry pet foods) delivering the same function are available. Thus, four different sub-categories are included in this PEFCR: wet cat food, dry cat food, wet dog food and dry dog food. Four screening studies were conducted and benchmarks for each sub-category will be established as shown in Figure 1 below.

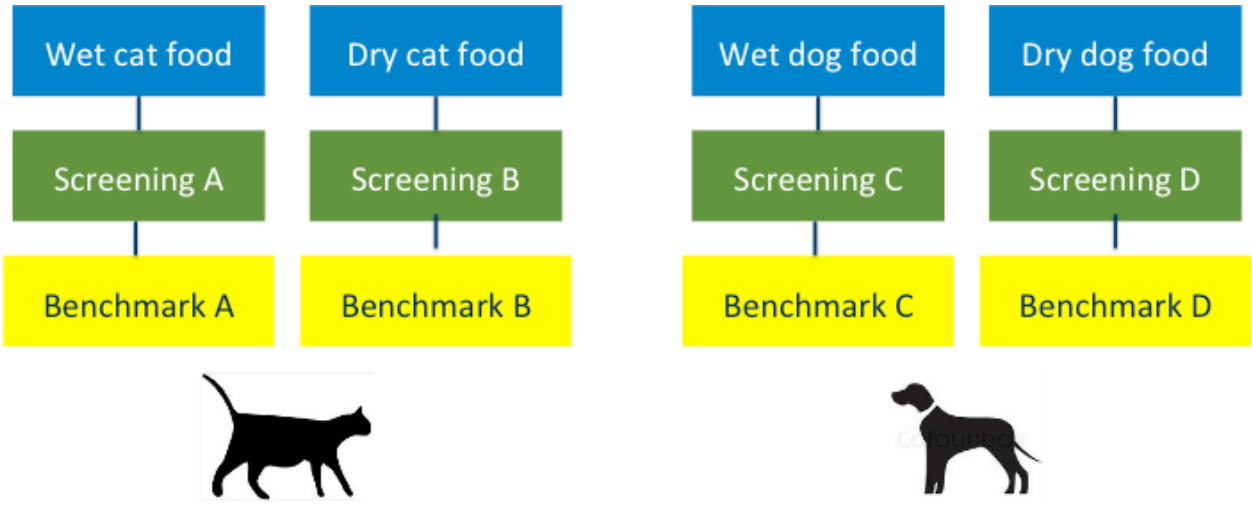

Figure 1 Sub-categories for prepared pet food for cats and dogs

The PEFCRs shall enable comparative assessment of different products from the same sub-category. The PEFCRs shall not serve comparisons of products from different sub-categories.

Based on sales data for the mass of pet food sold in France, Germany and the UK, the split for cat food is 60% dry and 40% wet and the split for dog food is 82% dry and 18% wet (Nielsen, 2014). These three

markets were selected because together they account for more than 55% of the European market and collectively, all package sizes and formats of complete pet food for cats and dogs sold in the European market are accounted for.

5.1. Unit of analysis

Key aspects regarding "what?", "how much?", "how well?", and "for how long?" used to define the function provided by prepared pet food and thus to determine the unit of analysis are summarized in Table 2 below.

Table 2 Key aspects to determine the unit of analysis

Product	Aspect detail	Pet food PEFCR
What?	Function provided	Prepared pet food for cats and dogs
How much?	Magnitude of the function	Daily ration
How long?	Duration of the product provided	1 day
How well?	Expected level of quality	To meet the daily nutritional requirements of an average cat or dog

The reason for choosing daily rations over a fixed mass when answering "how much?" is that it better integrates the function of pet food: a daily ration considers the average nutritional density of the product and the daily recommended energy intake for an average cat and dog, thus allowing for fair comparisons between products of the same sub-category.

While there are many possible answers to the question "how well?", this PEFCR only considers meeting the daily nutritional requirements of an average cat or dog and does not consider palatability or other such considerations. The reason why a consumer may choose a wet product over a dry product or vice-versa is not necessarily related to feeding their pet its daily nutritional requirements. Wet food may be preferred by certain pets or necessary for certain pets that are not able to chew dry food easily. For these PEFCRs, only one main function can be selected. Thus, for the complete life cycle of prepared pet food for cats and dogs, the following unit of analysis will be considered for this PEFCR:

- **Serving the recommended daily intake in kilocalories (kcal ME) ("daily ration") of prepared pet food to a cat or dog.**

The reference flow is measured in grams (g) per day per pet to satisfy the unit of analysis and is detailed in Table 3 below.

The reference flows for each product category were calculated using daily energy requirements of cats and dogs (secondary data) and considering average product energy densities (secondary data) for both wet and dry varieties of pet food. However, when the energy density of a product is available (primary data) and determined in accordance with the latest version of FEDIAF's Nutritional Guidelines for Complete and Complementary Pet Food for Cats and Dogs (kcal ME), this data shall be used to calculate the reference flows.

In Table 3 below, daily energy requirements were calculated in accordance with FEDIAF's Nutritional Guidelines for Complete and Complementary Pet Food for Cats and Dogs (2014) and based on average pet weights (secondary data).

Table 3 Reference flows

	Cat	Dog
Formula	100 [kcal] x cat weight$^{0.67}$ [kg]	110 [kcal] x dog weight$^{0.75}$ [kg]
Average pet weight *	4 kg	15 kg
Daily energy requirements (calculation)	253 kcal ME	838 kcal ME
Dry product reference flows (3'800 kcal ME/kg)**	67 g/day	221 g/day
Wet product reference flows (950 kcal ME/kg)**	266 g/day	883 g/day

* Secondary data

** Primary data or by default secondary data as stated

5.2. Representative products

For this PEFCR, four virtual representative products are proposed based on two different technologies: one for wet pet food and one for dry pet food for both a cat and a dog as shown in Table 4 below.

Table 4 Representative products considered

Pet	Food type	Representative product
Cat	Wet	Average wet cat food sold in Europe
	Dry	Average dry cat food sold in Europe
Dog	Wet	Average wet dog food sold in Europe
	Dry	Average dry dog food sold in Europe

The reason for this split is that dogs and cats cannot be compared and comparisons will only be made between products of the same sub-category. Note that while there is no significant difference in the inventory considered for a dry cat food and a dry dog food in these PEFCRs, they are separated nonetheless due to the differences in the reference flow for each representative product to satisfy the unit of analysis (i.e., an average cat requires much fewer calories than an average dog in one day).

An average recipe (or BOM) for each type of pet food was determined based on primary data received from pet food manufacturers that are members of the TS to ensure that all common ingredients are included despite the quantity actually used in each product. Thus, all four representative products are virtual products.

All packaging options for each representative product were considered and the packaging split for each representative product will be based on sales data for the mass of pet food sold in France, Germany and the UK (Nielsen, 2014) which were converted to total kcal sold using the average nutritional densities of dry and wet products approved by FEDIAF (FEDIAF, 2014a).

The package size for each representative product is based on the most popular package size in terms of mass sold for each sub-category of pet food based on the Nielsen market data (Nielsen, 2014).

The following packaging types will be considered for each of the four representative products:

- Wet cat food: plastic pouch, metal can and aluminium tray
- Dry cat food: plastic bag, paper bag and carton box
- Wet dog food: plastic pouch, metal can, aluminium tray and sausage (sausage-shaped plastic tube)
- Dry dog food: plastic bag, paper bag and carton box

Details for the packaging considered for each of the four representative products are shown in Table 5 below.

Table 5 Packaging based on market share considered for each of the four representative products

Specification	Cat		Dog	
	Wet	Dry	Wet	Dry
Product weight (g)	400	2'000	400	8'000
Plastic bag/pouch	43%	73%	1%	89%
Paper bag	--	4%	--	5%
Carton box	--	23%	--	6%

Specification	Cat		Dog	
	Wet	Dry	Wet	Dry
Metal can	46%	--	77%	--
Aluminium tray	11%	--	20%	--
Sausage	--	--	2%	--

Thus, as an example, the representative product packaging for the wet cat food sub-category will be a mix of a plastic pouch, metal can and aluminium tray and it will contain 400 g of wet cat food as shown in Figure 2 below. The product weight for each representative product was determined based on the most commonly sold package size based on mass for each category per the Nielsen market data.

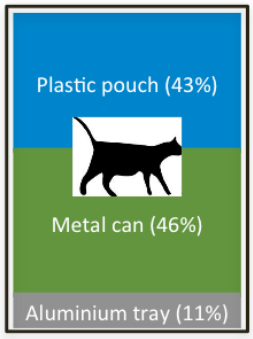

Figure 2 Representative product packaging for wet cat food

A detailed description of the representative products and underlying data are provided in Annex I - Screening report.

5.3. Product classification (CPA)

The corresponding Classification of Products by Activity (CPA) for prepared pet food for cats and dogs is shown in Figure 3 below.

Figure 3 CPA Section C and its divisions

This PEFCR covers prepared pet food for cats and dogs, as defined by the CPA code C10.92.1 Prepared pet foods.

5.4. System boundaries, life cycle stages and processes

The entire life cycle (from cradle to grave) of prepared pet food for cats and dogs is included in the system boundaries as shown in Figure 4 below.

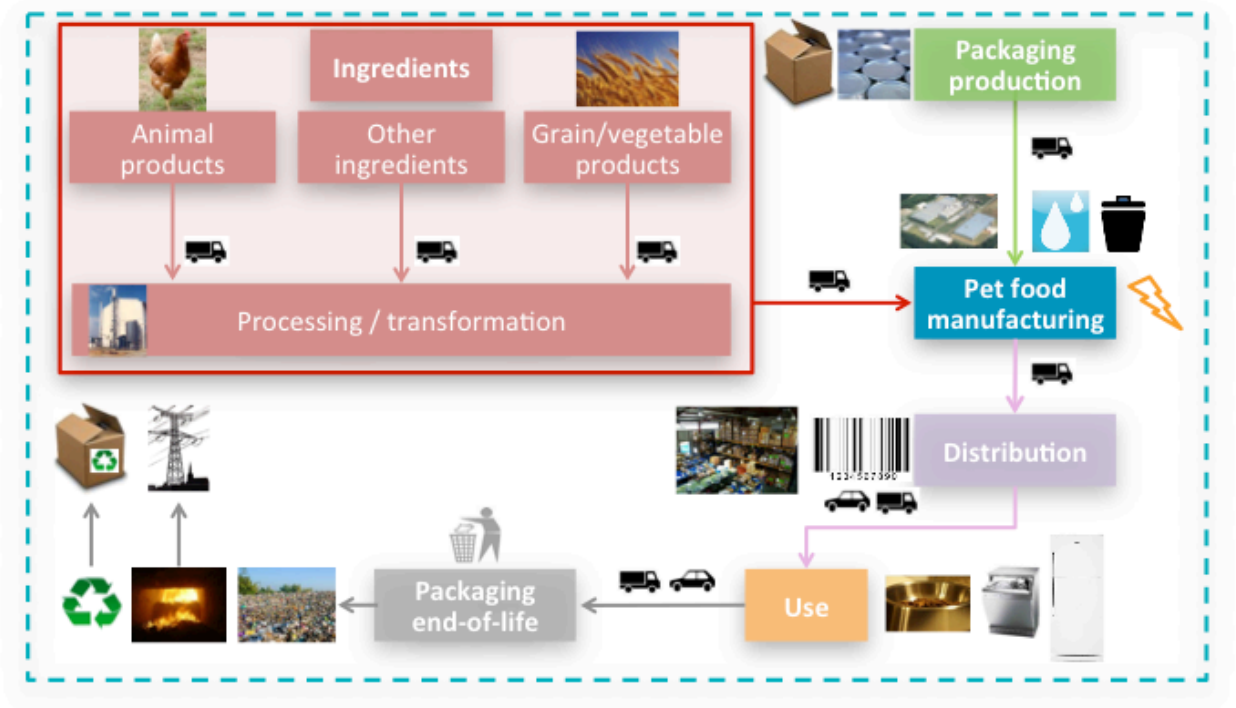

Figure 4 System boundaries for the screening study

The following life cycle stages are included: ingredients, packaging production, pet food manufacturing, distribution, use and packaging end-of-life.

The main processes for each life cycle stage that are considered in the data collection for the life cycle inventory (LCI) are detailed in Figure 5 below:

Figure 5 Details on each life cycle stage considered

The organizational boundary with respect to pet food manufacturers is shown in Figure 5 above to highlight which activities are under the organization's control. The coloured boxes indicate which processes are considered to be part of the background system and the white box indicates the processes that are considered to be part of the foreground system. The ingredients and packaging production stages are considered to be upstream processes whereas the distribution, use and packaging end-of-life stages are considered to be downstream processes.

Within each of these stages, the LCA considers all identifiable "upstream" inputs to provide a comprehensive view of the product system. For example, transportation does not only include the operation (fuel consumption and tail pipe emissions), but also upstream processes such as fuel production, truck production as well as maintenance and road construction. In this way, the production chains of all inputs are traced back to the original extraction of raw materials.

Note that infrastructure is included in all stages.

However in the PEF context, the foreground and background systems shall be defined in relation to the so-called "materiality approach" which considers:

- the relevance of the processes/stages driving the environmental impact, and
- the level of influence that the company performing the PEF study has on them.

The outcome of this approach for pet food manufacturers is summarized in Table 6 below:

Table 6 Application of the "materiality approach" for pet foods

Life cycle stage	Level of influence	Relevance to impact	Foreground/Background
Ingredients	Medium	High	Foreground/background
Packaging production	Low/medium	Low for dry pet foods and high for wet pet foods	Foreground/background
Manufacturing	High	Low	Foreground/background
Distribution	Low	Medium/high	Foreground/background
Use	Low	Low for dry pet foods and medium for wet pet foods	Background
Packaging end-of-life	Low	Low	Background

Different stakeholders using the current PEFCRs may have different levels of influence on each life cycle stage, and should therefore adapt their foreground and background systems accordingly.

5.5. Selection of the EF impact category indicators

The 15 EF impact categories that shall be used (European Commission, 2013) as well as the corresponding impact assessment models, sources and classifications are provided in Table 7 below:

Table 7 List of impact categories and related assessment methods used

Impact category	Model	Unit	Source	Classi-fication
Climate change	Bern model – Global Warming potentials (GWP) over a 100 year time horizon	kg CO_2 eq	Intergovernmental Panel on Climate Change, 2007	I
Ozone depletion	EDIP model based on the ODPs of the WMO over an infinite time horizon	kg CFC-11 eq	WMO, 1999	I
Freshwater ecotoxicity	USETox model	CTUe	Rosenbaum et al., 2008	II/III
Human toxicity –	USETox model	CTUh	Rosenbaum et al.,	II/III

Impact category	Model	Unit	Source	Classi-fication
cancer effects			2008	
Human toxicity – non-cancer effects	USETox model	CTUh	Rosenbaum et al., 2008	II/III
Particulate matter	RiskPoll model	kg PM2.5 eq	Humbert, 2009	I
Ionising radiation	Human Health effect model	kg U^{235} eq	Dreicer et al., 1995	II
Photochemical ozone formation	LOTOS-EUROS model	kg NMVOC eq	van Zelm et al., 2008	II
Acidification	Accumulated Exceedance model	mol H+ eq	Seppälä et al., 2006; Posch et al., 2008	II
Terrestrial eutrophication	Accumulated Exceedance model	mol N eq	Seppälä et al., 2006; Posch et al., 2008	II
Freshwater eutrophication	EUTREND model	kg P eq	Struijs et al., 2009	II
Marine eutrophication	EUTREND model	kg N eq	Struijs et al., 2009	II
Land use	Soil Organic matter (SOM) model	kg C deficit	Milà i Canals et al., 2007	III
Water resource depletion	Swiss Ecoscarcity model	m^3 water eq	Frischknecht et al., 2008	III
Mineral and fossil resource depletion	CML 2002 model	kg Sb eq	van Oers et al., 2002	II

The three classification levels are based on the ILCD Handbook "Recommendations for Life Cycle Impact Assessment in the European context" (JRC, 2011) and according to their quality:

- Level I: recommended and satisfactory
- Level II: recommended, but in need of some improvements
- Level III: recommended, but to be applied with caution

In conformity with the proposition made by at the TAB meeting on 24-25 February 2015, the selection of the most relevant impact categories was not entirely based on the normalised impact results, but on expert evaluation from the Technical Secretariat. This approach closely follows the recommendations in the ENVIFOOD Protocol. Elements considered for this assessment include the following:

- Relevance for the pet food sector (i.e., important in calculations)
- Sufficient level of robustness in the life cycle inventory
- Sufficient level of robustness in the characterization model (Hauschild et al., 2012)
- Normalization factor uncertainty (European Commission, 2014)
- Reliability of impact categories

- Correlation with already selected impact categories

As a preliminary list, the most relevant life cycle impact categories identified are as follows:

- Climate change
- Freshwater eutrophication
- Marine eutrophication
- Terrestrial eutrophication
- Land use
- Water resource depletion
- Mineral and fossil energy depletion

The rationale for the selection of these impact categories is provided in Table 8 below.

Table 8 Rationale for selecting the most relevant impact categories for complete prepared pet food for cats and dogs

Impact category	Rationale
Climate change	Because pet food uses meat co-products and beef in particular, greenhouse gas emissions from cattle (feed production, enteric fermentation and manure) are a recognized environmental issue worldwide. This is among the best known and most reliable impact categories for which key elementary flows are commonly measured or documented and the pet food sector can influence the impacts.
Freshwater eutrophication	Impacts for this impact category are related to both electricity consumption (electricity is consumed in many background systems) and phosphate emissions and are robust. The pet food industry can influence these impacts, which are not negligible for pet food.
Marine eutrophication	Use of N fertilizers (organic or mineral) for feed production is a well-known environmental issue in the agricultural sector. Proper management of nitrogen flows is also an important lever for farmers to improve their sustainability record. The pet food industry has some level of influence on these impacts, which are not negligible for pet food.
Terrestrial eutrophication	Animal products are responsible for most of the impacts for this indicator; the impacts are due to ammonia and nitrogen oxides emissions directly by animals (manure management) or in relation to the energy consumption (fossil fuel combustion). The pet food industry can influence these impacts, which are not negligible for pet food.
Land use	Pet food is made of a mixture of meats, grains and vegetables and thus plays a role in the competition for arable land, through feed, vegetable and grain production as well as grazing areas. Pet food companies can influence land use through the sourcing of the ingredients used.
Water resource depletion	Pet food is made of a mixture of meats, grains and vegetables, which all require water and thus plays a role in the competition for water. Pet food companies can influence water resource use through the sourcing of the ingredients used, the use of water for wet pet foods and their manufacturing processes.

Impact category	Rationale
Mineral and fossil energy depletion	Wet pet food packaging requires the use of steel, tin and aluminium, which have significant impacts on this impact category. The pet food industry has some leverage on the types and sizes of packaging it uses.

5.6. Additional environmental information

Practitioners should report additional environmental information as described in the European Commission (2013) (PEF Guide). Additional environmental information should include the following (non-exhaustive list):

- Bills of material;
- Recyclability, recoverability, reusability information, resource efficiency for packaging;
- Information on the disposal of hazardous/non-hazardous waste;
- Information on energy consumption;
- Information on local/site-specific impacts, e.g. local impacts on acidification, eutrophication and biodiversity;
- Other relevant environmental information on the activities and/or sites involved, as well as on the product output;
- Information regarding the company work with social/environmental responsibility but also data about specific environmental characteristics of the product may be added;
- Sustainability programs for pet food or ingredients/energy/packaging, etc., percentage that follows this sustainability program. (e.g. percentage of cardboard that is from a certified source or from sustainable fisheries). In case the information is unknown, it shall be stated as such and considered as zero by default; and
- Information on deforestation.

5.7. Assumptions/limitations

Prepared pet food for cats and dogs not listed in Section 5.3 is not part of the scope of this PEFCR. However, as long as no specific PEFCR is addressing them, companies desiring to assess the PEF of their products are invited to align as much as possible with this PEFCR.

The results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks. This disclaimer shall be put in any PEF/OEF assessment report.

European Commission disclaimer for the screening studies

Within the Environmental Footprint (EF) pilot phase normalisation and equal weighting were foreseen to be used in the EF screenings to identify the most relevant impact categories. The use of normalisation and weighting for this purpose remains the objective for the EF pilots and beyond. However, currently PEF screening results after the normalisation and equal weighing present some inconsistencies stemming from errors at various levels of the assessment. Therefore, screening results after normalisation and equal weighting are not sufficiently robust to apply for product comparisons in an automatic and mandatory way in the Environmental Footprint (EF) pilots, e.g. to identify the most relevant impact categories. To avoid any potential misinterpretation and misuse of the EF screening results the normalised and equally weighted results have been placed in a confidential annex. The access to this confidential annex has to be guaranteed to the following stakeholders: European Commission, Environmental Footprint Steering Committee, Environmental Footprint Technical Advisory Board, Environmental Footprint Helpdesk, PEFCRs/OEFSRs reviewers, Environmental Footprint screening reviewers, supporting studies verifiers, and EF pilot phase independent reviewers. It is up to the Technical Secretariat of the EF pilot to decide to grant access to information contained in the confidential annex also to other stakeholders.

6. Resource use and emission profile

6.1. Screening step

The main outcomes of the screening study are reported in Annex I - Screening report. The PEF screening identified the following **life cycle stages** as the most relevant:

- Ingredients
- Distribution
- Packaging production for wet pet food only
- Use stage for wet cat food

In summary, the **most relevant processes** with the highest contributions for each representative product are listed in Table 9 below:

Table 9 Processes considered to be hotspots in the screening study per life cycle stage

Life cycle stage	Relevant processes	Wet cat	Dry cat	Wet dog	Dry dog
Ingredients	Beef co-products	✓		✓	
	Beef meal (dry cat and dog food)		✓		✓
	Poultry co-products	✓		✓	
	Wheat grains		✓		✓
	Soybeans		✓		
Packaging production	Tinplate production	✓		✓	
	Steel production	✓		✓	
Manufacturing					
Distribution	Transport to retailer	✓	✓	✓	
	Retailer activity	✓	✓		✓
Use	Dishwasher use	✓			
Packaging EOL					

The data collection efforts shall be focused on the most relevant life cycle stages and processes identified in the PEF screening. In order to classify the data as primary or secondary data, the following rules shall be considered:

- **Primary (or specific) data** refer to data from specific process within the supply-chain of the company applying the PEFCR. Such data may take the form of activity data[1], or LCI dataset[2]. Primary data are site-specific or producer specific (if multiple sites for a same product). Primary data may be obtained through meter readings, purchase records, utility bills, engineering models, direct monitoring, mass balance, stoichiometry, or other methods for obtaining data from specific processes in the value chain of the company applying the PEFCR. Also called "specific data".
- **Secondary (or generic) data** refers to data not from specific process within the supply-chain of the company applying the PEFCR. This refers to data that is not directly collected, measured, or estimated, but rather sourced from a third-party life-cycle-inventory database or other sources. Secondary data includes industry-average data (e.g., from published databases, government statistics, literature studies, and industry associations), financial data, proxy data, and other generic data.

Ideally, primary data should be used for all stages, but in practice, only secondary data may be available for some processes. Primary data shall be collected for the foreground system while secondary data may be used for the background system. Background/foreground systems shall be defined according to the goal of the study. In general, for all activities that are under the control or the direct influence of the commissioner of the PEF study, primary data should be collected and whenever primary and site-specific data are available, these data should be used instead of secondary data.

Some of these key parameters are specific to these PEFCRs while others are transversal key parameters to be defined at the TAB level.

[1] **Activity data**: This term refers to information which is associated with input or output processes while modelling Life Cycle Inventories. In the PEF guidelines, it is also called “non-elementary flows”. Activity data are multiplied by an LCI to derive the environmental footprint associated with a process or an operation. Examples of activity data include kilowatt-hours of electricity used, quantity of fuel used, output of a process, hours equipment is operated, distance travelled, floor area of a building, etc.

[2] **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 could be a unit process dataset (UPR) or an aggregated dataset (also called system process (SP)).

Other stakeholders (i.e. all but pet food manufacturers) using the current PEFCRs may not have the same level of influence on each life cycle stage, and would therefore have different foreground and background systems.

A complete list of processes to be included (primary or secondary) as well as associated data quality and review requirements is provided in Sections 6.3 and 6.4 below per life cycle stage. Details on each flow considered per sub-category are included in Annex IX indicating which data (with suggested units) are required to be collected.

6.2. Data quality requirements

According to the PEF Guide (European Commission, 2013), a semi-quantitative assessment shall assess the data quality of the datasets based on six criteria:

- Five relating to the data:
  - i. Technological representativeness (TeR)
  - ii. Geographical representativeness (GR)
  - iii. Time-related representativeness (TiR)
  - iv. Completeness (C)
  - v. Parameter uncertainty (P)
- One relating to the methodology
  - i. Methodological Appropriateness and Consistency (M)

Five quality levels are defined for each criterion:

- Very good (1);
- Good (2);
- Fair (3);
- Poor (4);
- Very poor (5).

The overall Data Quality Rating (DQR) shall be calculated by summing up the achieved quality rating for each of the quality criteria, divided by the total number of criteria (i.e. six).

$$DQR = \frac{TeR + GR + TiR + C + P + M}{6}$$

Equation 1: Data quality rating calculation

The Data Quality Rating (DQR) shall correspond to a data quality level defined as follows:

- Overall DQR < 1.6: excellent quality

- Overall DQR from 1.6 to < 2.0: very good quality
- Overall DQR from 2.0 to < 3.0: good quality
- Overall DQR from 3 to < 4.0: fair quality
- Overall DQR > 4.0: poor quality

This semi-quantitative assessment shall be done at least for the datasets related to the most relevant processes identified by the analysis.

The criteria that shall be used to perform the data quality assessment are shown in Table 10 below (European Commission, 2013).

601 Table 10 Data quality assessment criteria

Quality level	Quality rating	Technological represent. (TeR)	Geographical represent. (GR)	Time represent. (TiR)	Completeness (C)	Parameter uncertainty (P)	Methodological compliance and consistency (M)
Very good	1	The specific technology considered	Specific to the region considered in the scope of the analysis	≤ 3 year old data	≥90% of a full LCI	Very low uncertainty (≤ 10%)	Full compliance with all requirements of the PEF guide
Good	2	Average in Europe for the specific technology based on the consumption	Average of several countries in the geographical scope of the analysis	3-5 years old data	80%-90% of a full LCI	Low uncertainty (10% to 20%)	Attributional Process based approach AND: Following three method requirements of the PEF Guide (2013) met: — Dealing with multi-functionality — End of life modelling — System boundary
Fair	3	Average in Europe for the specific technology based on the production	Referred to a different country in the same geographical scope of the analysis	5-10 years old data	70-80% of a full LCI	Fair uncertainty (20% to 30%)	Attributional process-based 1999-2005 approach AND: The following two method requirements of the PEF Guide (2013) are met: — Dealing with multi-functionality — End of life modelling However, the following method requirement of the PEF Guide (2013) is not met: — System boundary
Poor	4	Average in Europe for a similar technology based on the consumption	Referred to a different region, out from the geographical scope but with similar characteristic	10-15 years old data	50-70% of a full LCI	High uncertainty (30% to 50%)	Attributional process-based approach AND: The following method requirement of the PEF Guide (2013) met: — Dealing with multi-functionality However, the following two method requirements of the PEF Guide (2013) are not met: — End-of-life modelling — System boundary
Very poor	5	Other process or unknown	Global or unknown	≥ 15 years old data	<50% of a full LCI	Very high uncertainty (> 50%)	Attributional process-based approach BUT: None of the following three method requirements of the PEF Guide (2013) are met: — Dealing with multi-functionality — End-of-life modelling — System boundary

602

603 ## 6.3. Requirements regarding foreground-specific data collection

604 This section describes the requirements regarding the collection of **primary/site-specific data**.
605 Primary/site-specific data shall be collected by the companies as specified in the subsections below
606 and Annex IX. Specific details per life cycle stage are described in the subsections below.

Ingredients

The ingredients stage is a hotspot for all four types of pet foods considered for many impact categories and thus shall be included for all PEF studies.

- Activity data (i.e. amounts of each ingredient): Primary data shall be used
- LCI dataset (i.e. upstream production): Primary data should be used when available. In other situations, secondary data should be used.

To maintain confidentiality of the recipe for the pet food, only the percentage for each ingredient category shall be displayed in the PEF report; however for the analysis, a complete list of all ingredients required to produce 1 kg of pet food shall be included as well as ingredient processing.

It is important to regionalize by country where possible. For example, the impacts for Brazilian and American soybeans may be quite different for certain impact categories. Should the ingredients come from multiple sources, a representative sample should be used to properly represent the variability of the sources.

While all ingredients required to manufacture prepared pet foods are included in this PEFCR and are a part of the product environmental footprint, this PEFCR does not provide detailed guidance on how to model the upstream production of these ingredients.

Modelling of beef co-products shall be aligned with the Cattle Model Working Group (CMWG) recommendations (JRC, 2015). The CMWG was set up in July 2014 and consisted of a transversal group of experts including 2 representatives from each of the dairy, meat, leather, feed and pet food PEF pilots; the European Commission Directorate-General for the Environment (EC/DG-ENV); the European Commission Joint Research Centre (JRC); the Food and Agriculture Organization of the United Nations (FAO); and the European Food Sustainable Consumption and Production Roundtable. More details on the allocation procedure are provided in Section 6.10.

For example for beef, the LCI datasets shown in Table 11 below are currently available but should be modified to account for IDF and CMWG allocations.

Table 11 Beef datasets from LCI databases

Country	Dataset	Database/Source
France	Beef cattle, national average, at farm gate/FR	AGRIBALYSE 1.2
Netherlands	Beef co-product, feed grade, from dairy cattle, at slaughterhouse/NL Economic (CMWG) Beef co-product, feed grade, from beef cattle, at slaughterhouse/IE Economic (CMWG)	Agri-Footprint 1.0

When published data representative of national averages for other EU countries is available, these may also be used providing they comply with the PEF requirements.

When no data exists in LCI databases or published literature, the Agri-footprint 1.0 processes shall be used by default.

The percentage of beef co-products coming from dairy cows compared to beef cattle must also be considered.

Finally, the distance and transportation mode for each ingredient coming to the manufacturing plant should be considered with primary data when available.

Data requirements for the ingredient stage are summarized below in Table 12 below.

Table 12 Input and output data requirements for the ingredients life cycle stage

Item	Data requirement for activity data (amounts)	Data requirement for LCI dataset (upstream production)
Meat ingredients	Primary	Secondary
Grain/vegetable ingredients	Primary	Secondary
Other ingredients	Primary	Secondary
Upstream freezing energy	Secondary	Secondary
Ambient transport to plant	Primary (distance and mode)	Secondary
Frozen/heated transport to plant	Primary (distance and mode)	Secondary

Data quality requirements for the ingredients life cycle stage are provided in Table 13 below.

Table 13 DQR guidance for the ingredients life cycle stage

Quality rating	Time representativeness	Technological representativeness	Geographical representativeness
1	Average **over 2+ years**, in the **previous 5 years**, with respect to 2015	Single site or sample of sites representing **>80%** of total supply chain	Primary or regionalised secondary data used for **>80% upstream** processes
2	Data for a **single year**, in the **previous 5 years**, with respect to 2015	Single site or sample of sites representing **>60%** of total supply chain	Primary or regionalised secondary data used for **>50% upstream** processes
3	Data for a **single year**, in the **previous 10 years**, with respect to 2015	Single site or sample of sites representing **>40%** of total supply chain	Primary or regionalised secondary data used for **>30% upstream** processes

Quality rating	Time representativeness	Technological representativeness	Geographical representativeness
4	Data for **less than a year**, in the **previous 5 years**, with respect to 2015	Single site or sample of sites representing **>20%** of total supply chain	Non-regionalised secondary data used for upstream processes
5	Unknown	Single site with unknown representativeness of total supply chain	Unknown or proxy

649

650 ### Packaging production

651 The following definitions apply and shall be used:

652 • **Primary packaging:** Material that immediately covers the product. For example, primary
653 packaging can consist either of a can, a lid and a label. Note that some consider the label to
654 be secondary packaging.
655 • **Secondary packaging:** Packaging or containment of a primary package. Packaging for
656 multipacks and their labels are also considered to be secondary packaging.
657 • **Tertiary packaging:** Packaging conceived so as to facilitate handling and transport of a number
658 of sales units or grouped packaging in order to prevent physical handling and transport
659 damage.

660 Primary data shall be used to model primary packaging activity data (i.e. amounts), but secondary data
661 should be used to model the upstream manufacturing of primary packaging materials and
662 components. Secondary and tertiary packaging may be modelled using secondary data.

663 The dimensions of each pet food product and the quantity of pet food that each unit contains shall be
664 documented.

665 For tinplate production, the surface area of the steel can to be coated shall be documented.

666 Additionally, should any packaging materials contain recycled content, this shall be documented and
667 modelled accordingly.

668 Finally, the distance and transportation mode for each packaging material coming to the
669 manufacturing plant should be considered.

670 Input and output data requirements for the packaging production stage are provided in Table 14
671 below.

672

673

674 Table 14 Input and output data requirements for the packaging production life cycle stage

Item	Data requirement for activity data (amounts)	Data requirement for LCI dataset (upstream production)
Aluminium tray	Primary	Secondary
Steel production	Primary	Primary
Can making	Primary	Primary or secondary
Tinplate production	Primary	Primary or secondary
Plastic bag	Primary	Secondary
Plastic pouch	Primary	Secondary
Plastic tube	Primary	Secondary
Paper bag	Primary	Secondary
Paper labels	Primary	Secondary
Carton box	Primary	Secondary
Secondary/tertiary packaging	Primary	Secondary
Glue and lacquer	Secondary	Secondary
Pallets	Secondary	Secondary
Packaging transport	Primary (distance and mode)	Secondary

675

676 Data quality requirements for the packaging production life cycle stage are provided in Table 15 below.

677

678 Table 15 DQR guidance for the packaging production life cycle stage

Quality rating	Time representativeness	Technological representativeness	Geographical representativeness
1	0-1.9 years with respect to 2015	All amounts and types of packaging materials (primary, secondary and tertiary) are known and reported. Manufacturing of packaging materials is based on primary data.	Origin of all materials is known and reported. Location of all manufacturing sites is known and reported.
2	2-4.9 years with respect to 2015	All amounts and types of primary packaging materials are known and reported. Manufacturing of primary packaging is based on primary data. Secondary data is used for secondary and tertiary packaging.	Origin of some materials is known and reported. Location of all manufacturing sites is known and reported.
3	5-9.9 years with respect to 2015	All amounts and types of primary packaging materials are known and reported. Manufacturing of primary packaging is based on secondary data. Secondary data is used for secondary and tertiary packaging.	Origin of materials is unknown. Location of >50% of manufacturing sites is known and reported.
4	10-14.9 years with respect to 2015	Some amounts and types of primary packaging materials are known and reported. Others are based on secondary data or assumptions. Manufacturing of primary packaging is based on secondary	Origin of materials is unknown. Location of a single manufacturing site is known and reported.

Quality rating	Time representativeness	Technological representativeness	Geographical representativeness
		data. Secondary data is used for secondary and tertiary packaging.	
5	>15 years with respect to 2015	All amounts and types of packaging materials (primary, secondary and tertiary) are based on secondary data or assumptions.	Origin of materials is unknown. Location of a manufacturing sites is unknown.

Manufacturing

Primary data shall be used to model the manufacturing stage. Each pet food manufacturing plant typically produces a number of different pet foods. Details on how to address multi-functionality of the manufacturing processes are provided in Section 6.10.

Input and output data requirements for the manufacturing stage are provided in Table 16 below.

Table 16 Input and output data requirements for the manufacturing stage

Item	Data requirement for activity data (amounts)	Data requirement for LCI dataset (upstream production)
Water	Primary	Secondary
Electricity	Primary	Secondary
Natural gas	Primary	Secondary
Fuel oil	Primary	Secondary
Consumables	Primary or secondary	Secondary
Waste to recycling	Primary	Secondary
Waste to disposal	Primary	Secondary
Wastewater to treatment	Primary	Secondary
Hazardous waste to treatment	Primary or secondary	Secondary
Solvent waste to treatment	Primary or secondary	Secondary
Infrastructure	Secondary	Secondary
Manufacturing losses	Primary or secondary	Secondary

Data quality requirements for the manufacturing stage are provided in Table 17**Error! Reference source not found.**.

691 Table 17 DQR guidance for the manufacturing stage

Quality rating	Time representativeness	Technological representativeness	Geographical representativeness
1	0-1.9 years with respect to 2015	All amounts and types of inputs and outputs are known and reported. Energy and water use are attributable to specific products. Waste streams are attributable to specific products.	Origin of all inputs and energy carriers are known and reported
2	2-4.9 years with respect to 2015	>60% of inputs and outputs are known and reported. Energy and water use, as well as waste streams are reported for an entire process line.	Origin of >60% inputs and energy carriers are known and reported
3	5-9.9 years with respect to 2015	>60% of inputs and outputs are known and reported. Others are based on assumptions and secondary data. Energy and water use, as well as waste streams are reported for an entire manufacturing plant.	Origin of >40% inputs and energy carriers are known and reported
4	10-14.9 years with respect to 2015	>40% of inputs and outputs are known and reported. Others are based on assumptions and secondary data. Energy and water use, as well as waste streams are reported for an entire manufacturing plant.	Origin of >20% inputs and energy carriers are known and reported
5	>15 years with respect to 2015	Most inputs and outputs are based on assumptions and secondary data. Energy and water use, as well as waste streams are reported for an entire manufacturing plant.	Origin of inputs and energy carriers are not reported.

692

693 The default loss rate to be used for the manufacturing stage is 2%, which is based on averaged primary
694 data.

695 See Section 6.9 for details on how food loss is treated.

696 ### Distribution

697 When available, primary data should be collected for the distances and modes of transport for each
698 transport step from the manufacturing plant to the retailer.

699 Product volumes and product capacities in terms are needed to allocate the infrastructure and
700 overhead impacts. Distribution centre and retail activity were modelled according to the default
701 assumptions (Quantis, 2015) and are detailed in Section 6.10 below. The following elements were
702 included: infrastructure, energy consumption, refrigerant gas consumption and leaks.

703 For allocation of the impacts of the transport of the user, see Section 6.10.

Average storage times at the manufacturing plant, at the distribution centre and at the retailer should be based on primary data when available. Average default storage times for all representative products were calculated based on primary data:

- At plant: 5 days
- At DC: 20 days
- At retailer: 15 days

The average storage volume factor for ambient product storage is 4 (Quantis, 2015).

The default loss rate to be used for the distribution stage is 0.5%, which is based on averaged primary data.

Input and output data requirements for the distribution life cycle stage are provided in Table 18 below.

Table 18 Input and output data requirements for the distribution life cycle stage

Item	Data requirement for activity data (amounts and distances)	Data requirement for LCI dataset
Transport from plant to DC	Primary	Primary or secondary
Distribution centre activity	Secondary	Secondary
Transport from DC to point of sale	Primary or secondary	Primary or secondary
Retailer activity	Secondary	Secondary
Distribution chain losses	Secondary	Secondary
Transport from retail to consumer home	Secondary	Secondary

In cases where primary data cannot be used, secondary data can be used following the guidance below.

6.4. Requirements regarding background generic data

Data that have less influence on the results and/or are less accessible to the companies are classified as **secondary data**. Secondary (or generic) data should be replaced by primary (specific) data when available. In cases where primary data cannot be used, secondary data can be used in PEF studies in accordance with the values provided in Annex IX.

Use

The use stage includes the impacts related to the dishwashing of the dishes and utensils used to serve pet food. For wet pet food, it was assumed that by default a small dish and fork are used for each meal and they are washed once per day. For dry pet food, it is assumed that by default the dish is washed

once per week. For washing, it is assumed that 50% of the dishes are washed in a dishwasher and 50% are washed by hand.

Other default assumptions related to the dishes are listed below:

- Dish lifetime: 5 years
- Dish material: hard plastic
- Feedings per day: 2 (morning and evening)

Impacts related to dishwashing in a dishwasher based on the fraction of space that the dishes take up per dishwasher cycle include the following by default (Quantis, 2015):

- Dishwasher production, delivery and end-of-life
- Electricity necessary to operate the dishwasher
- Water usage and associated wastewater treatment
- Soap usage

Impacts related to hand washing include hot water and soap usage. Further details are provided in the screening study.

Refrigerated storage of unused portions of wet pet foods is also considered and it includes the energy necessary to operate the refrigerator as well as the refrigerator production, delivery and end-of-life.

The following default values were used:

- Energy (0.0037 kWh/L-day for a fridge with a 210-L internal storage capacity) and a fraction of the refrigerator itself
- The whole package is put in the refrigerator
- For wet cat food, the average fridge storage time per day is 0.8 days per day whereas it is 1 day for wet dog food. For the wet cat product, each 400-g product yields approximately 3 servings whereas for a wet dog, the can is never fully emptied. This should be updated based on the actual product size.
- Storage volume factor in the fridge is 3

The default loss rate to be used for the use stage is 1%, which is based a WRAP report on pet food packaging (WRAP, 2009).

Input and output data requirements for the use life cycle stage are provided in Table 19 below.

Table 19 Input and output data requirements for the use life cycle stage

Item	Data requirement for activity data (amounts)	Data requirement for LCI dataset
Pet food dishes	Secondary	Secondary

Hand washing	Secondary	Secondary
Dishwasher use	Secondary	Secondary
Refrigerated storage	Secondary	Secondary
Use losses	Secondary	Secondary

758

759 **Packaging end-of-life**

760 Data used for end-of-life logistics and treatment are summarized in the tables below based on
761 Eurostat statistics and in accordance with the document "PEF/OEF: Default data to be used to model
762 end-of-life" (Quantis, 2015). See Section 6.8 below for details.

763

764 Data requirements for the packaging EOL life cycle stage are provided in Table 20 below.

765

766 Table 20 Input and output data requirements for the packaging EOL life cycle stage

Item	Data requirement for activity data (amounts)	Data requirement for LCI dataset
Collection	Secondary	Secondary
Recycling (cardboard)	Secondary	Secondary
Recycling (metals)	Secondary	Secondary
Recycling (plastics)	Secondary	Secondary
Landfilling	Secondary	Secondary
Incineration	Secondary	Secondary

767

768 In the PEF supporting studies, the default secondary LCI datasets listed in Annex IX shall be used.

769

770 ## 6.5. Data gaps

771 In this PEFCR, recommendations regarding default data to be used when no primary data are
772 available are provided. Therefore, no data gaps are foreseen. According to European Commission
773 (2013), "data gaps exist when there is no specific or generic data available that is sufficiently
774 representative of the given process in the product's life cycle".

775 ## 6.6. Use stage

776 See Section 6.4 for details.

777 [Specify:

778 • The use-stage scenarios to be included in the study,

- The time span to be considered for the use stage. The lifetime shall be determined according to verifiable technical performance and should not be related to other alike parameters (e.g. if a paint can technically last 10 years, the lifetime to consider is 10 years even if the sector knows that users paint their home every other 5 years. However, for transparency reasons, a reference to scenarios that are considered to be close to real use (e.g. inform that a repaint is expected by the average user pattern every 5 years) should be made,
- The use phase scenario shall be based on the best-known average situation. In case of different user patterns, more than one scenario should be provided.]

6.7. Logistics

See Section 6.4 for details.

[Specify transport, distribution and storage scenarios to be included in the study together with the underlying assumptions (e.g. distribution in central Europe, distribution in south Europe, distance to port, etc.)]

6.8. Packaging end-of-life stage

The packaging EOL stage includes the transport and treatment of the different packaging wastes (primary, secondary and tertiary packaging).

Packaging end-of-life is modelled according to recommendations provided by the European Commission to deal with multi-functionality in end-of-life situations (European Commission, 2013) as described in Section 6.10.

All packaging waste that is not recycled can be assumed to be incinerated or landfilled according to the municipal solid waste treatment rates of the corresponding market. For EU-28, 42% of municipal solid waste is incinerated and 58% is landfilled (Eurostat, 2012). Heat recovery is assumed for incineration, with recovery rates of 10% for electricity and 20% for heat (expert judgment). The electricity recovery is assumed to offset the UCTE grid mix and the heat recovery is assumed to offset light fuel oil. These assumptions should be adapted to the local context if possible.

Default parameters for waste packaging collection and treatment after consumer use are provided in the tables below.

807 Table 21 Default parameters for waste packaging collection and treatment

Transport	km	Transportation mode	Reference
Consumer home to collection point	1	Car	Assumption (75% of households do not need transport; 25% of households drive about 4 km to local collection point
Collection point to recycling	100	Truck	Assumption
Collection point to incineration	30	Municipal waste collection truck	Assumption
Collection point to landfill	30	Municipal waste collection truck	Assumption
Collection point to methanisation	100	Truck	Assumption
Collection point to composting	30	Truck	Assumption

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809 Table 22 End-of-life treatment of packaging materials based on Eurostat data (Eurostat, 2013)

Packaging material	Recycling	Incineration	Landfill	LHV (MJ/kg)
Mixed plastics	35.3%	27.4%	37.3%	30.79
PE	35.3%	27.4%	37.3%	42.47
PET	35.3%	27.4%	37.3%	22.95
Cardboard	83.8%	6.9%	9.3%	15.92
Paper	83.8%	6.9%	9.3%	14.12
Aluminium	72.5%	11.6%	15.9%	30.8
Steel	74%	12%	14%	0
Wood	37.9%	26.3%	35.8%	14
Pouches/other	0%	42.3%	57.7%	30.79

810

811 Energy recovery shall be considered for incineration, with default recovery rates of 10% as electricity
812 and 20% as heat. The lower heating values (LHVs) for each type of packaging material are also included
813 in Table 22 above as well.

Note	Regarding the end-of-life formula, a limitation of the screening is that the R2 component is interpreted as the collection rate. This will be improved for the supporting studies based on indications from the European Commission (clarifications on-going). A clear definition of recycling and/or collection should be stated.

6.9. Pet food waste/losses

The relevant definitions for pet food waste and pet food losses are based on FAO definitions (Parfitt et al., 2010) as follows:

- Pet food losses refer to the decrease in pet food mass throughout the part of the supply chain that specifically leads to food for pet consumption. Pet food losses are incurred at production and processing stages as well as in the pet food supply chain (distribution and retail)
- Pet food waste relates to consumer behaviour

Pet food waste and losses throughout the distribution chain are recognised as a potentially important issue. Losses occurring within and between the life cycle stages, from the manufacturing site to the retailer, and the waste occurring at the consumer's home, are however not clearly known.

The waste and loss rates shown below shall be considered when primary data are not available:

- At manufacturer: 2% (loss)
- At retailer: 0.5% (loss)
- At user: 1% (waste) per WRAP report (2009)

Loss at the retailer is assumed to include storage and transportation losses. Pet food waste and losses are treated in accordance with the following default assumptions based on secondary data (Quantis, 2015):

- 50% trashed (incinerated or landfilled)
- 25% composting
- 25% methanisation

6.10. Requirements for multifunctional products and multiproduct processes allocation

The following decision hierarchy recommended by the PEF Guide 2012 is in accordance with ISO 14044 (ISO 2006a), the international reference standard for LCA.

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

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

- Expanding the product system (known as system expansion) to include the additional functions related to the co-products

Step 2: Where allocation cannot be avoided, the inputs and outputs of the system should be partitioned between its different products or functions in a way that reflects the underlying physical relationships between them

Step 3: Where physical relationship alone cannot be established or used as the basis for allocation, the inputs should be allocated between the products and functions in a way that reflects other relationships between them. For example, input and output data might be allocated between co-products in proportion to the economic value of the products.

The following parts of the life cycle involve multi-output processes:

i) Meat and grains
ii) Overheads
iii) Transportation from retailer to the consumer's home
iv) Material recycling, or incineration with energy recovery at the end-of-life

Meat products

For all meat products, the following co-products are considered:

- Fresh meat and edible offal
- Food-grade co-products (fat and bones)
- Category 3 slaughter by-products (food-grade co-products not intended for human consumption)
- Other (hides, skins, category 1 and 2 material and waste)

According to the CMWG (2015):

The by-products from slaughterhouse and rendering are classified in three categories:

- **Category 1:** Risk materials, e.g. infected/contaminated animals or animal by-products
  - Disposal and use: incineration, co-incineration, landfill, used as biofuel for combustion, manufacture of derived products
- **Category 2:** Manure and digestive tract content, products of animal origin unfit for human consumption
  - Disposal and use: incineration, co-incineration, landfill, fertilisers, compost, biofuels, combustion, manufacture of derived products
- **Category 3:** Carcases and parts of animals slaughtered and which are fit for human consumption but are not intended for human consumption for commercial reasons, include skins and hides going for leather industry (note that hides and skins can also belong to other categories depending on the use)
  - Disposal and use: incineration, co-incineration, landfill, feed, pet food, fertilisers, compost, biofuels, combustion, manufacture of derived products (e.g. leather), oleochemicals and chemicals

In accordance with the outcome of the CMWG's technical report (JRC, 2015), upstream burdens and activities are allocated to raw milk and live animals based on the IDF biophysical allocation method (IDF, 2015) whereas downstream burdens and activities are allocated to slaughterhouse and rendering products based on economic allocation.

The environmental impact per mass unit of slaughterhouse output i (EI_i) is calculated as follows:

$$EIi = EIw \; x \; ARi \qquad \text{Equation 1}$$

where EI_w is the environmental impact of the whole animal divided by the live weight mass of the animal and AR_i is the allocation ratio for output i (calculated as the economic value of i divided by mass fraction of i).

The IDF 2015 allocation method between milk, cull cows and surplus calves is based on the physiological feed energy requirements of the dairy cow to produce milk and the meat. Allocation is used to split emissions that cannot be directly attributed to either milk or meat (e.g. energy use by milking equipment should be attributed entirely to milk). The allocation factor (AF) for raw milk is calculated as follows:

$$AF = 1 - 6.04 \; x \; \frac{M_{meat}}{M_{milk}} \qquad \text{Equation 2}$$

where M_{meat} is the mass of live weight of all animals sold including bull calves and culled mature animals per year, and M_{milk} is the mass of fat and protein corrected milk sold per year (corrected to 4% fat and 3.3% protein).

The mass fractions and economic allocation percentages for meats are provided in Table 23 below.

Table 23 Mass fraction and economic allocation percentages for meats

Meat	Fresh meat and edible offal	Food-grade co-products	Category 3 slaughter by-products	Other	Source
Mass fraction (%)					
Beef	49%	15%	7%	29%	JRC, 2015
Chicken	65.3%		34.6%	--	FEDIAF, 2014b
Pork	82%		18%		FEDIAF, 2014b
Lamb	87%		13%	--	Institut d'Elevage, 2012
Fish	45%		55% (range: 40-70%)	--	Newton, 2014
Rabbit	65.3%		34.6%		Same as chicken
Economic allocation (%)					
Beef	92.9%	2.8%	0.8%	3.5%	JRC, 2015
Chicken	96.6%		3.4%	--	FEDIAF, 2014b
Pork	98.9%		1.1%	--	FEDIAF, 2014b
Lamb	96.6%		3.4%	--	Same as chicken
Fish	96.6%		3.4%	--	Same as chicken
Rabbit	96.6%		3.4%	--	Same as chicken

Manufacturing

Manufacturing plants usually produce more than one type of pet food. The data collection for each process unit within the plant is resource-intensive and in some cases impossible due to insufficient metering on a process unit level. Thus, the allocation of resources and emissions should be done by mass allocation.

Distribution, retail and retail overheads

The DC and retail activity were modelled according to the default assumptions document submitted to the TAB (Quantis, 2015). The impacts were allocated based on the storage capacity and type of representative products.

For the DC, the impacts are calculated based on cubic-metre-(m^3-)-weeks for a 1-year period. A DC can store 60'000 m^3 of products (assuming 50% of 30'000 square metre (m^2) building is dedicated to 4-metre (m) high storage) during 52 weeks, i.e., 3'120'000 m^3-weeks/year in total. It is assumed that 20% of the storage area is chilled or frozen, i.e., 12'000 m^3 or 624'000 m^3-week/year. Therefore, for ambient storage, the capacity is considered to be 2'496'000 m^3-week/year.

This storage capacity can be allocated knowing the storage volumes and times for the product. For ambient products, a storage volume of 4 times the product volume is considered for a duration of 25 days (combined total for the plant and DC) based on averaged primary data from pet food companies.

For the supermarket, impacts during one year are modelled according with PEF/OEF default data and assumptions document (Quantis, 2015) and are also measured in m^3-weeks. A retail place can store 2'000 m^3 of products (50% of 2'000 m^2 building, 2-m high storage) during 52 weeks, i.e., 104'000 m^3-weeks/year in total. A total of 60 m^2 for fridges and 60 m^2 for freezers (2 m high) are considered, therefore the capacity is 91'520 m^3-week for ambient products and 6'240 m^3-week for both chilled and frozen products.

The retail total storage capacity is allocated per product knowing the storage volumes and times. For ambient products, a storage volume of 4 times the product volume is considered for a duration of 2 weeks based on primary data from pet food companies.

Transportation from retail to consumer home

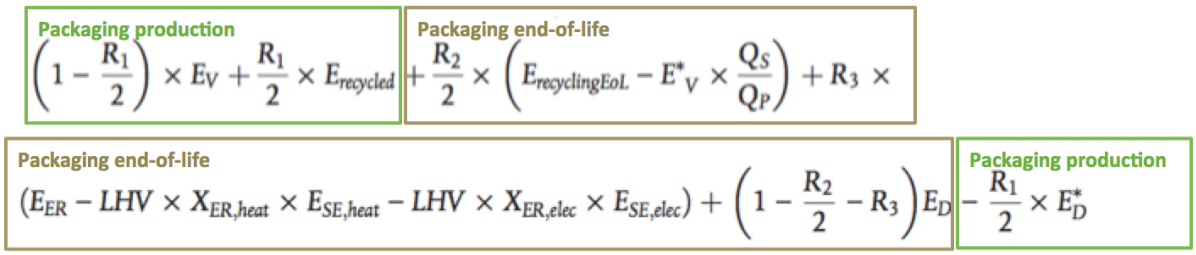
Transportation of goods in a personal car requires allocating the journey to the different products transported. As default approach, each item purchased at the store is allocated 5% of the journey, based on the assumption that a minimum of 20 products purchased at a time. This is known as a unitary allocation. By item, products in their most usual sales formats are considered, i.e., the product weight selected for each representative product.

- 400-g for both wet cat and dog food
- 2-kg and 8-kg for dry cat and dog food, respectively

Material recycling and energy recovery from waste incineration

Recycling and incineration of packaging materials are common multi-output processes. The EOL formula provided in Annex V of the PEF method (European Commission, 2013) is used as a baseline approach.

The 50:50 end-of-life formula shall be applied, as illustrated in Figure 6 below where elements of the formula to be considered within the life cycle stages "Packaging" and "End-of-life" are highlighted.



$$\left(1-\frac{R_1}{2}\right)\times E_V+\frac{R_1}{2}\times E_{recycled}+\frac{R_2}{2}\times\left(E_{recyclingEoL}-E^*_V\times\frac{Q_S}{Q_P}\right)+R_3\times\left(E_{ER}-LHV\times X_{ER,heat}\times E_{SE,heat}-LHV\times X_{ER,elec}\times E_{SE,elec}\right)+\left(1-\frac{R_2}{2}-R_3\right)E_D-\frac{R_1}{2}\times E^*_D$$

Figure 6 PEF guide 50/50 formula with the terms grouped per life cycle stage

7. Benchmark and classes of environmental performance

Note	This section will be completed at a later date.

[Identify the environmental performance benchmark for the product category, based on the results of the screening on the representative product and the information gathered through the stakeholders consultation. Provide a description of the benchmark, by summarising information reported in Annex III.

Identify classes of environmental performance. Ideally, there should be 5 classes of environmental performance (from A to E, with A being the best performing class and C being the performance of the representative product, i.e. the benchmark), by taking into account the estimated spread (including uncertainty) around the benchmark results, which might differ from impact category to impact category.

BREF, EU legislation and ISO type I labels are example of sources of information that may be used to define best and worst performance.

8. Interpretation

Note	This section will be completed at a later date based on the screening and supporting studies.

[Describe the hot-spots and the most relevant impact categories of the product category. Describe uncertainties common to the product category. The range in which results could be seen as not being significantly different in comparisons or comparative assertions shall be identified. Provide an assessment on whether this PEFCR can be used for comparing performances of similar products.]

According to the PEF Guidance (2014), the interpretation phase shall include the following steps:

- Assessment of the robustness of the Product Environmental Footprint model (e.g. completeness and consistency check);
- Identification of hotspots;
- Estimation of uncertainty; and
- Conclusions, recommendations and limitations.

All impact categories having a visible impact at one or the other level shall be considered for the assessment.

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

The main conclusions together with the hotspot analysis for prepared pet food for cats and dogs can be found in the PEF screening report in Annex I – Screening report.

9. Reporting, Disclosure and Communication

Note	This section will be completed at a later date.

[Specify and describe the 3-4 best ways of communicating the results of a PEF-profile for this product category to different stakeholders (B2B and B2C as appropriate)]

9.1. PEF external communication report

In case a PEF external communication report is listed among the communication options, the PEFCR shall:

i) Specify and justify any deviations from the default reporting requirements presented in chapter 8 of the PEF Guide, as well as specify and justify any additional reporting requirements and/or differentiate reporting requirements depending on, for example, the type of applications of the PEF study and the type of product being assessed.

ii) Specify whether the PEF results shall be reported separately for each of the selected life cycle stages.]

iii) Specify the format for reporting any additional environmental information.]

9.2. PEF performance tracking report

In case a PEF performance tracking report is listed among the communication options, the PEFCR shall:

[Specify and describe the requirements for a PEF performance tracking report, allowing for the comparison of a PEF profile of a specific product over time with respect to its original or previous PEF profile]

9.3. PEF Declaration

In case a PEF declaration is listed among the communication options, the PEFCR shall specify and describe the requirements, as listed in chapter 3.10.3 of this guidance].

9.4. PEF label

In case a PEF label is listed among the communication options, the PEFCR shall specify and describe the requirements for the use of the label, its content and its layout.

10.Verification

Note	This section will be completed at a later date.

[Specify the requirements for verification to be used, depending on the intended application and communication vehicles used].

According to the European Commission (2014):

The verification procedure shall be transparent. The independent verifier shall generate a report documenting the verification process, while adhering to the obligations covering rules for data confidentiality. This report shall be available to any person upon request.

According to the European Commission (2013):

Any PEF study intended for internal communication claiming to be in line with the PEF Guide and any PEF study for external communication (e.g. B2B or B2C) shall be critically reviewed in order to ensure that:

- The methods used to carry out the PEF study are consistent with this PEF Guide;
- The methods used to carry out the PEF study are scientifically and technically valid;
- The data used are appropriate, reasonable and meet the defined data quality requirements;
- The interpretation of results reflects the limitations identified;
- The study report is transparent, accurate and consistent.

For additional information regarding verification, please refer to the PEF Guidance (2014) and PEF Guide (2013).

996 # 11.References

BIO Intelligence Service and FEDIAF (2013)	BIO Intelligence Service and FEDIAF (2013). Testing of the EU ENVIFOOD Protocol: Final Report, November 15th, 2013.
European Commission (2008)	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)	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 (2014)	European Commission (2014). *Environmental Footprint Pilot Guidance document*. Guidance for the implementation of the EU Product Environmental Footprint (PEF) during the Environmental Footprint (EF) Pilot Phase, v. 4.0, May 2014.
European Food SCP Round Table (2013)	European Food Sustainable Consumption and Production (SCP) Round Table (2013). ENVIFOOD Protocol - Environmental Assessment of Food and Drink Protocol, Version 1.0, November 20th, 2013.
Eurostat (2012)	Eurostat (2012). Municipal waste generation and treatment, by type of treatment method http://epp.eurostat.ec.europa.eu/tgm/refreshTableAction.do?tab=table&plugin=1&pcode=tsdpc240&language=en
Eurostat (2013)	Eurostat (2013). Packaging waste statistics http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Packaging_waste_statistics
FACCO (2012)	FACCO (2012). Proposition de référentiel "Evaluation de l'impact des aliments pour animaux de compagnie, November 28th, 2012.
FEDIAF (2014a)	FEDIAF (2014a). Nutritional Guidelines for Complete and Complementary Pet Food for Cats and Dogs, May 2014.
FEDIAF (2014b)	FEDIAF (2014b). Pet food pilot position paper: allocation of environmental impacts between meat and animal by-products at slaughterhouse level, October 2014.
Galatola and James (2015)	Galatola and James (2015). Data requirements in Product Environmental Footprint Category Rules (PEFCRs), Version 1.0, 12 May 2015.
IDF (2015)	International Dairy Federation (IDF) (2015). Unpublished draft revision of the 2010 IDF guide to standard life cycle assessment methodology for the dairy sector.
Institut de l'Elevage (2012)	Institut de l'Elevage (2012). Gac A., Tribot-Laspière P., Scislowski V., Lapasin C., Ponchant P., Guardia S., Nassy G., Chevillon P. (2012). Recherche de méthodes d'évaluation de l'expression de l'empreinte carbone des produits viande.
James and Galatola (2015)	Screening and hotspot analysis: procedure to identify the hotspots and the most relevant contributions (in terms of impact categories, life cycle stages, processes and flows), Version 4.0. Keith James and Michele Galatola. 24 April 2015.

JRC (2015) JRC (2015). Baseline Approaches for the Cross-Cutting Issues of the Cattle Related Product Environmental Footprint Pilots in the Context of the Pilot Phase 2013-2016. European Commission, Joint Research Centre, Institute for Environment and Sustainability, Sustainability Assessment Unit

Nielsen (2014) Nielsen (2014). Extraction from database: MainMeal – Multicube; period ending: P06 2014; markets: France, Germany, UK (Mass Market - w/o SPT), August 2014.

NRC (2006) NRC (2006) Energy *in Nutrient Requirements of Dogs and Cats.* The National Academic Press, Washington, DC: p.28

Parfitt et al. (2010) Parfitt, J., Barthel, M., & Macnaughton, S. (2010). Food waste within food supply chains: quantification and potential for change to 2050. Philosophical Transactions of the Royal Society of London B: Biological Sciences, 365(1554), 3065–3081.

Quantis (2015) Quantis (2015). "PEF/OEF: Default data to be used to model distribution, storage and use stage" ("PEF-OEF_DistUseDefaultData_2015-03-01_v1.pdf") and end-of-life ("PEF-OEF_EOL DefaultData_V1.2_uploaded.xlsx")

WRAP (2009) WRAP (2009). Efficient use of resources in pet food packaging design.

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12.Supporting information for the PEFCR

Open stakeholder consultations

This document is available for consultation in the stakeholder workspace dedicated to this PEFCR which is accessible through this site:

- https://webgate.ec.europa.eu/fpfis/wikis/display/EUENVFP/

Note	This section will be completed at a later date.

PEFCR Review Report

Additional requirements in standards not covered in PEFCR

[If a PEFCR is designed to be compliant with more than one standard, list requirements for any claim that intends to be compliant with these standards]

Cases of deviations from the default approach

[Where deviations from the default approach (as given in the PEF or in this PEFCR) is made, justification, results, interpretation and recommendation to the European Commission and the PEF-practitioner should be included.]

13.List of annexes

Annex I – Screening report

The following documents make up the screening report for the pet food pilot:

- PEFCR_PetFood_ScreeningStudy_2015-08-31.pdf
- PEFCR_PetFood_ScreeningStudy-CONFIDENTIALAnnexI-NormWeightedResults_2015-08-31.xlsx (confidential)
- PEFCR_PetFood_ScreeningStudy-AnnexII-LCIData_2015-08-31.xlsx

Annex II – Supporting studies

Note	This section will be completed at a later date.

Reports, without disclosing any confidential information[3], describing the at least 3 PEF supporting studies that shall be carried out in compliance with the latest version of the PEF guide and with the included draft PEFCR.

They shall be based on existing, real products. The studies should always be done under the assumption that its result would be used for a PEFCR that could support comparisons or comparative assertions intended to be disclosed to the public.

The report on the supporting studies will be used to:

- Test the draft PEFCR
- Check the relevance of the identified the most relevant environmental impacts
- Check the relevance of the environmental performance benchmarks
- Check the relevance of the classes of environmental performance related to the specific product category in scope of the PEFCR (if feasible)

Annex III – Benchmark and classes of environmental performance

Note	This section will be completed at a later date.

[3] Confidential information can be dealt with in a separate way in line with chapter 8.2.4 in the PEF guide Fourth element: Confidential Report: "The Confidential Report is an optional reporting element that shall contain all those data (including raw data) and information that are confidential or proprietary and cannot be made externally available. It shall be made available confidentially to the critical reviewers."

Document all the steps taken to define the benchmark, as a result of the 2nd consultation.

Document all the steps taken to define the classes of environmental performance, as a result of the 2nd consultation.

Annex IV – Upstream scenarios (optional)

Note	This section will be completed at a later date.

Report describing upstream scenarios and processes as a result of the 1st virtual consultation.

Annex V – Downstream scenarios (optional)

Note	This section will be completed at a later date.

Report describing downstream scenarios and processes as a result of the 1st virtual consultation.

Annex VI – Normalisation factors

Note	This section will be completed at a later date.

List normalisation factors to be used in the PEFCR pilot phase

Annex VII – Weighting factors

Note	This section will be completed at a later date.

List alternative weighting approaches tested as “additional” compared to the baseline approach (i.e. all impact categories shall receive the same weight in the baseline approach).

Annex VIII – Foreground data

Note	This section will be completed at a later date.

Including a list of mandatory substances/elementary flows in the foreground system to be collected.

Annex IX – Background data

Annex IX is provided as the following document:

- PEFCR_PetFood_DraftPEFCRs_AnnexIX-BackgroundData_2015-08-31.xlsx

Note	This section will be completed at a later date.

List of generic data that shall be used in the PEFCR

Annex X – EOL formulas

Note	This section will be completed at a later date.

List of alternative formulas tested as “additional” compared to the baseline approach specified in the PEF Guide (if appropriate).

Report of the sensitivity analysis carried out by the Technical Secretariat.

Annex XI – Background information on methodological choices

Note	This section will be completed at a later date.

Provide detailed information about the justification for methodological decisions taken (e.g. selection of impact categories, additional environmental information, etc)

Appendix A – Overview of existing PCR and sectorial guidance documents

To the TS's knowledge, only two sectorial guidance documents for prepared pet food for cats and dogs are available for consultation and to date, there are no core conflicts with the PEF guide and guidance documents.

A brief overview of each of these documents is presented in the subsections below.

Evaluation of pet food impacts position paper (Proposition de référentiel "Evaluation de l'impact des aliments pour animaux de compagnie")

Key elements discussed in the position paper prepared by FACCO in 2012 pertaining to this PEFCR are summarized below:

- **Functional unit**: supports the unit of analysis proposed in this PEFCR
- **Allocation**: Recommends the use of economic allocation for meat products

Testing of the EU ENVIFOOD Protocol: Final Report

In 2013, BIO Intelligence Service was commissioned by the FEDIAF to test the ENVIFOOD Protocol. This report has not been made publically available to date, but it has been consulted because it is highly relevant for the development of the PEFCRs for prepared pet food for cats and dogs. Key elements discussed in this report pertaining to this PEFCR are summarized below:

- **Representative products**: Only two representative products were included in this study, one wet and one dry. No distinction between cat food and dog food was made in terms of the life cycle inventory. A 400-g tin can of wet pet food and a 4-kg plastic bag of dry pet food were considered. In the PEF screening study, four representative products will be considered and all common packaging types will be considered.
- **Functional unit**: Supports the unit of analysis proposed in this PEFCR (a sensitivity analysis between "1 daily ration" and "100 g" was performed)
- **System boundaries**: Consumer transport and infrastructure were excluded but they will be included in the PEF screening study
- **Allocation**: Recommends the use of economic allocation (a sensitivity analysis between mass and economic allocation was performed)