



Review of Environmental Footprint supporting studies

*Key learnings regarding PEFCRs/OEFSRs and horizontal issues
from 40 supporting studies*

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1 Introduction

The European Commission (EC) has published a Communication on 'Building the Single Market for Green Products', dated 9 April 2013, with the overall aim of facilitating better information on the environmental performance of products and organizations¹. This Communication outlines a framework for further developing the product and organization environmental footprint methods with the participation of a wide range of stakeholders through testing. This testing developed into the Environmental Footprint Rules pilot phase which started at the end of 2013 and will run until the first quarter of 2017. The pilot phase aims at testing the development of product environmental footprint category rules (PEFCR) and organization environmental footprint sector rules (OEFSR), as well as at exploring various solutions for practical challenges such as access to, and quality of, life cycle data, cost-effective verification methods, and communication.

In the supporting studies, not only the rules described in the reference documents were followed but also alternative approaches selected by the companies conducting the studies. The supporting studies constitute, this way, great input for the development of the final PEFCRs and OEFSRs. With the review of the supporting studies, the Commission aims to identify insights provided that should be included in the finalisation of the PEFCRs and OEFSRs. Similarly, the Commission is using the pilot phase to further elaborate on technical issues not sufficiently described in the PEF and OEF guide. Since the start of the pilot phase, there have been many technical issue papers developed on topics like the use phase, the hotspots analysis, the data requirements, etc. Because many of these technical issue papers have only been approved after the screening studies had been finalised, the supporting studies are the first opportunity to test them in practice. For that reason, the review of the supporting studies also aims at gathering learnings on horizontal issues which will then constitute input to finalise the technical issue papers.

The work carried out in this project aims at understanding the rules and approaches adopted in the supporting studies, thereby providing the Commission with new insights about horizontal issues and about the applicability of draft PEFCRs. Consequently, this is the perspective that the consortium took throughout this project.

The consortium of PRé Consultants and Ecomatters was commissioned by the European Commission – DG Environment to support the review of the Environmental Footprint supporting studies that are part of the Environmental Footprint pilot phase. This final report describes the activities carried out in the project and includes all deliverables. The report is structured as follows:

- Section 2: Project management and deliverables
- Section 3: Reviews
- Section 4: Learnings regarding PEFCRs
- Section 4: Learnings on horizontal issues
- Annexes: Background documentation

¹ COM(2013) 196 final. Brussels, 9 April 2013.

2 Project management and deliverables

We carried out the following steps for the assignment:

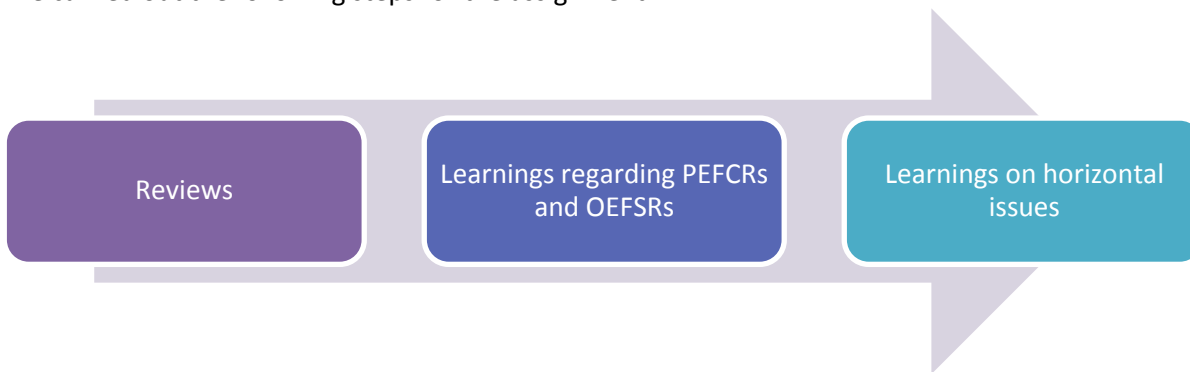


Figure 1 – Project steps

Project management

The project management has been carried out by Marisa Vieira of PRé Consultants (project manager) and Max Sonnen of Ecomatters (backup in case of absence of Marisa). Management of the reviews of the individual supporting studies was done by Benedetta Nucci from DG ENV and by Marisa Vieira from the consortium.

For internal project management we established a core project team. The role of this core team was to:

- Safeguard a consistent method within the consortium, aligned with the Commission team, for the reviews of the supporting studies to be conducted.
- Support in the evaluation of the results and in identifying learnings regarding the PEFCRs and OEFSRs and learnings on horizontal issues.
- Provide recommendations to the Commission team, e.g. on further harmonization of horizontal issues across pilots.

The review team was composed of four persons, two from PRé and two from Ecomatters.

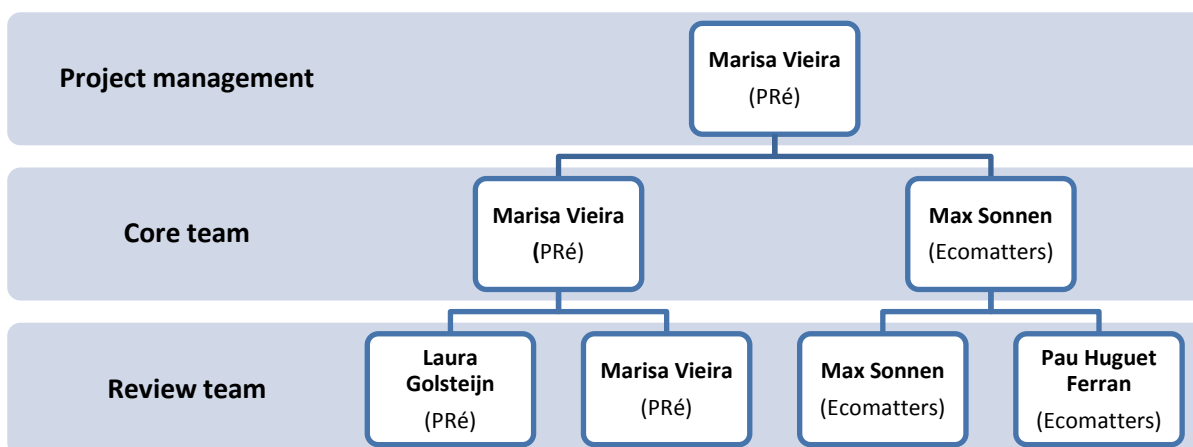


Figure 2 – Structure of the project team.

The consortium had three meetings with the Commission team:

1. Kick-off meeting (18 July)
2. Meeting to discuss and align the first set of reviews (29 August)

3. Meeting to present the main outcomes with regards to the learnings on horizontal issues and lessons regarding PEFCRs and OEFSRs (3 October)

Quality and planning control

- There was frequent contact between the reviewers to discuss the progress and ensure consistency and quality.
- On 29 August 2016, after reviewing a few supporting studies, the review team and Commission team had a meeting to share initial results and ensure consistency and quality.
- All SS reviews were delivered at least one week prior to the consultation deadline of the respective pilot. The only exception were the supporting studies of intermediate paper products, because its consultation was closed prior to kick-off of the project.
- All the final deliverables were cross-read by one team member specifically for language quality.

Deliverables

The deliverables submitted in the scope of this project were:

- 40 individual reviews, one per supporting study (section 3 and Annex II - confidential)
- Learnings regarding the PEFCRs and OEFSRs (section 4)
- Learnings on horizontal issues (section 5)
- All reviews and learnings were compiled in one final report (this document in its entirety)

3 Task 1: Reviews

A total of 40 supporting studies were reviewed and delivered by the consortium on basis of the review template developed and agreed with the Commission (see Annex I). The list of supporting studies reviewed by the consortium is displayed in Table 1.

Table 1 – Overview of supporting studies reviewed by the consortium in the scope of this project.

Pilot	Review deadline	Number of SS reviewed by the consortium
Batteries	09/09/2016	3
Beer	08/09/2016	2
Dairy	02/09/2016	3
Feed	02/09/2016	1
Footwear	02/09/2016	3
Intermediate paper	27/06/2016	3
IT equipment	17/10/2016	3
Olive oil	21/10/2016	5
Pasta	23/08/2016	3
Photovoltaic	07/10/2016	2
Red meat	09/09/2016	3
T-shirts	05/09/2016	3
UPS	27/10/2016	4
Water	01/09/2016	2

The review template included 65 specific review items and one overall assessment of the study. This resulted in standardized review of the supporting studies, for which the answers were 'Yes', 'Partially', 'No', and 'Not relevant', and comments were added if applicable. In Tasks 2 and 3, the learnings regarding the PEFCRs as well as the horizontal issues were derived from the 40 reviews.

4 Task 2: Learnings regarding PEFCRs and OEFSRs

This chapter describes the key learnings regarding PEFCRs and OEFSRs and reporting. Our consortium did not review any supporting study from OEF pilots. In this task we took a process-oriented perspective, whereas the technical LCA related topics are discussed in the next section ‘Learnings on horizontal issues’.

The key feedback that summarizes most of the specific learnings in this entire chapter is that the reporting requirements could be made more explicit in, for example, reporting tables and specific examples. The reason for this finding is that many reporting elements were ignored or reported in a minimal way. The reference to the specific questions mentioned in the learnings can be found in Annex I.

Learning 1: The PEFCRs often lack the operational procedure (i.e. an explanation on how to perform or report) of procedures for elements that are not defined in the PEF guide or in the version of the Guidance document used. Examples of such procedures include those described in the issue papers on electricity modelling, the biogenic carbon and the use stage. Furthermore the data needs matrix often has not been implemented or it was unclear whether it was used.

Reference | Q58-61 implementation of papers: Q58: Biodiversity 79% not or partially reported of relevant cases, Q59: Use stage: 66% not or partially reported of relevant cases, Q60: Biogenic Carbon 62% not or partially reported of relevant cases Q61: Electricity 65% not or partially reported of relevant cases

Recommendations:

1. For each of the TAB issue papers, provide a generic text that can be added to the PEFCR with an operationalization procedure. This way each PEFCR has a similar starting point for the implementation of the issue paper.
2. Until the PEF guide is updated, add a section to the SS template with a reference to the issue papers which are not in the PEF guide.

Learning 2: If an operational procedure (how to do or report something) is not provided, the topic is often skipped or misinterpreted. This was observed for the following review items:

- Summary (Q 19/40 Not or partially compliant)
- General information (Q2 19/40 Not or partially compliant)
- Co-products, by-products & waste streams (Q8 16/40 Not or partially compliant)
- Diagram with system boundaries (Q9 29/40 Not or partially compliant)
- List of source of published data (Q18 19/40 Not or partially compliant)
- Data validation (Q20 37/40 Not or partially compliant)
- Allocation justification (Q22 25/40 Not or partially compliant)
- Identification of most relevant life cycle stages (Q28 30/40 Not or partially compliant)
- Limitation to the EF study (Q33 30/40 Not or partially compliant)
- Degree of accuracy (Q39 31/40 Not or partially compliant)
- Average DQR (Q39 22/40 Not or partially compliant)
- Technical use paper Biodiversity (Q58 23/40 Not or partially compliant)
- Technical use paper Use stage (Q59 21/40 Not or partially compliant)
- Technical use paper Biogenic carbon (Q60 23/40 Not or partially compliant)
- Technical use paper Electricity (Q61 24/40 Not or partially compliant)
- Application of EoL formula (Q63 36/40 Not or partially compliant)

Specifically on allocation procedures: Often allocation plus the method of allocation was not reported separately.

Reference | Q22: Justification of allocation. 66% not or partially reported of relevant cases.

Recommendations: For each of the topics / SS chapters, we recommend to do:

1. Review the relevance of the topic
2. Make a 'shall requirement' to do the reporting
3. Create the relevant reporting requirements
4. Include all operational procedures in the guidance / guide and/or PEFCR. Regarding the allocation, we recommend to create a section in the SS template where all cases of allocation are described, including allocation method and justification.

Learning 3: Items that are 'should' requirements are often skipped and ignored.

Recommendation: Make the TS and TAB aware of this and recommend to review the "should requirements" in the guide and PEFCRs. If it is of critical importance, then consider changing to "shall". If it is not critical, consider removing it to simplify the PEFCR.

Learning 4: When there is room for interpretation or choice, this interpretation is made by the practitioner, but usually not documented.

Recommendations:

1. Evaluate to what extent room for interpretation is needed within the PEFCR. In the future, PEFCRs should be handled without the need for interpretation.
2. To capture cases of interpretation, create a table in the SS called "Expert judgement" to document all choices that are not specifically prescribed in the PEFCR but need to be created in the SS:

Chapter	Topic	Choice	Explanation for choice (if needed)

Learning 5: (primary) Data collection procedures are not consistent between the PEFCRs, and data collection is not transparently reported in most supporting studies. Often it is not completely clear what the data quality and collection requirements are. The data is documented as "received from the company" or very minor source data checks. The data collection is performed with maximum effort but correctness checks are either not implemented or not documented. Also, the data collection period or completeness coverage is often not reported. In one case where the data collection requirements are more specific, it is still not 100% clear how the SS operationalized this and where exactly they have deviated from the PEFCR.

Recommendations:

1. Update the SS study template to accommodate for basic questions like data collection period and completeness checks.
2. A clear data collection template could be provided by the PEFCRs covering data quality, collection requirements and proof documentation (info on quality, collection period, etc.), rather than generic descriptions.
3. Have a fundamental discussion in the TAB/SC on how relevant this data verification procedure is. The current approach is in line with current LCA practice (self-declaration by companies). However, if it is decided that data verification and documentation needs to be more stringent, it is likely that you will need to work with assurance services. This would be an additional step and can increase costs significantly.

Learning 6: Co-products, by-products and waste are often only partially reported, and it is usually unclear if (or how) these were modelled. The baseline EF end-of-life formula is almost never applied to manufacturing waste.

Reference | Q8: 40% not or partially reported of relevant cases

Recommendations:

1. Create a specific part of the reporting template where all co-products, by-products and waste should be addressed specifically including the way they are treated.
2. Often there is a lack of data and the small amounts of waste are only a minor part of the impact. Therefore, the focus is on the most relevant elements causing the largest impact. Hence, providing default datasets including the correct EOL formula for the various types of manufacturing waste will be helpful.

Learning 7: Reporting the most relevant life cycle stages, processes and elementary flows according to annex D of the guidance was often done in a non-compliant way. Such information was reported in a long list of tables covering many pages.

Reference | Q28: 75% not or partially reported of relevant cases

Recommendation: Discuss the added value of reporting the most relevant flows in the current format. As is, it can be considered as an additional administrative burden that some pilots skip, and others deliver multiple pages of tables with information that does not really summarize the key drivers. If the current format is considered to be of added value, then operationalize it with clear tables to be filled in in the SS template. This way, people do not have the opportunity to skip this section or to choose their own (wrong) format or approach.

Learning 8: Most of the supporting studies did not follow up on all the commitments made as a result of the public consultation and Steering Committee feedback.

Reference | Q62: 90% not or partially reported of relevant cases

Recommendation: None.

Learning 9: From the overall review statement, it shows that the supporting studies have very different quality and completeness levels. Some pilots go into much detail, but often a very pragmatic approach of doing less than the minimum is chosen. For instance, items already part of the template were completely skipped without any justification or explanation. We think this is at least partially caused by the resource constraints that a number of individual companies have. This is especially relevant for pilots with many smaller companies instead of a few big ones.

Recommendation: If the EC wants to achieve a minimum quality level, a (small) reimbursement for these supporting studies would be appropriate, for instance provided by the branch association. We believe that if each of the participating companies would have received a compensation for delivering a compliant Supporting Study, the overall quality and completeness could have been significantly better. For future PEFCR development, such compensation could be considered.

5 Task 3: Learnings on horizontal issues

All individual reviews were collected and the answers to the questions provide us with a good overview of the compliance per criteria. The comments of the reviewer provide insight into the problems or learnings that were found.

Impact assessment methods

In Table 2, an overview of the review items concerning impact assessment are displayed. The main insights provided by the review of the SS are summarised in Table 3 together with our recommendations on how some of these could be solved.

Three SS of the same pilot have calculated the results with an impact assessment method composed of 9 impact categories instead of the prescribed EF impact assessment method composed of 15 impact assessment categories. Despite the debate around some of the recommended characterisation models for impact assessment in the EF initiative, most supporting studies did not report anomalies in the application of these methods and default CFs. Also, there were a number of alternative methods used in 16 supporting studies, but this did not result in recommendations other than those already mentioned in Table 3.

Table 2 – Overview of review items concerning impact assessment methods.

Question	Yes	Partially	No	Not relevant
43 Were there anomalies identified in the application of the default 15 impact categories from the ILCD method published by JRC?	6	0	34	0
44 Were there alternative LCIA methods used? Did they provide extra insight?	16	0	24	0

Table 3 – Review insights and recommendations concerning impact assessment methods.

Review insights	Recommendations
<u>Climate change</u> : One SS used climate change excluding carbon dioxide emissions from land use change.	The EC could clearly indicate if this is also a possibility, e.g. as additional environmental information, or if climate change results can only be reported according to the rules specified in the biogenic carbon issue paper.
<u>Water resource depletion</u> : One SS recommended not to use the default method for this impact category and advises the EC to exclude or update it, because 1) cooling and turbine water use (i.e. for hydroelectricity) have high contribution for water resource depletion and the SS considers it debatable whether these elementary flows should be inventoried since they are not consumed but, instead withdrawn and returned to a water compartment. ReCiPe was used as alternative method and worked out better. 2) CFs for water depletion are spatially differentiated per country, causing the results to fluctuate considerably from country to country, and consequently leading to very different scores from the benchmark, even if the net value of water input is similar or contradictory.	<p>It should be explicitly if the water resource depletion impact category assesses water withdrawal or consumption so that cooling and turbine use water flows can be properly quantified.</p> <p>As for the difference among countries, it is intentional for the impact assessment to capture this difference in regional water stress.</p> <p>Guidance from the Commission and per PEFCR is required on the modelling of water consumption.</p> <p>Most existing LCI data is not yet regionalised so this is a necessary development to properly assess water resource depletion impacts also in the background data of a product system. This issue is likely to be solved with the availability</p>

<p>Another SS reports that the characterization factors and the way water consumption is modelled (e.g. how precise and detailed are the information on location and source of water will determine which process or elementary flow is taken into consideration in the study) affect dramatically the overall results.</p> <p>Another SS indicates that water resource depletion requires country specific (background) data which is currently largely missing.</p>	<p>of EF-compliant datasets that are being purchased by the EC.</p>
<p><u>Land use</u>: This impact category was reported in one SS as very unreliable due to inconsistencies in inventory modelling (in background database).</p>	<p>This issue is likely to be solved with the availability of EF-compliant datasets that are being purchased by the EC.</p>
<p><u>Freshwater ecotoxicity</u>: should be dealt with caution given the number of active substances (pesticides and metals) involved and the uncertainty of the impact assessment models. Minimum one order of magnitude (i.e. factor 10) between the two options should be seen as a significant difference.</p>	<p>The EC (consulting the USEtox® team) could provide guidance on the significant difference needed for all toxicity impact categories to avoid the ‘easy’ exclusion of these impact categories from the assessments.</p>

End of life formulas

For this topic, we looked into insights provided by the application of the default EF EoL formula and of alternative formulas implemented in the SS. Despite the extensive debate on the default EoL formula and its ongoing evaluation, only a few SS calculated the results using alternative formulas. It also became apparent that the EoL formula is often only applied to packaging waste or waste of the final product, but that it is almost never applied to manufacturing/processing waste. An overview of the classification of review items about EoL modelling are displayed in Table 4. The main insights and recommendations are summarised in Table 5.

Table 4 – Overview of review items concerning the application of the baseline EF end-of-life formula.

Question	Yes	Partially	No	Not relevant
47 Is the PEF/OEF EoL formula applied and are there new insights provided?	17	11	11	1
48 Were there alternative EoL formulas applied? Did they provide extra insight?	6	3	31	0
63 Was the EoL formula applied not only to packaging waste but also to processing waste that goes to recycling/recovery?	4	21	15	0

Table 5 – Review insights and recommendations concerning the application of the baseline EF end-of-life formula.

Review insights	Recommendations
<p>For various supporting studies, it is neither reported nor clear whether the baseline EoL formula was applied. For others, this modelling approach was not implemented despite being included in the PEF method.</p>	<p>Require explicit reporting of the application of the formula, determining also where and to which materials this was applied.</p>
<p>Because LCI data for some materials with combined recycled and virgin content was sometimes aggregated, it was not possible to model these data following the baseline EF EoL formula. It was also not possible to adapt the recycled content value (R1).</p>	<p>This is likely to be solved with the availability of EF-compliant datasets that are being purchased by the EC, noting that they would need to be disaggregated in such a way to enable modelling of specific R1 rates.</p>

One SS requests instructions on how to deal with missing information for the calculation of the EoL parameters and the default datasets to be used (to be included in the PEFCR), so to make more homogenous the studies that will be performed based on its PEFCR.	Instructions on the virgin material that is to be avoided and on the recycling activities to be accounted for are needed.
Modifying the quality factors (Qs/Qp) have significant influence in the results.	The EC could recommend robust quality factors for a large range of materials, not limited to just packaging materials.
Complex products using numerous types of materials find it difficult to apply the baseline EoL formula and request a clear guideline on how to apply the EF formula and to obtain data for complex products.	The remodelling exercise of the representative products may solve this. Alternatively, the EC could consider a simplification of the formula for such cases.
A few SS implemented alternative EoL formulas and this has a large influence on the results obtained.	The EoL formula chosen and the factors used are determinant for the calculation of the EF profile of products. This need to be robust and the rules unbiased.
For most SS, it was unclear whether the EoL formula was applied to processing/manufacturing waste that goes to material or energy recovery. It seems that it is not being applied.	Provide a template table to be filled in by PEF/OEF studies in which they need to list of material/energy recovery flows, indicating at which life cycle stage they occur, what type of materials are recovered and reporting the necessary EoL parameters (e.g. R1, R2, R3, Qs, etc).

Application of the hotspots issue paper

An overview of the classification of review items about the application of the hotspots issue paper is displayed in Table 6. Although the hotspots issue paper was already integrated in the Guidance document (Annex D) and its application was mandatory for all supporting studies, most have not completely matched the requirements for various reasons. 14 SS (partially) identified other life cycle stages, processes and/or elementary flows, thus highlighting the importance of the SS in identifying the hotspots for a specific PEFCR.

Table 6 – Overview of review items concerning the application of the hotspots issue paper.

Question	Yes	Partially	No	Not relevant
28 Is the list of the most relevant life cycle stages, processes and elementary flows provided as described in the annex D of the guidance?	10	21	9	0
29 Are there any additional most relevant life cycle stages, processes, and flows identified according to the requirements as described in the PEFCR/OEFSR?	9	5	19	7
45 Were there anomalies identified in the application of the default normalisation and weighting sets published by JRC?	8	1	28	3
46 Were alternative normalization and/or weighting sets used for the selection of most relevant impact categories and did this provide new insights?	4	0	36	0
49 Are there anomalies identified in the application of the methodology to identify most relevant processes, elementary flows, life cycle stages and hotspots? If so, which?	12	2	26	0
50 Were there anomalies identified when dealing with vertically aggregated datasets? If so, which?	1	0	24	15
51 Were the specific instructions about aggregating elementary flows implemented? Did they provide extra insight?	0	9	30	1
52 Were the specific instructions about identifying the most relevant elementary flows per process implemented? Did they provide extra insight compared to identifying the most relevant elementary flows at life cycle level?	1	8	30	1

Table 7 – Review insights and recommendations concerning the application of the hotspots issue paper.

Review insights	Recommendations
In the SS, various deviations from the instructions of the hotspots issue paper were made, e.g. other thresholds were used, the identification was limited to most relevant impact categories or life cycle stages only, etc.	Reinforce the need to follow the rules specified in Annex D of the Guidance. Also, specify which of these will be needed for EF studies after PEFCRs/OEFSRs have been approved.
For impact categories with negative characterised results, e.g. land use, the hotspots were not identified.	Provide an example in Annex D that illustrates how to do the assessment in case of negative contributions.
Most SS did not identify the most relevant elementary flows per process, and for most SS it was unclear whether they followed the instructions about aggregating elementary flows.	None
Some SS did not calculate normalized and weighted results, failing to confirm the identification of most relevant impact categories using them. For a few SS, methodological issues with normalization and weighting are mentioned, but not specified. A few SS assessed different normalization and weighting factors. Only for one SS additional impact categories would be identified as most relevant, when using the weighting set by Ponsioen & Goedkoop.	The identification of most relevant impact categories can be influenced by the weighting set selected. A better approach for selecting most relevant impact categories is required.

The use of the Data Needs Matrix or the baseline PEF/OEF approach on data requirements

The implementation of the data requirements issue paper or the baseline PEF/OEF approach on data requirements was evaluated. An overview of the classification of review items about the data (quality) requirements is displayed in Table 8 and the main highlights and recommendations are summarised in Table 9.

Table 8 – Overview of review items regarding data (quality) requirements.

Question	Yes	Partially	No	Not relevant
9 Is there a diagram indicating the system boundaries and the processes that are included and those excluded, highlighting those activities which fall respectively under situation 1, 2 or 3 of the Data Needs Matrix, and highlighting where primary activity data / primary life cycle inventory is used?	14	25	1	0
15 Is primary and secondary data selected as described in the PEFCR?	25	10	5	0
24 Does the supporting study report the data quality assessment scoring per process according in accordance with the PEFCR requirements?	27	4	9	0
53 Were there anomalies in the application of the procedure to be applied when implementing the PEFCR/OEFSR used? Did this provide new insights?	11	4	20	5
54 Were there anomalies in the re-calculation of the data quality ratings using the formula to re-calculate the DQR provided in the version 5.2 of the guidance.	9	6	23	2
55 Were there anomalies in the selection of primary and secondary data according to the requirements of the version 5.2 of the guidance.	9	2	23	6

Table 9 – Review insights and recommendations regarding data (quality) requirements.

Review insights	Recommendations
The majority of the SS did not present a system diagram clearly distinguishing processes in situations 1, 2 and 3 (in case Annex E was implemented). Most just copied the original system diagram from the draft PEFCR and highlighted the life cycle stage for which they have control.	Recommend the PEFCR to have a system diagram to be used in EF studies for which each process shall be tagged with one of three colours for situations 1, 2 and 3.
Most SS reported the data quality assessment scoring per process according to the PEFCR requirements. Some only did this at life cycle stage level and not per process.	The remodelling exercise should clearly establish a list of processes included to avoid assessment at different levels of detail. This complete list of processes with its data quality score for the representative product model should be clearly presented.
Some SS found it difficult to meet the data quality score requirements because of 1) low representativeness (TeR, GR and TiR) and low methodological appropriateness and consistency of secondary datasets used and 2) data gaps.	This is likely to be solved with the availability of EF-compliant datasets that are being purchased by the EC.

Benchmarking and classes of performance

In Table 10 an overview of the classification of review items related to benchmarking and classes of performance is displayed. Table 11 presents a list of key insights and recommendations.

Table 10 – Overview of review items regarding benchmarking and classes of performance.

Question	Yes	Partially	No	Not relevant
41 Is the product compared to the benchmark defined at PEFCR/OEFSR level?	19	3	14	4
42 Is the score of the product regarding its class of performance calculated and reported?	6	0	27	7
56 Was the product compared to the benchmark defined at PEFCR/OEFSR level?	20	3	12	5
57 Was the score of the product regarding its class of performance calculated and reported?	3	3	29	5

Table 11 – Review insights and recommendations regarding benchmarking and classes of performance.

Review insights	Recommendations
For various SS of 3 different pilots, the products are not compared to the benchmark because no benchmarks are defined in the draft PEFCRs. Other SS that have not compared provided the following reasons: 1) because use phase is different for different products of the same category, 2) products are very specific and cannot be compared to the average benchmark for this product category.	For pilots that did not do the comparison, arguing this is not appropriate, the appropriateness of the functional unit and of the granularity of the product group should be assessed.
When comparing the benchmark with the product, results were often very different. For one SS, it was concluded that comparing the EF performance of a specific 'real' product with a virtual product is inappropriate.	Benchmarks for food products should be related with the product nutritional value in order to promote sustainable diets to consumers, which combines both public health and environmental objectives.
Most draft PEFCRs/OEFSRs did not yet include a section on classes of performance. As a result, the majority of the supporting studies did not include this in the SS.	The EC to provide clear guidance on the definition of classes of performance and to indicate if it is a 'shall' or 'should' requirement for a pilot.

Other horizontal issues

The following list of horizontal issues was selected to analyse in the review of the SS with the Commission: biodiversity, use stage, biogenic carbon, electricity modelling, and level of granularity. The overview of the classification of the review and the key insights and recommendations are shown in Table 12 and Table 13, respectively.

Table 12 – Overview of review items regarding other horizontal issues.

Question	Yes	Partially	No	Not relevant
58 Does the supporting study follow the guidance regarding biodiversity from the PEFCR/OEFSR?	6	2	21	11
59 Does the supporting study follow the technical use paper on use stage?	11	6	15	8
60 Does the supporting study follow the technical use paper on biogenic carbon?	14	1	22	3
61 Does the supporting study follow the technical use paper on electricity?	13	9	15	3
64 Does the level of granularity of the PEFCR allows a meaningful comparison of the product with the RP/benchmark?	3	18	3	16

Table 13 – Review insights and recommendations regarding other horizontal issues.

Review insights	Recommendations
<u>Biodiversity</u> : Most SS reviewed did not assess biodiversity and for some of those, there was no requirement to address biodiversity in the PEFCR. Those who did assess biodiversity tend to have a closer connection to natural systems in their activities. Although they assess it, there are often no clear recommendations made for integration in the PEFCR. Also, when various alternatives for assessing biodiversity were explored, there is no recommendations for which should be used in the future.	Provide more concrete guidance on how biodiversity can be assessed and include a default section for this in the PEFCR and supporting study templates.
<u>Use stage</u> : Only one quarter of the SS explicitly follow this issue paper; most remaining do not make any reference to the use stage issue paper so it is unclear whether the requirements established in the issue paper are followed.	Provide in the PEFCR and supporting studies templates a section with default reporting items for the use stage in order to comply with the issue paper.
<u>Biogenic carbon</u> : For pilots for which the biogenic carbon issue paper is relevant (i.e. the contribution of biogenic GHG emissions and from land transformation contribute with more than 5% of the total climate change score), the 3 separate sub-categories are not systematically calculated and reported.	Provide in the PEFCR and supporting studies templates a section with default reporting items for the biogenic carbon in order to comply with the issue paper. The first is simply a Yes/No for the 5% contribution of the biogenic emissions, carbon uptake and CO ₂ from land transformation. The other items are only to be filled in in case the contribution is higher than 5%. Specify whether the contribution needs to be calculated each time or if the PEFCR can prescribe this for all studies of that product category.
<u>Electricity</u> : Although most SS do not document if they follow the issue paper on electricity, most seem to be in line because they simply use the country or European average grid mix. One SS stated that the process to find the relevant	Attempt to simplify the process to proof that green electricity is used. Clearly indicate how upstream processes that use renewable electricity can be accounted for in EF studies.

<p>certificates proving that there is no double counting when green electricity is used should be simplified. Also, due to the difficulty to prove that renewable sources of energy were used, the SS used country mix electricity data instead. Another SS indicated the difficulty to apply consumption mixes to secondary datasets. if upstream suppliers own the guarantees of origins (so these are not in the level of influence of brewers), it is not possible to get the necessary statements and thus not possible to prove renewable electricity to adapt the electricity mix of secondary datasets in situation 2, option 2.</p>	
<p><u>Level of granularity:</u> SS from various pilots state that comparing specific products to a benchmark would not be appropriate.</p>	<p>Further develop the issue paper on level of granularity by enquiring all pilots what are the elements required to ensure comparability within their product category, including extending or reducing the scope of product group.</p>

Annex I. Review template

GENERAL INFORMATION

Pilot name
Product/Organization under study
Draft PEFCR/OEFSR followed
Guidance document (version) followed
Software used for the assessment
Supported by consultant (if any)
Company conducting the supporting study

Example

Pilot name
Product
version 2.3 of 22 July 2016
5.2
Software name
Consultant company name
Company name

Company contact person name
Company contact person email
Reviewer name
Quality assurance name

Name@company.com
First name Last name
Pau Huguet Ferran
Max Sonnen

SUPPORTING STUDY REVIEW

Question #	Section	Sub-section	Review question	Reviewer answer	Follow-up question	Comment field
1	Summary	Summary	Does the supporting study include a summary according to the requirements of the supporting study template?		If partially / NO please comment	
2	General	General	Does the supporting study include the general information as described in the supporting study template?		If partially / NO please comment	
3	General	General	Does the supporting study include the statements about compliance with the guide requirements, data collection and data quality assessment procedures, and confidentiality as described in the supporting study template?		If partially / NO please comment	

4	Goal of the study	Goal of the study	Does the supporting study include the definition of the goal of the study as described in the supporting study template?		If partially / NO please comment	
5	Goal of the study	Goal of the study	Does the supporting study include any additional intended application?		If partially / YES please specify	
6	Scope of the study	Functional/declared unit	Is the functional unit provided as described in the PEFCR?		If partially / NO please comment	
7	Scope of the study	System boundaries	Does the supporting study include the list of all attributable life cycle stages and processes that are part of the product system?		If partially / NO please comment	
8	Scope of the study	System boundaries	Are the co-products, by-products and waste streams of at least the foreground system clearly identified?		If partially / NO please comment	
9	Scope of the study	System boundaries	Is there a diagram indicating the system boundaries and the processes that are included and those excluded, highlighting those activities which fall respectively under situation 1, 2 or 3 of the Data Needs Matrix, and highlighting where primary activity data / primary life cycle inventory is used?		If partially / NO please comment	
10	Scope of the study	System boundaries	Are the system boundaries defined as described in the PEFCR?		If partially / NO please comment	
11	Scope of the study	System boundaries	Are the foreground and background systems defined as described in the PEFCR?		If partially / NO please comment	
12	Scope of the study	Supplementary analysis	Does the supporting study include and describes (calculation procedure, assumptions, data sources, etc.) the additional supplementary analysis required in the PEFCR?		If partially / NO please comment	
13	Scope of the study	Supplementary analysis	Does the supporting study include and describes (calculation procedure, assumptions, data sources, etc.) any other additional supplementary analysis not defined in the PEFCR?		If YES please comment	
14	Life cycle inventory analysis	Data collection and quality assessment	Does the supporting study include the documentation and description of all primary data collected as specified in the supporting study template (list per life cycle stage, list activity data used, detailed bill of materials, list of primary		If partially / NO please comment	

			and secondary datasets used, modelling parameters derived from primary data)?			
15	Life cycle inventory analysis	Data collection and quality assessment	Is primary and secondary data selected as described in the PEFCR?		If partially / NO please comment	
16	Life cycle inventory analysis	Data collection and quality assessment	Does the supporting study include a description of the primary data collection procedures		If partially / NO please comment	
17	Life cycle inventory analysis	Data collection and quality assessment	Are the primary data collection/estimation/calculation procedures implemented as defined in the PEFCR?		If partially / NO please comment	
18	Life cycle inventory analysis	Data collection and quality assessment	Does the supporting study include a list of the sources of published literature?		If partially / NO please comment	
19	Life cycle inventory analysis	Data collection and quality assessment	Are the sources of published literature identified as defined in the PEFCR?		If partially / NO please comment	
20	Life cycle inventory analysis	Data collection and quality assessment	Does the supporting study include a validation of data, including documentation?		If partially / NO please comment	
21	Life cycle inventory analysis	Data collection and quality assessment	Does the data validation satisfy the requirements of the PEFCR?		If partially / NO please comment	
22	Life cycle inventory analysis	Data collection and quality assessment	Does the supporting study include the justification of the allocation procedures used?		If partially / NO please comment	
23	Life cycle inventory analysis	Data collection and quality assessment	Is the justification of the allocation procedures defined as described in the PEFCR?		If partially / NO please comment	
24	Life cycle inventory analysis	Data collection and quality assessment	Does the supporting study report the data quality assessment scoring per process according in accordance with the PEFCR requirements?		If partially / NO please comment	
25	Life cycle inventory analysis	Data gaps	Does the supporting study specify data gaps and the way these data gaps are filled?		If partially / NO please comment	

26	Life cycle inventory analysis	Data gaps	Are the data gaps filled as described in the PEFCR?		If partially / NO please comment	
27	Life cycle inventory analysis	Data gaps	Are there any recommendations given to the final PEFCR development regarding data gaps?		If partially / YES please comment	
28	Impact assessment results	PEF/OEF results	Is the list of the most relevant life cycle stages, processes and elementary flows provided as described in the annex D of the guidance?		If partially / NO please comment	
29	Impact assessment results	PEF/OEF results	Are there any additional most relevant life cycle stages, processes, and flows identified according to the requirements as described in the PEFCR/OEFSR?		If partially / YES please comment	
30	Impact assessment results	PEF/OEF results	Are the characterised results per life cycle and impact category provided for all 15 impact categories?		If partially / NO please comment	
31	Impact assessment results	PEF/OEF results	Are there the normalised and weighted results per life cycle and impact category provided?		If partially / NO please comment	
32	Impact assessment results	PEF/OEF results	Is there all the additional environmental information as required by the PEFCR/OEFSR provided?		If partially / NO please comment	
33	Impact assessment results	PEF/OEF results	Are the limitations of the EF results relative to the goal and scope of the PEF/OEF study provided?		If partially / NO please comment	
34	Impact assessment results	Supplementary analysis	Are the results and conclusions of the supplementary analysis provided?		If partially / NO please comment	
35	Impact assessment results	Supplementary analysis	Are there conclusions and recommendations given to the final PEFCR/OEFSR?		If partially / YES please comment	
36	Interpreting PEF/OEF results	PEF/OEF results	Are the supporting study results compared to those of the screening study, describing and explaining the differences?		If partially / NO please comment	
37	Interpreting PEF/OEF results	PEF/OEF results	Is there general feedback given to the final PEFCR/OEFSR?		If partially / YES please comment	

38	Interpreting PEF/OEF results	PEF/OEF results	Is the degree of accuracy of the supporting study described?		If partially / NO please comment	
39	Interpreting PEF/OEF results	PEF/OEF results	Is the average DQR for the supporting study described?		If partially / NO please comment	
40	Interpreting PEF/OEF results	PEF/OEF results	Is there at least a qualitative description of the uncertainty of the study?		If partially / NO please comment	
41	Interpreting PEF/OEF results	Comparison to the benchmark	Is the product compared to the benchmark defined at PEFCR/OEFSR level?		If partially / NO please comment	
42	Interpreting PEF/OEF results	Performance classes	Is the score of the product regarding its class of performance calculated and reported?		If partially / NO please comment	
43	Horizontal issues	Impact assessment methods	Were there anomalies identified in the application of the default 15 impact categories from the ILCD method published by JRC?		If partially / YES please comment	
44	Horizontal issues	Impact assessment methods	Were there alternative LCIA methods used? Did they provide extra insight?		If partially / YES please comment	
45	Horizontal issues	Most relevant impact categories	Were there anomalies identified in the application of the default normalisation and weighting sets published by JRC?		If partially / YES please comment	
46	Horizontal issues	Most relevant impact categories	Were alternative normalization and/or weighting sets used for the selection of most relevant impact categories and did this provide new insights?		If partially / YES please comment	
47	Horizontal issues	End of life formulas	Is the PEF/OEF EoL formula applied and are there new insights provided?		If partially / YES please comment	
48	Horizontal issues	End of life formulas	Were there alternative EoL formulas applied? Did they provide extra insight?		If partially / YES please comment	
49	Horizontal issues	Most relevant processes, elementary flows, life cycle stages and hotspots	Are there anomalies identified in the application of the methodology to identify most relevant processes,		If partially / YES please comment	

			elementary flows, life cycle stages and hotspots? If so, which?			
50	Horizontal issues	Most relevant processes, elementary flows, life cycle stages and hotspots	Were there anomalies identified when dealing with vertically aggregated datasets? If so, which?		If partially / YES please comment	
51	Horizontal issues	Most relevant processes, elementary flows, life cycle stages and hotspots	Were the specific instructions about aggregating elementary flows implemented? Did they provide extra insight?		If partially / YES please comment	
52	Horizontal issues	Most relevant processes, elementary flows, life cycle stages and hotspots	Were the specific instructions about identifying the most relevant elementary flows per process implemented? Did they provide extra insight compared to identifying the most relevant elementary flows at life cycle level?		If partially / YES please comment	
53	Horizontal issues	Data needs matrix	Were there anomalies in the application of the procedure to be applied when implementing the PEFCR/OEFSR used? Did this provide new insights?		If partially / YES please comment	
54	Horizontal issues	Data needs matrix	Were there anomalies in the re-calculation of the data quality ratings using the formula to re-calculate the DQR provided in the version 5.2 of the guidance?		If partially / YES please comment	
55	Horizontal issues	Data needs matrix	Were there anomalies in the selection of primary and secondary data according to the requirements of the version 5.2 of the guidance?		If partially / YES please comment	
56	Horizontal issues	Benchmarking and classes of performance	Was the product compared to the benchmark defined at PEFCR/OEFSR level?		If partially / YES please comment	
57	Horizontal issues	Benchmarking and classes of performance	Was the score of the product regarding its class of performance calculated and reported?		If partially / YES please comment	
58	Horizontal issues	Biodiversity	Does the supporting study follow the guidance regarding biodiversity from the PEFCR/OEFSR?		If partially / NO please comment	
59	Horizontal issues	Use stage	Does the supporting study follow the technical use paper on use stage?		If partially / NO please comment	
60	Horizontal issues	Biogenic carbon	Does the supporting study follow the technical use paper on biogenic carbon?		If partially / NO please comment	

61	Horizontal issues	Electricity	Does the supporting study follow the technical use paper on electricity?		If partially / NO please comment	
62	Others	Review of screening studies	Does the supporting study tests the items specified in the review report of the screening studies and the commitments taken in the SC meeting and during the public consultation by the pilots?		If partially / NO please comment	
63	Horizontal issues	End of life formulas	Was the EoL formula applied not only to packaging waste but also to processing waste that goes to recycling/recovery?		If partially / NO please comment	
64	Others	Level of granularity	Does the level of granularity of the PEFCR allows a meaningful comparison of the product with the RP/benchmark?		If partially / NO please comment	
65	Others	Link to other PEFCRs/OEFSRs	Does the SS refer to other PEFCR/OEFSR apart from the one for which it has been developed?		If partially / YES please comment	
66	Overall evaluation of the supporting study		This constitutes a summary of the review of the supporting study, i.e. general review statement.			

Annex II. Individual reviews of supporting studies

This annex is confidential. It is enclosed to this document in a zip file containing all 40 reviews and files responding to the commitments made in the SC meeting and during the public consultation by the pilots.