



# PEFCR for Dairy Products – Partial revision

EF SG meeting, 18 December 2024

# Project information



## PEFCR for Dairy Products

connect to the world of dairy

### Who is EDA?

The European Dairy Association (EDA) is the acknowledged voice of the European milk processing industry creating a European forum for both, high level debates on the future of the European "lactosphère" and in-depth analysis of today's dairy related topics on the European agenda

PROJECT INFORMATION	
<b>Project Title</b>	Product Environmental Footprint Category Rules (PEFCR) for Dairy Products
<b>Contracting organisation</b>	The European Dairy Association (EDA)
<b>Liability Statement</b>	Information contained in this report has been compiled from and/or computed from sources believed to be credible. Application of the data is strictly at the discretion and the responsibility of the reader. Blonk is not liable for any loss or damage arising from the use of the information in this document.
<b>Blonk Project team</b>	Jasper Scholten, Business Unit Manager (jasper@blonksustainability.nl) Iana Salim, Sustainability Consultant (iana@blonksustainability.nl) Naomi Buijs, Sustainability Consultant (naomi@blonksustainability.nl)
<b>Commissioner</b>	Alberto Babolin (ABABOLIN@euromilk.org) European Dairy Association 22-28 Avenue d'Auderghem 1040 Brussels – Belgium

# Agenda

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- Technical secretariat
- Timeline and main activities
- Documents updated
- Panel review and open consultation
- TAB scrutiny

# Technical secretariat – partial revision



Name of the organisation	Type of organisation	Name of the members
European Dairy Association (EDA)	Industry association	Alberto Babolin
Alliance for Beverage Carton and the Environment (ACE)	Industry association	Michel Steinecke
Association de la Transformation Laitière Française (ATLA)	Industry association	Pierre Barrucand
Savencia (under ATLA)	Industry	Auriane Pouvreau
Blonk Sustainability, Mérieux NutriSciences Company (Blonk)	Industry	Naomi Buijs, Iana Câmara Salim, Jasper Scholten
Arla Foods (under Danish Dairy Board)	Industry	Maiken Voigt
Deutsches Milchkontor GmbH (DMK)	Industry	Dirk Von Aschwege
European Container Glass Association (FEVE)	Industry association	Fabrice Rivet Giulia Gallo Vanessa Chesnot
Fonterra	Industry	Andrew Fletcher
Lactalis	Industry	Marie-Laure Brandy
Milchindustrie-Verband e.V. (MIV)	Industry association	Astrid Stein
FrieslandCampina (under NZO)	Industry	Sanne Dekker (coordinated by NZO)
Royal A-ware (under NZO)	Industry	Raoul Schiffer (coordinated by NZO)
Zbornica kmetijskih in živilskih podjetij (GZS)	Industry association	Barbara Rupnik

# Timeline and steps - partial revision

Step	2021/2	2023				2024			
	022	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Compose new technical secretariat									
Monthly progress meetings									
RP model in SimaPro									
Set up wikipage									
Compose review panel									
EF 3.1 data available in SP									
Update PEFCR									
Preparation of consultation and panel review									
Consultation									
Panel review									
Draft final PEFCR									
Scrutiny by the TAB									
Approval final PEFCR									

# Panel review and open consultation

Review panel	Affiliation	Role
<b>Greg Thoma</b>	University of Arkansas	LCA and dairy expert
<b>Jude Capper</b>	Livestock Sustainability Consultancy	LCA and dairy expert
<b>Judith Brouwer</b>	LCA and dairy expert	NGO representative
<b>Number of comments received</b>	<b>298</b>	

Open consultation	
<b>Start date</b>	September 04, 2024
<b>End date</b>	October 11, 2024
<b>Number of participant stakeholders (online)</b>	5
<b>Organisations that participated</b>	<ul style="list-style-type: none"> <li>• EF Helpdesk (Studio Fieschi &amp; soci)</li> <li>• Pre Sustainability</li> <li>• IRTA - Institute of Agrifood Research and Technology (IRTA)</li> <li>• Natural Resources Institute Finland (Luke)</li> <li>• Glimpact</li> </ul>
<b>Number of comments received</b>	<b>69</b>

# Documents updated of the partial revision

Document	Updated/created
<b>PEFCR for dairy products (main document)</b> <i>PEFCR-DairyProducts_05.11.2024</i>	Updated
<b>LCI data</b> <i>PEFCR-partial update DairyProducts_Version1- Life cycle inventory_28.10.2024</i>	Updated
<b>Model of the RPs PEFCR for dairy products update</b> <i>ExcelModel_RP_DairyPEFCR</i>	Updated

# Representative products

Sub-category	Type	Typical products
<b>Liquid milk</b>	F*	Standardised milk (skimmed, semi-skimmed, whole milk)
<b>Dried whey products</b>	I <sup>+</sup>	Whey powder, whey protein powder, lactose powder
<b>Cheeses</b>	F	Ripened cheese (soft and hard), unripened cheese (spoonable, spreadable, solid)
<b>Fermented milk products</b>	F	Spoonable yoghurt (set, stirred), fermented milk drinks (liquid yoghurt, kefir)
<b>Butterfat products</b>	F	Butter (salted, unsalted), spreadable dairy fats

\*Final product

+Intermediate product

# Life cycle stages



Life cycle stage	Activities
<b>1. Raw milk supply</b>	Feed production (incl. pesticide and fertiliser inputs and emissions, energy, irrigation water, land transformation, feed processing, etc.)
	Milk production (incl. direct emissions at the farm)
	Milk collection and transport to dairy processing unit
<b>2. Dairy processing</b>	Dairy products processing (incl. energy use and wastewater treatment)
	Dairy ingredients processing (incl. energy use and wastewater treatment)
	Dairy ingredients transport to dairy processing unit
	Container filling or product packing
	On-site warehousing (storage)
<b>3. Non-dairy ingredients supply</b>	Production of non-dairy ingredients
	Non-dairy ingredients packaging manufacturing
	Non-dairy ingredients transport to dairy processing unit
<b>4. Packaging</b>	Raw materials production
	Packaging manufacturing (primary and secondary)
	Packaging transport to dairy processing unit
<b>5. Distribution</b>	Transport to the distribution centre
	Warehousing at distribution centre (storage, incl. refrigeration where relevant)
	Transport to point of sale
	Retailing at point of sale (storage, incl. refrigeration where relevant)
	Transport to final user
<b>6. Use</b>	Chilling operations in domestic refrigerator (at final user) and dishwashing
<b>7. End of life</b>	Household waste: packaging (and food) waste transport and treatment

# Most relevant impact categories

The **most relevant impact categories** for all five product sub-categories in scope of this PEFCR are:

- Climate change
- Ecotoxicity, freshwater
- Particulate matter
- Acidification
- Eutrophication, terrestrial
- Eutrophication, marine
- Resource use, fossils
- Water use

Additional impact sub-categories that shall be reported separately (since they contribute to over 5% of the total climate change impact):

- Climate change – biogenic
- Climate change – land use and land transformation

# Most relevant life cycle stages

Sub-category	Raw milk supply	Dairy processing	Non-dairy ingredients supply	Packaging	Distribution	Use stage	End of life
Liquid milk	Yes	No	No	Yes	No	Yes	No
Dried whey products	Yes	Yes	No	No	n/a	n/a	n/a
Cheeses	Yes	No	No	No	No	No	No
Fermented milk products	Yes	Yes	Yes	Yes	Yes	No	No
Butterfat products	Yes	No	No	No	No	No	No

# Most relevant processes

Example for butterfat



Impact category	Processes
Climate change	Cow milk {EU+EFTA+UK}   typical (average) production   production mix, at farm   FPCM (Fat Protein Corrected Milk)   LCI result (from LC stage "Raw milk supply")
Climate change - biogenic	Cow milk {EU+EFTA+UK}   typical (average) production   production mix, at farm   FPCM (Fat Protein Corrected Milk)   LCI result (from LC stage "Raw milk supply")
Climate change - land use and transformation	Cow milk {EU+EFTA+UK}   typical (average) production   production mix, at farm   FPCM (Fat Protein Corrected Milk)   LCI result (from LC stage "Raw milk supply")
Ecotoxicity, freshwater	Cow milk {EU+EFTA+UK}   typical (average) production   production mix, at farm   FPCM (Fat Protein Corrected Milk)   LCI result (from LC stage "Raw milk supply")
Particulate matter	Cow milk {EU+EFTA+UK}   typical (average) production   production mix, at farm   FPCM (Fat Protein Corrected Milk)   LCI result (from LC stage "Raw milk supply")
Acidification	Cow milk {EU+EFTA+UK}   typical (average) production   production mix, at farm   FPCM (Fat Protein Corrected Milk)   LCI result (from LC stage "Raw milk supply")
Eutrophication, terrestrial	Cow milk {EU+EFTA+UK}   typical (average) production   production mix, at farm   FPCM (Fat Protein Corrected Milk)   LCI result (from LC stage "Raw milk supply")
Eutrophication, marine	Cow milk {EU+EFTA+UK}   typical (average) production   production mix, at farm   FPCM (Fat Protein Corrected Milk)   LCI result (from LC stage "Raw milk supply")
Water use	Cow milk {EU+EFTA+UK}   typical (average) production   production mix, at farm   FPCM (Fat Protein Corrected Milk)   LCI result (from LC stage "Raw milk supply")
Resource use, fossils	Cow milk {EU+EFTA+UK}   typical (average) production   production mix, at farm   FPCM (Fat Protein Corrected Milk)   LCI result (from LC stage "Raw milk supply")
	Electricity grid mix 1kV-60kV {EU+EFTA+UK}   technology mix   consumption mix, to consumer   1kV - 60kV   LCI result (from LC stages "Dairy processing", "Distribution" and "Use stage")
	Thermal energy from natural gas {EU+EFTA+UK}   technology mix regarding firing and flue gas cleaning   production mix, at heat plant   MJ, 100% efficiency   LCI result

# RP results update per impact category – Example butterfat

Results per 50g of butterfat–  
Characterization step



Impact category	Unit	EF 2.0			EF 3.1			% Difference
		Life cycle excl. Use stage	Use stage	Total 2.0	Life cycle excl. Use stage	Use stage	Total 3.1	
Climate change	kg CO <sub>2</sub> eq	4.60E-01	3.18E-03	<b>4.63E-01</b>	4.49E-01	3.13E-03	<b>4.52E-01</b>	-2.4%
Climate change - biogenic		2.45E-01	2.22E-05	<b>2.45E-01</b>	1.91E-01	2.20E-05	<b>1.91E-01</b>	-22.2%
Climate change - fossil		1.51E-01	3.15E-03	<b>1.54E-01</b>	1.68E-01	3.11E-03	<b>1.71E-01</b>	10.8%
Climate change – land use and land transformation		6.39E-02	3.21E-06	<b>6.39E-02</b>	9.06E-02	3.31E-06	<b>9.06E-02</b>	41.7%
Ozone depletion	kg CFC-11 eq	1.55E-09	3.80E-11	<b>1.59E-09</b>	1.48E-09	3.82E-11	<b>1.52E-09</b>	-4.3%
Particulate matter	disease incidence	3.06E-08	9.69E-11	<b>3.07E-08</b>	5.87E-08	9.98E-11	<b>5.88E-08</b>	91.7%
Ionising radiation, human health	kBq U <sup>235</sup> eq	1.25E-02	1.27E-03	<b>1.38E-02</b>	1.22E-02	1.27E-03	<b>1.35E-02</b>	-2.0%
Photochemical ozone formation, human health	kg NMVOC eq	9.88E-04	5.31E-06	<b>9.93E-04</b>	1.35E-03	5.25E-06	<b>1.36E-03</b>	36.9%
Acidification	mol H <sup>+</sup> eq	4.04E-03	9.61E-06	<b>4.05E-03</b>	5.37E-03	9.47E-06	<b>5.38E-03</b>	32.9%
Eutrophication, terrestrial	mol N eq	1.74E-02	1.99E-05	<b>1.74E-02</b>	2.36E-02	1.94E-05	<b>2.36E-02</b>	35.3%
Eutrophication, freshwater	kg P eq	3.46E-05	1.12E-07	<b>3.47E-05</b>	4.97E-05	1.12E-07	<b>4.98E-05</b>	43.5%
Eutrophication, marine	kg N eq	1.21E-03	2.21E-06	<b>1.21E-03</b>	3.02E-03	2.08E-06	<b>3.03E-03</b>	149.6%
Land use	Dimensionless (pt)	4.51E+01	2.52E-02	<b>4.51E+01</b>	3.46E+01	1.50E-02	<b>3.46E+01</b>	-23.3%
Water use	m <sup>3</sup> world eq	8.48E-02	1.04E-03	<b>8.58E-02</b>	1.23E-01	1.19E-03	<b>1.24E-01</b>	44.8%
Resource use, minerals and metals	kg Sb eq	5.20E-07	6.55E-09	<b>5.27E-07</b>	1.91E-07	4.43E-09	<b>1.95E-07</b>	-62.9%
Resource use, fossils	MJ	1.47E+00	5.40E-02	<b>1.52E+00</b>	1.31E+00	5.39E-02	<b>1.37E+00</b>	-10.2%
Human toxicity, cancer	CTUh	n.a	n.a	<b>n.a</b>	1.90E-10	1.35E-12	<b>1.91E-10</b>	<b>n.a</b>
Human toxicity, non-cancer	CTUh	n.a	n.a	<b>n.a</b>	1.34E-08	2.76E-11	<b>1.34E-08</b>	<b>n.a</b>
Ecotoxicity, freshwater	CTUe	n.a	n.a	<b>n.a</b>	5.69E+01	3.34E-02	<b>5.69E+01</b>	<b>n.a</b>

# Differences EF 2.0 & 3.1

**General context:**

These differences can be explained by:

- a. Different datasets EF2 X EF3.1; Difficult to investigate (black box)
- b. Different/improved method EF2 X EF3.1
- c. And/Or a combination of both

Impact Category	Main Difference (EF 2.0 vs EF 3.1)	Explanation
Climate change (kg CO2 eq)	Differences in modelling (e.g., peatland oxidation) and of Methodology update characterization factors	
Ecotoxicity, freshwater (CTUe)	Update of some characterization factors (chlorpyrifos, bifenthrin, lambda cyalothrin)	Methodology update
Eutrophication, terrestrial (kg eq)	Regionalization of Ammonia flows in EF 3.1, which was not done in EF 2.0	Ammonia emissions from fertilizer application has been modelled in more detail in EF 3.1
Human toxicity, cancer (CTUh)	The use of different Chromium elementary flows in farm modelling that is not characterized under human toxicity	Chromium III has zero emission factor for human toxicity in EF 3.1, unlike EF 2.0
Land use (pt)	Different land use types between EF 2.0 and EF 3.1 due to updated LANCA method	EF 3.1 uses agricultural land occupation vs. annual land occupation in EF 2.0
Acidification	Regionalization of Ammonia flows in EF 3.1, which was not done in EF 2.0	Ammonia emissions from fertilizer application has been modelled in more detail in EF 3.1
Water use	Changes in impacts of the background data	Difficult to identify the exact reasons due to aggregated datasets

# Differences in climate change

## Cow milk production in Europe

	EF2 - GWP100/AR5	EF3.1 - GWP100/AR6
Total climate change [kg CO <sub>2</sub> eq]	1.37	1.33
Climate change – Land use change [kg CO <sub>2</sub> eq]	0.205	0.29
Climate change – Peat oxidation [kg CO <sub>2</sub> eq]	N/A	Part of LUC emissions*

GWP	EF2.0 (IPCC AR*5)	EF3.1 (IPCC AR6)
CO <sub>2</sub>	1	1
Biogenic CH <sub>4</sub>	34	27.2
N <sub>2</sub> O	298	273

\* IPCC Assessment Report (AR)

\* The new EF method required to include peat emissions but the EF3.1 LCIA method does not yet have a separate flow so peat emissions are included under LUC emissions

# Processing of feedback-main updates

Type of feedback	Comment	Action
<b>Editorial</b>	Check reference structure; Grammatical corrections	Review documents for editorial corrections
	Default content updated to Commission Recommendation (EU) 2021/2279 of 15 December 2021	Updated main text according to the default content of Commission Recommendation (EU) 2021/2279 of 15 December 2021
<b>General</b>	Revise confusing sections and eliminate inconsistencies	Simplified some sections and eliminated inconsistencies
	Add details about the update, including the executive summary	Added details and updated the executive summary
<b>Technical</b>	Elaborate on most important impact categories, and most important life cycle stages	More elaborated explanation to reviewers of the most important categories and life cycle stages
	Elaborate better on the choices of the representative products and datasets used, for instance, allocation type used, etc	More elaborated explanation to reviewers concerning the representative products and assumptions made in the pilot PEFCR

# Comments for a full update

Type of feedback	Comment
<b>Technical</b>	Update of the representative products
	Update allocation according to new IDF 2021
	Revise functional units and reference flows
	Revise feed composition and secondary datasets used
	Primary or secondary data for raw milk supply is used for comparison but only against the benchmark: Possibility to include a sentence stating that comparisons with the benchmark are not allowed.

# Main changes

Changes	
<ul style="list-style-type: none"> <li>▪ List of tables, figures, acronyms, definitions</li> </ul>	Generic update
<ul style="list-style-type: none"> <li>▪ Technical secretariat</li> <li>▪ Consultations and stakeholders</li> <li>▪ Review panel and review requirements</li> <li>▪ Review statement</li> <li>▪ Conformance to other documents</li> </ul>	Update of TS, consultation procedure, review panel and review statement
<ul style="list-style-type: none"> <li>▪ EF impact assessment</li> </ul>	➤ Update of EF method from 2 to 3.1
<ul style="list-style-type: none"> <li>▪ Most relevant impact categories ; stages and processes</li> </ul>	<ul style="list-style-type: none"> <li>➤ Update of most relevant impact categories</li> <li>➤ Update of life cycle stages and processes based on addition of freshwater ecotoxicity</li> </ul>

# Main changes

Chapter	Changes
Geographic validity	The PEFCR for Dairy Products was using European Union + EFTA, which were substituted by European Union + EFTA + UK.
<p data-bbox="61 431 1141 474">Revised structure of the PEFCR.</p> <p data-bbox="61 516 1141 688">The structure of this revised PEFCR has been changed as much as possible to adjust to the new template of Annex I of Commission Recommendation (EU) 2021/2279 (European Commission, 2021)</p>	<ul data-bbox="1151 431 2504 1125" style="list-style-type: none"><li data-bbox="1151 431 2504 559">➤ The classes of performances were not included in this revised PEFCR because methodological aspects cannot be included or revised in a partial update.</li><li data-bbox="1151 565 2504 694">➤ There is no representative product report available because during the pilot PEFCR the screening studies were not required to be updated and delivered to the EC, so this report does not exist.</li><li data-bbox="1151 699 2504 828">➤ The most relevant elementary flows are not included in this revised PEFCR because these were not allowed to be included during the pilot acknowledged and no new aspects could be included.</li><li data-bbox="1151 833 2504 1125">➤ In a partial revision the LCIA results are not allowed to change over a maximum (10% for the impact categories and 5% for the overall score) and the list of most relevant impact categories, life cycle stages, processes and direct elementary flows do not change. It is acknowledged by the EC that this requirement can never be met when the method and datasets from the EC already trigger much higher changes.</li></ul>

# Feedback TAB scrutiny 11 December 2024



- Meeting with EF-helpdesk (on 17 Dec) to clarify some small inconsistencies;
  - Delete defaults if mandatory company specific data is required (e.g. packaging)
  - COD
  - Delete some sentences which state that incineration emissions shall be modelled (to avoid double counting).
- Include limitation regarding the old IDF allocation (and why a new IDF allocation is developed).
- Open point with the EC if the most relevant elementary flows need to be included (previously stated this can be excluded in a partial revision of pilot PEFCRs)



# Future developments

- PEF connection with EU legislation such as Green Claims Directive, as one of the methodologies for substantiating environmental claims
- Full revision of PEFCR, when the new PEF guidance is available