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How to develop EF-compliant datasets on supplier products

Webinar, 20 November 2023

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- » Listen-only mode
- » Use chat function for questions/comments that will be answered in the Q&A part
- » Slides and recording will be made available at <u>https://ec.europa.eu/environment/eussd/smgp/ef_trainings.htm</u>

Today's agenda





EF in a nutshell

- Policy setting
- LCA & EF
- EF transition phase
- Benefits of PEF and PEFCR

EF-compliant datasets

- Modelling compliance
- Metadata compliance
- Data Quality
- Data Needs Matrix (DNM)

Supplier data collection

- Primary data vs. Secondary data
- Primary data requirement and data sources
- Confidential vs. transparent
- Frequent errors

Other need-to-knows

- Expertise, effort and time needed (indicative)
- look@LCI and other check software and script support

Q&A



Acronyms

B2B	Business-to-Business
B2C	Business-to-Consumer
CFF	Circular Footprint Formula
DQR	Data Quality Rating
EF	Environmental Footprint
EoL	End of Life (of a product)
EPD	Environmental Product Declaration
ILCD	International Reference Life Cycle Data System
LCA	Life Cycle Assessment
LCIA	Life Cycle Impact Assessment
OEF	Organisation Environmental Footprint
OEFSR	Organisation Environmental Footprint Sector Rules
PEF	Product Environmental Footprint
PEFCR	Product Environmental Footprint Category Rules
RO	Representative Organisation
RP	Representative Product



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EF in a nutshell

Environmental Footprint

Environmental Footprint Initiative: Why?



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For consumers Choosing the right product and understanding labels



For green producers Fair competition against false green claims



Unlock opportunities for the circular and green economy

More harmonised approach for environmental information

Provide reliable and relevant environmental claims



The EU policy dimension



Council Conclusions – 10/2019

Welcomes all initiatives to support the communication of environmental impacts based on the Environmental Footprint pilot and in time eventually the establishment of a mandatory scheme for environmental claims

□ European Green Deal – 12/2019

Reliable, comparable and verifiable information also plays an important part in enabling buyers to make more sustainable decisions and reduces the risk of 'green washing'

□ Circular Economy Action Plan – adopted 3/2020

The Commission will propose that companies substantiate their environmental claims using Product and Organisation Environmental Footprint methods

- Commission Recommendation 12/2021 (includes <u>current PEF and OEF method</u>) Updated recommendation to the EU Member States and updated EF Methods
- Taxonomy Regulation (on the definition and carbon footprint thresholds for sustainable companies) and Green Consumption Pledge
- Green Claims Initiative- 03/2023 To ensure consumers receive reliable, comparable and verifiable environmental information on products
- Batteries Regulation- 03/2023 To ensure that ... batteries have a low carbon footprint, use minimal harmful substances, need less raw materials from non-EU countries, and are collected, reused and recycled to a high degree in Europe

Ongoing EU policy developments, requiring or considering EF methods to be applied: Ecodesign Directive / Sustainable Products Initiative and Delegated Acts, Construction products Regulation, Empowering Consumers in the Green Transition, Non-Financial Reporting Directive

Life Cycle Assessment (LCA) of products

Impacts onExtraction/useresourceof physicalavailability:resources:



Energy availability



Material availability



Land productivity

. . .



Energy extraction



Material extrac*



Land use / conversion



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Pressures via emissions to air, water, soil:

Impacts on human health and environment:



CO2, Methane, ...



Phosphate, NOx,



Cadmium, POPs,



Eutrophication

Toxic Pressure

...

...

...



Challenges of LCA - EF response

LCA is used across many industries, but with incompatible schemes, with proliferation of labels and diverging claims. Hence, the EF is to ...

- » Ensure reproducibility, comparability
 - Narrow down ISO LCA method overall \rightarrow PEF/OEF Methods, plus more specific per product-category / sector \rightarrow PEFCR/OEFSR
 - Define scope and functional unit for comparisons within product categories
 - Require common EF-compliant background data

» Provide clear-cut decision support

- Materiality Approach (focus effort where it counts)
- Prescribe common set of impact methods instead of 10-20 impact indicators from free-to-chose LCIA methods
- Provide normalisation data and weighting factors to calculate EF single score
- Reporting template, communication requirements
- » Improve reliability with minimum reviewer/verifier qualifications, verification scope details
- » Provide authoritative backing by the European Commission

Most relevant environmental impacts covered



Impact category
Climate change
Ozone Depletion
Human Toxicity, cancer
Human Toxicity, non-cancer
Particulate matter
Ionising Radiation, human health
Photochemical ozone formation, human health
Acidification
Eutrophication, terrestrial
Eutrophication, freshwater
Eutrophication, marine
Ecotoxicity, freshwater
Land Use
Water use
Resources, minerals and metals
Resources, fossil (energy)

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Additional **biodiversity** aspects, **microplastics**, and other environmental aspects reported as well

PEFCRs/OEFSRs





Transition phase: Additional 4 – 5 PEFCRs

Pilot phase: 21 PEFCRs/OEFSRs completed

 \square Rechargeable batteries Decorative paints 0 IT equipment (HDD systems) Leather Thermal insulation (housing) Beer Dairy products 7 Feed for food prod. animals H Pet food Pasta Wine

- Packed water
- Hot & cold water pipe systems
- Liquid household detergents
- Uninterruptable power supply
- Photovoltaic electricity generation
- Intermediate paper product

Metal sheets



Retail (OEFSR)



ሞ

Copper prod. (OEFSR

What is a PEFCR





Product Environmental Footprint Category Rules (PEFCR):

- » Commission & industry collaboration, stakeholder scrutinized, specific rules per product category (PEFCR) enabling reliable product comparisons based on equivalent functional performance of the products
- » Rules relate to relevant activities under operational control of the producers (e.g., amount and type of used materials/parts, fuel and electricity use, waste types and amounts generated, packaging type and amount used, specific emissions, ...)
- » Upstream and downstream activities (e.g., materials production, transports, packaging recycling): use available secondary background data sets and e.g. default transport distances, but supplier-specific data can be used and is preferred
- » Definition of a representative product per product (sub)category: PEFCR benchmarks

Additional benefits of PEFCRs/OEFSRs





- » Saving expert support, effort, and costs ...
 - \circ ... for deriving product/organisation specific rules from EF method
 - \circ ... for compiling (and developing) needed EF secondary data
 - \circ ... for building up life cycle model
- » Enabling ...
 - o ... comparisons and comparative assertions against the benchmark
 - ... comparisons and comparative assertions among products
 - ... identification of significant environmental impacts common to a product group/sector
 - ... reputational schemes giving visibility to products/organisations that calculate their environmental performance
 - ... green procurement (public and corporate)



Environmental Footprint

EF-compliant datasets

Note: The updated list of key documents and technical materials for the EF Transition phase can be accessed on the European Platform on LCA (EPLCA) website: (<u>https://eplca.jrc.ec.europa.eu/EFtransition.html</u>)

EF compliance of datasets

- Modelling compliance (capital goods, recycling model rules, etc.)
- 2) Nomenclature, characterization factors, and other relevant information
 - ⇒ Dictionary/ Master data to develop EF compliant dataset (= flow list, flow properties, characterization and normalization factors ...)
- 3) Documentation compliance (e.g. data quality rating (DQR), extent of documentation/metadata, etc.)
- 4) Review compliance (who can review, what/how to review, review documentation)

EF reference package (EF 3.1) http://epica.jrc.ec.europa.eu/LCDN/d eveloperEF.xhtml

Guide on EF compliant data sets: https://eplca.jrc.ec.europa.eu/permali nk/Guide_EF_DATA.pdf

PEF and OEF methods: http://ec.europa.eu/environment/euss d/smgp/ef transition.htm

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EF modelling requirements*

- Specific modelling requirements regarding:
 - » Completeness
 - » Water use
 - » Handling multi-functional processes

» ...

- Extended guidance is provided on:
 - » Agricultural Modelling
 - » Electricity sourcing modelling

» ...

*Annexes to the "Commission Recommendation (EU) 2021/2279 of 15 December 2021 on the use of the Environmental Footprint methods to measure and communicate the life cycle environmental performance of products and organisations." (Rules on PEF and OEF studies and on PEFCR/OEFSR development)



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Documentation/Metadata requirements



https://eplca.jrc.ec.europa. eu/permalink/EF_Data_Gui de_EF3.1_addendum.pdf Scope of documentation - Essentially an LCI report in highly condensed form as ILCD formatted dataset:

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- » What is represented by the dataset, which technologies, which country/producer, which year/age... plus short description incl. limitations (both unit process and aggregated results dataset)
- » Which data sources have been used
- » How has it been modeled (within the EF rules), specific compliance declarations to be put
- » Which quality has been achieved, DQR results
- » Review confirmation
- » Administrative information

This guide is under fundamental revision; in case the new rules would already be available for use under EF 3.1, this would be announced by Commission in due time.



ILCD Data Network - Entry-level

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ILCD entry-level requirements

Compliance area



Documentation	Minimum documentation extent specified ILCD format to be used	
Nomenclature	 Compliance with ILCD nomenciature document (e.g. use of ILCD reference elementary flows), Certain aggregated elementary flows (e.g. VOC) are permitted Terminology use not enforced. 	In short: Essentially as
Data quality	 "Not defined", i.e. no data quality levels (Note: this requirement is covered as part of "Documentation") Data quality needs to be stated using ISO quality criteria Technological, geographical and time-related representativeness to be documented 	EF-compliant data sets, but
Method	 ISO 14040 and 14044 compliant process-based LCA Methodological ILCD-compliance not enforced; applied modelling framework(s) and allocation/substitution approaches to be documented 	method free
Review	 Use of reviewers from registry not required "Qualified reviewer" required (based on ISO 14025): knowledge of relevant sector knowledge of represented process or product LCA method expertise and experience Qualified independent external reviewer in line with ISO 14044 (chapter 6.1) requirements BUT separate review report is not required (review documented in data set) <u>OR</u> Qualified independent internal reviewer in line with ISO 14044 (chapter 6.1) requirements, BUT separate review report is required (with the ILCD template / minimum review documentation scope), in addition to review documentation provided within data set Review on unit process level may not be required, depending on data quality claims 	(within ISO14044 requirements), and a few less data quality and review specifics

Data quality

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Data quality (from "excellent" to "poor") as important aspect to evaluate validity of EF-compliant datasets *

Minimum requirement s	•	Completeness Methodological appropriateness and consistency ⁶⁹
Data quality criteria (scored)	• • •	Technological representativeness ⁷⁰ (TeR) Geographical representativeness ⁷¹ (GeR) Time-related representativeness ⁷² (TiR) Precision ⁷³ (P)
Documentati on	•	Compliant with the ILCD format
Nomenclatur e	•	Compliant with the ILCD nomenclature structure (use of EF reference elementary flows for IT compatible inventories; see detailed requirements at section 4.3)
Review	•	Review by "Qualified reviewer" Separate review report

Used to calculate the data quality rating (DQR)





 The current automated calculation of data quality over several datasets has shortcomings, including as the calculation method does not consider BoM and similar mixer datasets

- 5. Responsibility stays with the user to "adequately" choose/collect/set-up different data and datasets and combine these "adequately" towards high quality results or resulting datasets
- 6. Therefore, data and result quality needs qualified modelers and experienced reviewers/verifiers

Influencing factors of Data quality

- 1. Dataset must be clearly scoped (technical, geographical, timewise and supplier-wise)
- 2. Data quality of single datasets to be described: *actual* dataset vs. *ideal/intended* dataset meaning of DQR
- 3. The plain combination of "excellent" data does not automatically lead to "excellent" resulting datasets or "excellent" study results, as the selection and combination of data needs to also be excellent











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Nothing is Better Than Primary Data



User Influence on Data Quality (e.g. non-food can)

Resulting system/dataset DQR better than 2,0

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5election: EU+EFTA+UK: Cap, [...] 📎

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User Influence on Data Quality (e.g. non-food can)



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Data Needs Matrix (DNM) application for PEF study <u>without</u> PEFCR



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The user of the PEF method shall:

- Determine the level of influence of the producing company (three "situations"). This determines which option is to be used for each process.
- 2) Provide a table listing all processes and their situation according to the DNM
- 3) Follow the data requirements on the DNM
- Re-calculate the DQR values (for each criterion + total) for datasets:
 - In Situation 2, Option 2 of the DNM (secondary data with companyspecific activity data), and
 - o In Situation 3 if the process is among the "most relevant"



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		Data requirements
Situation 1: process run by the company	Option 1	Provide company-specific data (both activity data and direct emissions) and create a company-specific dataset (DQR≤1.5)
Situation 2: process <u>not</u> run by the company but <u>with</u> access to company-specific information	Option 1	Provide company-specific data and create a company- specific dataset (DQR≤1.5)
	Option 2	Use an EF-compliant secondary dataset and apply company-specific activity data for transport (distance), and substitute the sub-processes used for electricity mix and transport with supply-chain specific EF compliant datasets (DQR≤3.0).
Situation 3: process <u>not</u> run by the company and <u>without</u> access to company-specific information	Option 1	Use an EF compliant secondary dataset in aggregated form (DQR≤3.0). Recalculate DQR of the dataset if the process is "most-relevant"



DNM application for PEF study with PEFCR

"All processes required to model the product and that are **not** on the list of mandatory company-specific data ..." of the PEFCR "... shall be evaluated using the DNM"

		Most relevant process	Other process			Most relevant process	Other process
process run by my using the FCR	Option 1	Provide company-specific data (as create a company-specific dat (DQR≤1.5) ¹¹⁷ Calculate the DQR values (for each	requested in the PEFCR) and taset, in aggregated form		ion 3		Use company-specific activity data for transport (distance), and substitute the sub-processes used for electricity mix and transport with supply chain aposifie
Situation 1: the compa PE	Option 2		Use default secondary dataset in PEFCR, in aggregated form (DQR≤3.0) Use the default DQR values		Opt		EF compliant datasets (DQR≤4.0) Use the default DQR values.
t run by the but with access formation	Option 1	Provide company-specific data (as create a company-specific data (DQR≤1.5) Calculate the DQR values (for each	requested in the PEFCR) and taset, in aggregated form h criterion + total)	ess <u>not</u> run by ng the PEFCR ss to company- ormation	Option 1	Use default secondary data set in aggregated form (DQR≤3.0) Re-evaluate the DQR criteria within the product specific	
uation 2: process <u>no</u> ny using the PEFCR company-specific ir	Option 2	Use company-specific activity data for transport (distance), and substitute the sub-processes used for electricity mix and transport with supply-chain specific EF compliant datasets (DQR≤3.0).		Situation 3: proo the company usi and without acce specific inf	Option 2	context	Use default secondary data set in aggregated form (DQR≤4.0) Use the default DOR values.
26		Re-evaluate the DQR criteria within the product specific context		In short: e relevant",	eas i.e	ier requirements/optio . "other" processes	ns for not "most



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Environmental Footprint

Supplier data collection

Company-specific (primary) vs. secondary datasets

Company-specific datasets (often also called primary data, producer data, facility-specific data, ...)

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- » Directly measured or collected (incl. some estimations) at a specific facility or set of facilities, ideally for each process/machine
- » Data shall include all known inputs and outputs for the processes, i.e. products, waste, emissions and resources
- » All inputs and outputs need to be scaled to the reference flow of the respective process (typically the main product or service, such as waste treated, goods transported). Depending on the company, these reference flows can be final products (e.g. a pair of rubber boots), but also intermediate products, such as a plain fabric or a dyed fabric.
- » All company-specific data shall be modelled into company-specific EF-compliant datasets

• Secondary datasets (background data not from specific supplier/producer)

- » Generic data from literature or scientific papers or average data from LCA databases, industry association reports, government statistics, etc.
- » Average data from industry association LCI databases, company reports/studies/datasets, government statistics, etc.
- » Data sources shall be clearly documented and reported in the EF report

Primary (company-specific) data required ...



For PEF studies <u>with</u> a PEFCR (requirements pre-defined in "Representative product" model):

» PEFCR contains list of mandatory company-specific data (activity data, direct elementary flows and (unit) processes). This is based on the most relevant processes

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» User of the PEFCR shall adhere to these requirements

For PEF studies <u>without</u> a PEFCR (additional requirements, like e.g. relevance and DQRs):

- The modelling of the company-specific processes (e.g. energy needed and bill of materials (BOM) for the assembly of the product in scope).
- » For companies producing more than one product, the activity data used (including the BoM) shall be specific to the product in scope of the study.

Primary data sources

Typical, specific sources of company-specific data are:

- Process/line-, facility- or site/plant-level consumption data
- Bills and stock/ inventory changes of consumables
- Emission measurements (amounts and concentrations of emissions from flue gas and wastewater)
- Composition of consumables, products and waste
- Procurement and sale department(s)/ unit(s)



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Note:

- For complex products or formulations, the BoM is constituted of two parts: the list of materials/ingredients and the quantity used for each of them.
- The activity data of the BoM shall be specific to the product in scope and modelled with company-specific data.
- For companies producing more than one product the activity data used (including the BoM) shall be specific to the product in scope of the study.
- Often, the BoM is structured into a BoC (Bill of Components) and for each of these a BoM.

From activity data to a process dataset



Activity data ¹⁾

Examples of activity data

- Liters of fuel consumed
- Kilowatt-hours of electricity consumed
- Kilograms of material consumed
- Kilometers of distance traveled
- Hours of time operated
- Square meters of area occupied
- Kilograms of waste generated
- Kilograms of product sold
- Quantity of money spent

Source: GHG Protocol Scope 3 Standard

Process (LCA/EF) dataset

Contains all information determining environmental relevance, per unit of product/service output, e.g. one kg salmon caught in fishing area X (data all purely fictive)



¹⁾ Important is to <u>qualify</u> the activity data (e.g. what specific material?), <u>quantify</u> it (in a way it can be scaled to amount of product output), and <u>document</u> data sources, assumptions, and representativeness (for data quality assessment and verification purposes).

Primary data collection requirements for a mandatory process (purely illustrative example)





Data type	Example
Activity data to be collected	Technology of the scalf knitting process
Specific requirements (e.g. frequency, measurement standard, etc.)	Company-specific primary data on the percentage by weight required per product amount (e.g. one unit of specific scalf for men); data values not more than 2 years old
Material input	Merino (sheep) wool yarn (in kg)
Energy use	Electricity (in kWh) incl. energy source, heat (in MJ) incl. energy source
Other consumables	Packaging materials, labels, wool processing chemicals, machine lubricating oil,
Losses	In % of the processed varn (mainy due to off-spec products)

EF-compliant data sets from suppliers can be used, here e.g. for the yarn, or certified green electricity





Data Collection Support (Intro/Specification)

Questionnaire for the								
Cradle-to-Gate I CA of	Brand name							
Reference Year for Data Collection	2020							
Please feel free to add or change a	ny missing intermediate/raw materials/flo	vs according to your speci	fic process!					
For further questions, please contact:								
Name: Email:								
Company name:	Example Company							
Contact person for further enquiru:								
Email:								
Tel·								
Product(s) and proces	s specification						accord for EPDc	
reduct(c) and procee	e opeomoution			Price ratio	Net	Fossil share	Biogenic share	
			Molar	(in case of	Calorific	of potential	of potential	
			Masa	(in case of	Valua	or potential	or potential	
			Iviass	several	value	carbon	carbon content	
		Chemical name	[g/mol]	products)	[MJ/kg]	content [%]	[%]	
	Main Product							,
	Co-Product 1					\sim		
	Co-Product 2							
	Co-Product 3							
	Co-Product 4							
If applicable							\times	
	Intermediate Products in reaction					1 /		
	and other side-products/waste					1 /		
	flows			= =				
							\sim	
T 1 1	T 1 1							
l echnology used	lechnolo	gy Name						
	Please describe the type of chemical reacti	on						

- Data is often to be collected from various sources/units of a company
- Traditionally, Excel-based sheets are used; increasing use of more comprehensive, seamless data collection means
- Check PEFCR-specific requirements on which data to collect and how (e.g. measurement standards may be prescribed)

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Data Collection Support (Input Data)

				Comp	any Name	Example Company							
				Pr	oduct	Brand name							
				Unit Proc	cess Names	s Technology Nam							
				Process	City	E	xample Site						
	period			Location	Country		DE						
	2020			Area covere facili	d by production ties [m2]								
Inputs	puts												
Raw Materia	als / Pre-Cursors			10/-+				Data avality and a second	S	upply Trai	nsport D	istances [ki	n]
	Input Name	Further Characterization	Function	Content [%]	Comment	Unit	Annual Consumption	- value has been	Truck	Train	Ship	Pipeline	Origin
		More detailed information if useful (e.g. in case heterogenous precursors, solutions. etc) Please give	Reactant										
	Raw Material 1	percentages				kg		Measured					
	Raw Material 2		Reactant			kg		Measured					
	Raw Material 3		Reactant			kg		Measured					
	Raw Material 5		Reactant			Kg ka		Measured					
Water Use			Neaotaint			Ng		medidared					
Auxiliaries													
Electricity	Input Name	Eurther Characterization	Source	Comment 1	Comment 2	Unit	Annual Consumption	Data quality assessment					
	Electricity from country-specific				Contract 2	LelA/b		Measured					
	Electricity from CHP		Natural Gas	-		kWh		Measured					
	Electricity from company specific source or mix	If mixed electricity sources, please give composition in %	Hydropower			kWh		Measured					
Steam and	Thormal Enorgy												
Steam and	mennar Energy												

Example (not a PEF requirement)

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Data Collection Support (Output Data)

Jutputs								
roduct(s)				Net Calorific				
			Economic Value [€/kg]	Value	Water Content			Data quality assessment
	Product Name	Further Characterization	OR price ratios	[MJ/kg]	[%]	Unit	Annual Production	- value has been
	0	Considered as main	0	0,00		kg		Measured
	0	sold externally or internally	0	0,00		kg		Measured
	0	sold externally or internally	0	0,00		kg		Measured
	0	sold externally or internally	0	0,00		kg		Measured
	0	sold externally or internally	0	0,00		kg		Measured
aste for r	ecovery							
aste for i	ncineration							.
	Waste Category	Further Characterization	Comment 1	Comment 2	Comment 3	Unit	Annual Production	Data quality assessment - value has been
	Hazardous Waste for Incineration					kg		Measured
	Non-Hazardous Waste for							
	Incineration					kg		Measured
aste for la	anofili							
nissions	to Water							
nissions	to Air							
								Data quality assessment -
	Output Name	Characterization o	f emission flow	Comment 1	Comment 2	Unit	Annual Production	value has been
		Direct process off gas emit	ted to air - no emissions					
	1,1,2,2-Tetrachloroethane	from any fuel consumption m	entioned above included			kg		Measured
		Direct process off gas emit	ted to air - no emissions			Kg		Measured
		 Direct process off gas emit 	ed to air - no emissions			кд		Measured

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Data Collection Support (QA Checks)



	Example Company		
	Brand name		
	Technology Name		
	Example Site		
	2020		
м	ass Balance [kg]		Calculated from
	Output		stoicniometry
	Product(s) dry	#DIV/0!	
	Production Waste	#DIV/0!	
	Unreacted Raw Material		
#D11/01	Side reaction outputs	#DIV/0!	0,00
#DIV/U	Unrecorded Production waste (in WW)		
	Recorded waste in waste water	#DIV/0!	
	Air Emissions from reaction	#DIV/0!	
	Water formed in reaction	0,00	#DIV/0!
#DIV/0!	Sum	#DIV/0!	
utput ratio	#DIV/0!		
Wa	ater Balance [kg]		
	Output		
#DIV/0!	Waste Water to WWTP	#DIV/0!	
#DIV/0!	Water untreated	#DIV/0!	
#DIV/0!	Water relooped	#DIV/0!	
#DIV/0!	Water incl. in Products	#DIV/0!	
	Water Vapour (measured)	#DIV/0!	
	Water Vapour (calculated)	#DIV/0!	
#DIV/0!	Total Water Output	#DIV/0!	
utput ratio	#DIV/0!		
#DIV/0!	Total Output	#DIV/0!	
utput ratio	#DIV/0!		
Ene	ergy demand [MJ]		
	Output		
#DIV/0!			
#DIV/0! #DIV/0!			
#DIV/0! #DIV/0! #DIV/0!			
	M #DIV/0! #DIV/0! #DIV/0! #DIV/0! #DIV/0! #DIV/0! #DIV/0! #DIV/0! #DIV/0! utput ratio	Example Company Brand name Technology Name Example Site 2020 Mass Balance [kg] Mass Balance [kg] Mass Balance [kg] Mass Balance [kg] Product(s) dry Product(s) dry Product(s) dry Product(s) dry Product(s) dry Recorded Production waste Unreacted Raw Material Side reaction outputs Unrecorded Production waste (in WW) Recorded waste in waste water Air Emissions from reaction #DIV/0! Recorded waste in reaction #DIV/0! Water formed in reaction #DIV/0! Water Balance [kg] Vater Balance [kg] Vater Balance [kg] Vater Balance [kg] Vater Balance [kg] Vater Vapour (calculated) #DIV/0! Water Vapour (calculated) #DIV/0! Total Water Output Uput ratio #DIV/0! Total Output Uput ratio Energy demand [MJ] Output	Example Company Brand name Technology Name Example Site 2020 Mass Balance [kg] Mass Balance [kg] Mass Balance [kg] Production Waste Production Waste WDIV/0! Unreacted Raw Material Side reaction outputs #DIV/0! Unreacted Production waste (in WW) Recorded waste in waste water #DIV/0! Air Emissions from reaction Mater Balance [kg] Output Water Balance [kg] Water vapour (measured) #DIV/0! #DIV/0! Water Vapour (measured) #DIV/0! Water Vapour (measured) #DIV/0! Water Vapour (calculated) #DIV/0! Water Vapour (calculated) #DIV/0! Water Vapour (calculated) #DIV/0! Water Vapour (calculated) #DIV/0!

- » Best results, overall least effort, and fastest process:
 - » prepare tailored questionnaire with all known flows based on qualitative analysis and briefing call before sending questionnaire
 - » ask to document reasons if flows are not applicable
 - ask for being more specific (e.g. where many different substances are used as consumables (e.g. dies, catalysts, ...))
 - » PLUS ask for other flows to add
 - » Ask to confirm whole year is covered, no anomalies etc.
- » Early quality assurance recommended
- » Possibly iteration needed

Example (not a PEF requirement)

Prominent Issues in Data Collection



• Mass balance (major elements, water), or energy balance not closed

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- (Primary) source of electricity and thermal energy unclear
- Amount and disposition of wastewater / used process water unclear; confusing use and net loss of water
- Only regulated air emissions known / considered
- Treatment of raw-gas unclear
- Source of scrap/secondary input unclear (and if pre- or postconsumer)
- Distribution/disposal of waste & secondary material output unclear
- Share of bio-based carbon and recycled content in input and output unclear

Mistakes to be avoided in EF data collection

- Fuel or thermal energy input/consumption without emissions
- Reported emissions are not part of the EF elementary flow list Terminology of emission reports or (sum values of) measurement devices used, e.g. COD, BOD, instead of specific substances
- Reported (metal) resources are not part of the EF elementary flow list

Industry typical ore names reported, but lack of breakdown into elements: use element resource flows

- Unclear/lacking information on concentrations or purity Active ingredient or diluted solution?, prime-grade silicon or bulk material?
- Intermediate products reported as trade names Lacking proper identification such as constituents, CAS No.



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products

reflect purpose

See CFF webinar and training for details

Waste information insufficient for LCI EoL modelling -

Sold external, treatment unknown, composition unknown, ...

Process not properly treated/reported concerning co-

Substitution with unsuitable alternative, allocation does not

Unclear situation of used/produced (none-primary) -

materials No proper distinction of post-production scrap, post-consumer scrap or any other secondary material

Mistakes to be avoided in EF data collection (cont.)



*

*



Unit-Traps in (EF) Data Collection

- SI units vs. Imperial units (various different factors)
- kBq vs. Bq (factor 1,000)
- MJ vs. kWh (factor 3.6)
- Unconventional units: Gg not interpreted as 1,000 metric tons
- Combined property&unit-conversion errors: m2 to kg and others
- Lack of knowledge of domain-specific units and conventions



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Helpful Aspects in Data Collection

- Get management / C-Level buy-in/support
- Inform core stakeholders in your company (R+D, Production, Procurement, EHS, Marketing)
- Structure the core process steps
- Design own or adapt existing data collection sheets (check PEFCR (if available) for requirement definition)
- If possible, use data collection templates from your association, consultant, software supplier,.....
- Pre-fill data collection sheets as much as possible (use your systems like ERP, PLM, BoM, CAD,...), at least qualitatively, plus get quantitative data confirmed
- Check your company's (emission) reporting schemes
- Do internal QA and 4-eyes checks (...before verifiers reject the data, or, worst, erroneous data gets out: a 50% too high Climate change result may pass a review, and still be wrong)



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Confidential vs. transparent -I-





Standardized Reporting Frameworks

Using standardized frameworks for LCA data reporting can help in maintaining a balance between transparency and confidentiality. These frameworks can outline what data should be shared and how, ensuring consistency and reducing the risk of sensitive data exposure.

Sensitivity Analysis

Conducting sensitivity analyses to understand which data are critical and which are less sensitive can help in deciding what to share. This approach allows for the protection of the most sensitive data while still contributing valuable information to the LCA.

Aggregated Data Reporting

Instead of reporting sensitive data at an individual company or product level, data can be aggregated. This means combining data from multiple sources to provide an overall picture without revealing confidential information about any single entity.

Use of Third-Party Verifiers

Employing independent third-party verifiers can help maintain confidentiality. They can verify the data without disclosing sensitive information to competitors or the public. They act as a neutral party to ensure accuracy and transparency.

Confidentiality Agreements

When sharing data within the supply chain, confidentiality agreements can be put in place. These agreements legally bind parties to not disclose sensitive information, allowing for more open sharing of data within the agreed boundaries.

Confidential vs. transparent -II-





Data Anonymisation

Anonymising data involves removing or modifying sensitive information so that individuals or companies cannot be readily identified. This allows for the sharing of data patterns and trends without exposing specific details.

Tiered Access to Data

Implementing a tiered access system where different stakeholders have different levels of access to data can help maintain confidentiality. More sensitive data can be restricted to higher tiers, while less sensitive, aggregated data can be more widely accessible.

Virtual Safe Spaces

Creating virtual safe spaces for data sharing, where data can be analysed collectively without being directly accessed by individuals, can be a solution. This approach allows for the benefits of data pooling without direct exposure of sensitive information.

Collaborative Platforms with Controlled Access

Developing collaborative platforms where data can be shared and accessed under strict control and regulations can facilitate transparency while protecting confidentiality.



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Environmental Footprint

Other need-to-knows

Implementing a PEF/LCA study for the <u>first time</u> - considerations



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Duration:

 \circ ~ 3 - 6 months including data collection and verification

Resources:

- \circ ~ 2 5 days FTE technical staff for data collection in-house
- EF expert (in-house or contractor), incl. software and data
- External verification
- Some in-house coordination effort depends
- Management involvement in 2 3 meetings for briefing, buy-in, and decisions
- <u>Substantial</u> efficiency gains on all of the above, if doing PEF studies on several products concurrently, and/or with PEFCR models ready in an LCA software

Developing an EF-compliant supplier dataset for the first time - considerations

An EF-compliant dataset is equivalent to a PEF study, but without relevant parts of results analysis/interpretation, without a study report (as all is documented in dataset metadata), hence saves some expert time for development and review and some running time

Duration:

 \circ ~ 2 - 4 months including data collection and verification

Resources:

- \circ ~ 2 5 days FTE technical staff for data collection in-house
- $\circ~$ EF expert (in house or contractor), incl. software and data
- External review
- Some in-house coordination effort depends
- Management involvement in 1 2 meetings for briefing, buy-in, and decisions
- <u>Substantial</u> efficiency gains on all of the above, if developing EFcompliant datasets on several products concurrently, and/or with PEFCR models ready in an LCA software









Also called "background data", representing the life cycle wide aggregated environmental profile of specific consumables, product components, transport processes, waste treatment, ...:

- » Generally provided by the EC free of charge for PEF studies under PEFCRs
- » Either average data of (usually) highest recentness and accuracy from industry association data collection at members, often including trade and government statistics, etc. ...
- » ... or generic data of heterogeneous quality developed by consultants and research groups from technical literature and scientific papers, patents, industry projects, industry association reports, government and trade statistics, etc.
- » Note: <u>EF-compliant</u>, specific data sets from suppliers can be used in a PEF study instead of secondary data sets, <u>are in fact preferred</u>
- » All data sources shall be clearly documented and reported in the resulting PEF report and/or EF dataset

EF secondary datasets (EF 3.1)





- Provided by the Commission through procurement processes from data developers (Sphera, ecoinvent etc.), or supplied by international industry associations. All datasets are EF-compliant i.e. ...
 - » use the same, common EF 3.1 "core" energy, transport, packaging and end-oflife treatment datasets in the entire background system,
 - » are modelled with (predominantly) the same LCI method throughout life cycle,
 - » use the same EF 3.1 reference package, i.e. elementary flows, units etc., and are fully connected to the same EF 3.1 impact methods (e.g. Climate change, Acidification, Land use, ...),
 - » provide comprehensive dataset documentation,
 - » are independently reviewed, with additional quality-control by Commission, and
 - » are delivered and exchanged in the same interoperable ILCD & eILCD data formats, for integration into widely used LCA software.

Where to find the official EF secondary datasets

The official, mandatorily to be used <u>EF 3.1</u> secondary datasets are available via the registered nodes of the data developers. Datasets are usually provided directly in main LCA softwares already, to avoid import issues.

Node	Description of the lot(s) present in the node and compliance system	Owner	Link*
CEPE	Chemicals for paint (EF 2.0) (tendered, EF pilot phase)	CEPE/ecoinvent	http://ledp.copo.org/
	Chemicals for paint (EF 3.1. Level-1 disaggregated in eILCD) (updated from EF pilot phase)		nup://ican-cepe.org/
ecoinvent	Chemicals (EF 2.0) (tendered, EF pilot phase)	ecoinvent	http://ecoinvent.lca-data.com/
	Chemicals part 1 (EF 3.1. Level-1 disaggregated in eILCD) (updated from EF pilot phase)		
	Chemicals part 2, Apparel parts 1-2-3, Plastics, Other (EF 3.1) (tendered, EF transition phase)		
EF RPs	EF representative products (EF 2.0)	European Commission	http://eplca.jrc.ec.europa.eu/EF-node/
European Solvents Industry Group	Solvents (EF 3.1)	ESIG	https://data.esig.org/
FEFAC/Blonk	Feed (EF 2.0) (tendered, EF pilot phase)	FEFAC	http://lcdn.blonkconsultants.nl/Node/
	Feed (EF 3.1 . Level-1 disaggregated in eILCD) (updated from EF pilot phase)		
	Agrofood, Renewable (EF 3.1) (tendered, EF transition phase)		
Quantis	Agrofood, "others" (EF 2.0) (tendered, EF pilot phase) (Down, March 2023)	Quantis	https://lcdn.quantis-software.com/PEF/
RDC	Glass recycling (EF 2.0) (Down, March 2023)	RDC	http://soda.rdc.yp5.be/login.xhtml
Small Data Providers Database	Node operated by the European Commission, for small data providers (less than 10 process datasets per provider allowed) (EF 2.0)	European Commission	https://eplca.jrc.ec.europa.eu/EF-SDP/
Sphera (formerly thinkstep)	Core datasets official ETPE (includes <u>E</u> nergy, <u>T</u> ransport, (non-core) <u>P</u> ackaging, <u>E</u> nd-of-life) (EF 2.0) (tendered, EF pilot phase)	Sphera	http://lcdn.thinkstep.com/
	Core datasets official ETPE part 1 (EF 3.1) (updated from EF pilot phase)		
	Core datasets official ETPE part 2 ETPE (includes further <u>Energy</u> , <u>Transport</u> , <u>Packaging</u> , <u>E</u> nd-of-life)		
	Non-packaging plastics, electric and electronics, metals and minerals (EF 3.1) (tendered, EF transition phase)		

* Node links may change. For final node links, please check the JRC website at: https://eplca.jrc.ec.europa.eu/LCDN/contactListEF.xhtml

Use rights





- » Datasets are owned by data providers
- » Usage in the PEF/OEF framework is funded by the European Commission
- » End User License Agreement (available on the nodes) specifies the use for which the datasets can be used for free, and until when
- » For any other purposes, the dataset use rights need to be requested/purchased from the provider/IP owner

Validation Tool (developed by/for JRC)

» Allows checks of complete databases in ILCD archives for use of e.g. correct elementary flow list, documentation scope, several other format aspects across data set object types (but NOT replacing review/verification of documentation and some other technical aspects)

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» Available at: https://eplca.jrc.ec.europa.eu/LCDN/developer.xhtml



Look@LCI (developed by JRC)





- » Look@LCI shall be used as a tool to check EF-compliant datasets
- » It calculates LCIA results using the .xml files of processes of EFcompliant LCI datasets and the .xml files of the EF-methods (with the elementary flows and characterization factors)
- » Calculations are run using the "raw" data: no transformation (i.e. mapping) of the original files in/out of an LCA software is necessary
- » The tool, including a guidance document is available at: <u>https://eplca.jrc.ec.europa.eu/LCDN/developer.xhtml</u>
- » EF package to use with the tool is available at: <u>https://eplca.jrc.ec.europa.eu/LCDN/developerEF.xhtml</u>

Link Collection

- » Further reading about the EF transition phase
- » <u>Training material</u> (also to download slides and recordings of all webinars and trainings)
- » PEF and OEF methods
- » <u>EF Wiki</u>
- » Existing PEFCRs/OEFSRs
- » Rules for EF compliant data sets

- » Email address technical helpdesk: EF_Helpdesk@sphera.com
- » Email address EF Team at DG ENV: <u>env-environmental-footprint@ec.europa.eu</u>











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Q & A



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Questions & Answers

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