



How to develop EF-compliant datasets on supplier products

Webinar, 20 November 2023

Dr. Alicia Boyano
European Commission, DG ENV

**Dr.-Ing. Marc-Andree Wolf,
Kirana (Chomkhamsri) Wolf**
maki Consulting GmbH

Hannes Partl
Sphera Solutions GmbH

Technical info

- » 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 https://ec.europa.eu/environment/eussd/smgp/ef_trainings.htm



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
OEF SR	Organisation Environmental Footprint Sector Rules
PEF	Product Environmental Footprint
PEF CR	Product Environmental Footprint Category Rules
RO	Representative Organisation
RP	Representative Product



EF in a nutshell

Environmental Footprint Initiative: Why?

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 current PEF and OEF method)

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 on resource availability:

Extraction/use of physical resources:

Pressures via emissions to air, water, soil:

Impacts on human health and environment:



Energy availability



Energy extraction



Material availability



Material extraction



Land productivity



Land use / conversion



CO2, Methane, ...



Climate change



Phosphate, NOx,



Eutrophication



Cadmium, POPs, ...



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 ...

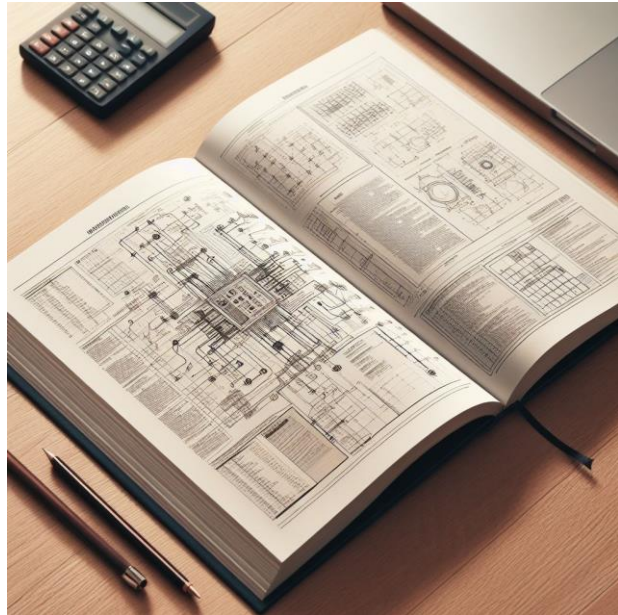
- » Ensure reproducibility, comparability
 - Narrow down ISO LCA method overall → PEF/OEF Methods, plus more specific per product-category / sector → PEFCR/OEFSR
 - Define scope and functional unit for comparisons within product categories
 - Require common EF-compliant background data
- » Provide clear-cut decision support
 - Materiality Approach (focus effort where it counts)
 - Prescribe common set of impact methods instead of 10-20 impact indicators from free-to-choose 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)















Pilot phase:

21 PEFCRs/OEFSRs completed

-  Rechargeable batteries
-  Decorative paints
-  IT equipment (HDD systems)
-  Leather
-  Thermal insulation (housing)
-  Beer
-  Dairy products
-  Feed for food prod. animals
-  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
-  T-shirt
-  Retail (OEFSR)
-  Copper prod. (OEFSR)

Transition phase:

Additional 4 – 5 PEFCRs



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



- » Saving expert support, effort, and costs ...
 - ... for deriving product/organisation specific rules from EF method
 - ... for compiling (and developing) needed EF secondary data
 - ... for building up life cycle model
- » Enabling ...
 - ... 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)



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: (<https://eplca.jrc.ec.europa.eu/EFtransition.html>)

EF compliance of datasets

- 1) 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)

PEF and OEF methods:

http://ec.europa.eu/environment/eussd/smgp/ef_transition.htm

EF reference package (EF 3.1)

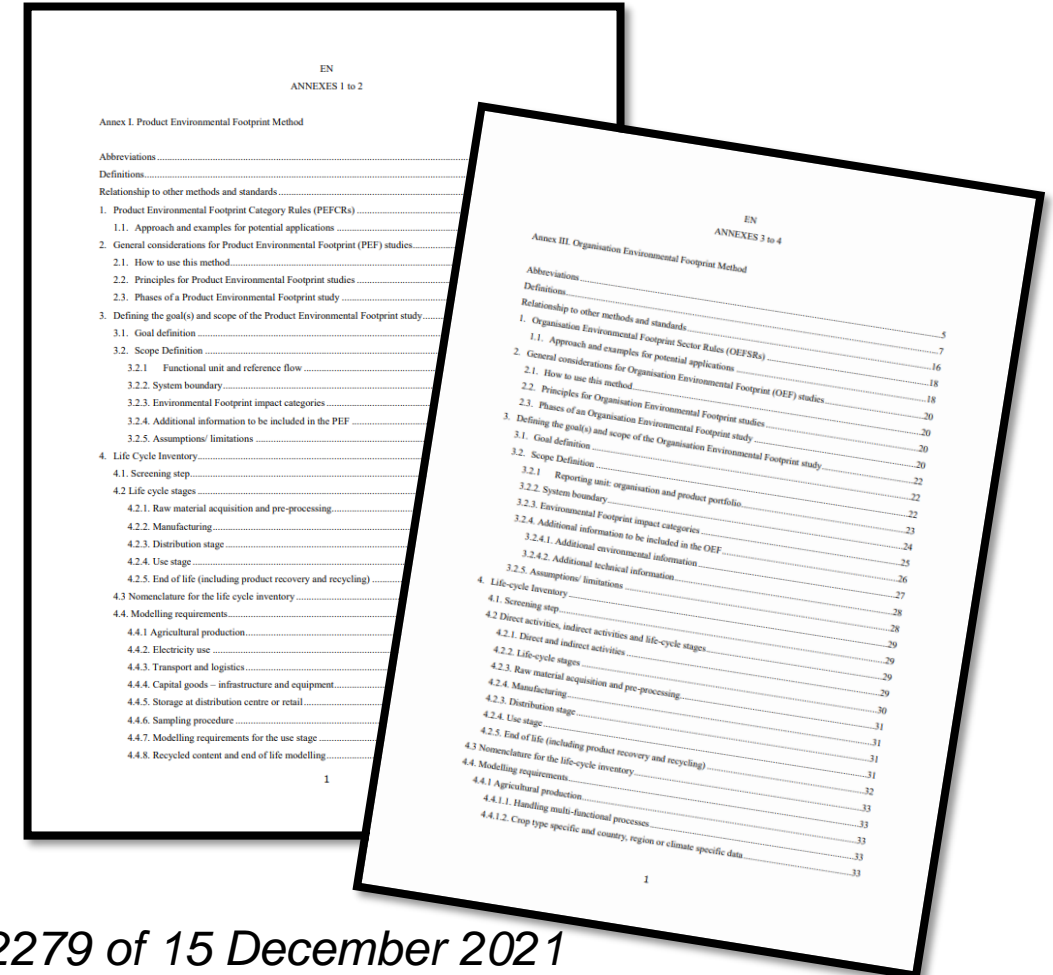
<http://eplca.jrc.ec.europa.eu/LCDN/developerEF.xhtml>

Guide on EF compliant data sets:

https://eplca.jrc.ec.europa.eu/permalink/Guide_EF_DATA.pdf

EF modelling requirements*

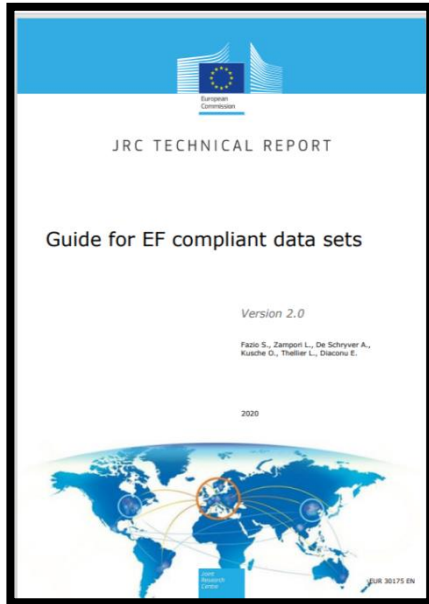
- Specific modelling requirements regarding:
 - » Completeness
 - » Water use
 - » Handling multi-functional processes
 - » ...
- Extended guidance is provided on:
 - » Agricultural Modelling
 - » Electricity sourcing modelling
 - » ...



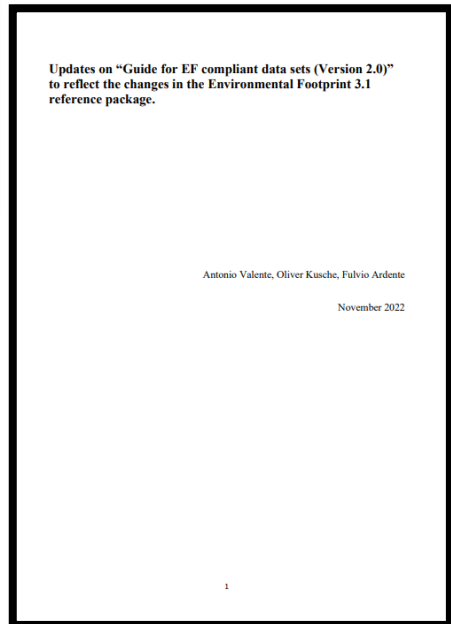
*Annexes to the “*Commission Recommendation (EU) 2021/2279 of 15 December 2021 on the use of the Environmental Footprint methods to measure and communicate the life cycle environmental performance of products and organisations.*” (Rules on PEF and OEF studies and on PEFCR/OEFSR development)

<http://data.europa.eu/eli/reco/2021/2279/oj>

Documentation/Metadata requirements



https://epclca.jrc.ec.europa.eu/permalink/Guide_EF_DATA.pdf

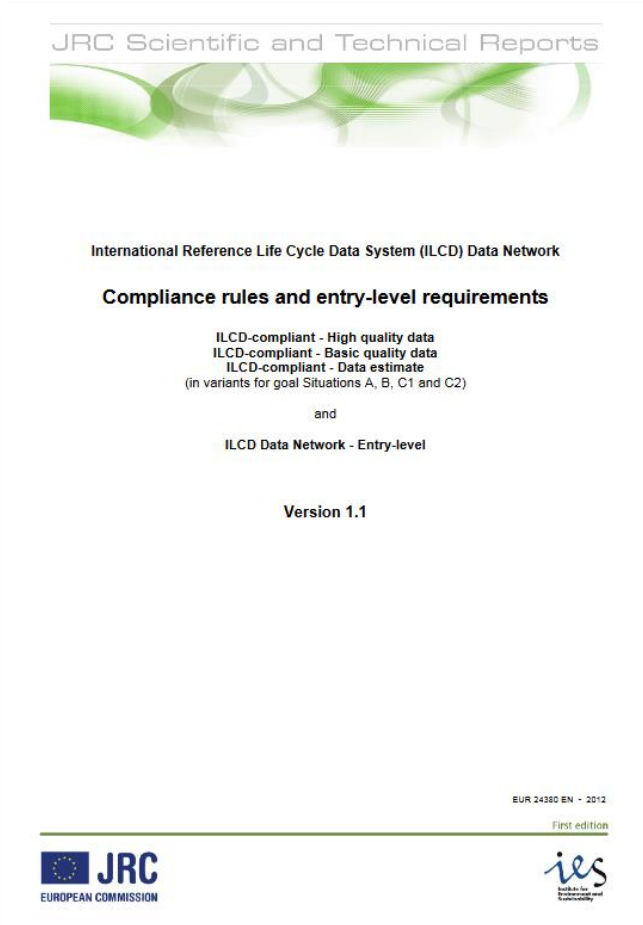


https://epclca.jrc.ec.europa.eu/permalink/EF_Data_Guide_EF3.1_addendum.pdf

- Scope of documentation - Essentially an LCI report in highly condensed form as ILCD formatted dataset:
 - » 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 entry-level requirements



<https://epclca.jrc.ec.europa.eu/uploads/ILCD-Data-Network-Compliance-Entry-level-Version1.1-Jan2012.pdf>

Compliance area	ILCD Data Network - Entry-level
Documentation	<ul style="list-style-type: none"> • Minimum documentation extent specified • ILCD format to be used
Nomenclature	<ul style="list-style-type: none"> • Compliance with ILCD nomenclature document (e.g. use of ILCD reference elementary flows), • <i>Certain aggregated elementary flows (e.g. VOC) are permitted</i> • <i>Terminology use not enforced.</i>
Data quality	<ul style="list-style-type: none"> • <i>"Not defined", i.e. no data quality levels (Note: this requirement is covered as part of "Documentation")</i> • <i>Data quality needs to be stated using ISO quality criteria</i> • <i>Technological, geographical and time-related representativeness to be documented</i>
Method	<ul style="list-style-type: none"> • ISO 14040 and 14044 compliant process-based LCA • <i>Methodological ILCD-compliance not enforced; applied modelling framework(s) and allocation/substitution approaches to be documented</i>
Review	<ul style="list-style-type: none"> ▪ <i>Use of reviewers from registry not required</i> ▪ <i>"Qualified reviewer" required (based on ISO 14025):</i> <ul style="list-style-type: none"> • <i>knowledge of relevant sector</i> • <i>knowledge of represented process or product</i> • <i>LCA method expertise and experience</i> • <i>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) OR</i> • <i>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</i> • <i>Review on unit process level may not be required, depending on data quality claims</i>

In short:
Essentially as EF-compliant data sets, but LCI modelling method free (within ISO14044 requirements), and a few less data quality and review specifics

Data quality

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

Minimum requirements	<ul style="list-style-type: none"> • Completeness • Methodological appropriateness and consistency⁶⁹
Data quality criteria (scored)	<ul style="list-style-type: none"> • Technological representativeness⁷⁰ (TeR) • Geographical representativeness⁷¹ (GeR) • Time-related representativeness⁷² (TiR) • Precision⁷³ (P)
Documentation	<ul style="list-style-type: none"> • Compliant with the ILCD format
Nomenclature	<ul style="list-style-type: none"> • Compliant with the ILCD nomenclature structure (use of EF reference elementary flows for IT compatible inventories; see detailed requirements at section 4.3)
Review	<ul style="list-style-type: none"> • Review by "Qualified reviewer" • Separate review report

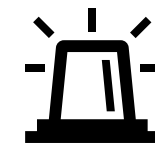
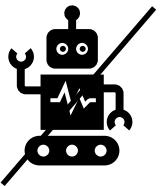
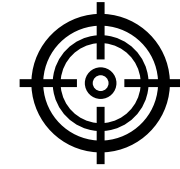


Used to calculate the data quality rating (DQR)

* Detailed DQR calculation is addressed in EF’s Data and Impact Assessment webinar (in case the revised rules are to be applied, Commission will communicate this in due time)

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
4. 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

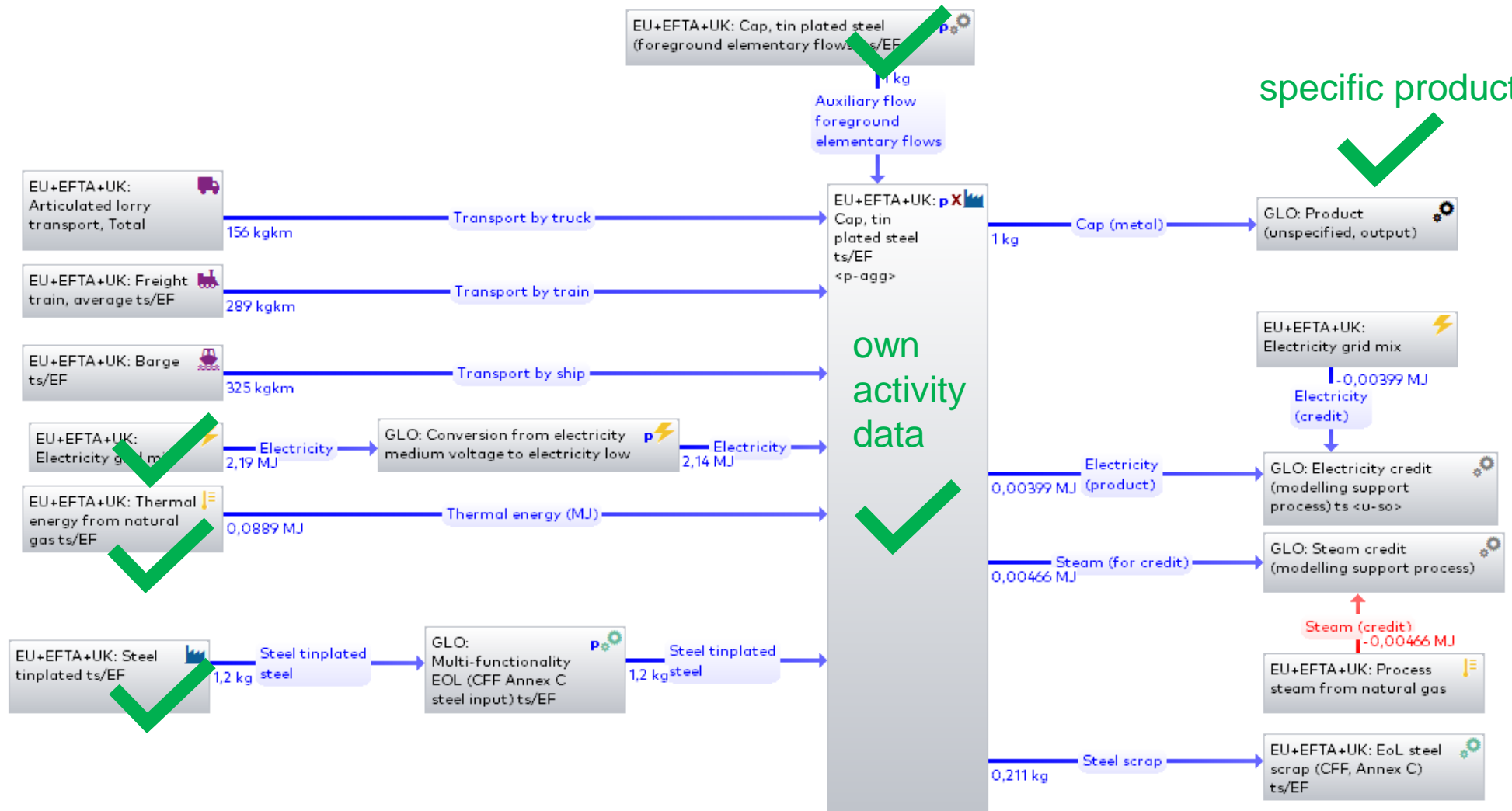


Nothing is Better Than Primary Data

EU+EFTA+UK: Cap, tin plated steel
Process plant: Reference quantities

own foreground emissions

Selection: EU+EFTA+UK: Cap, [...]

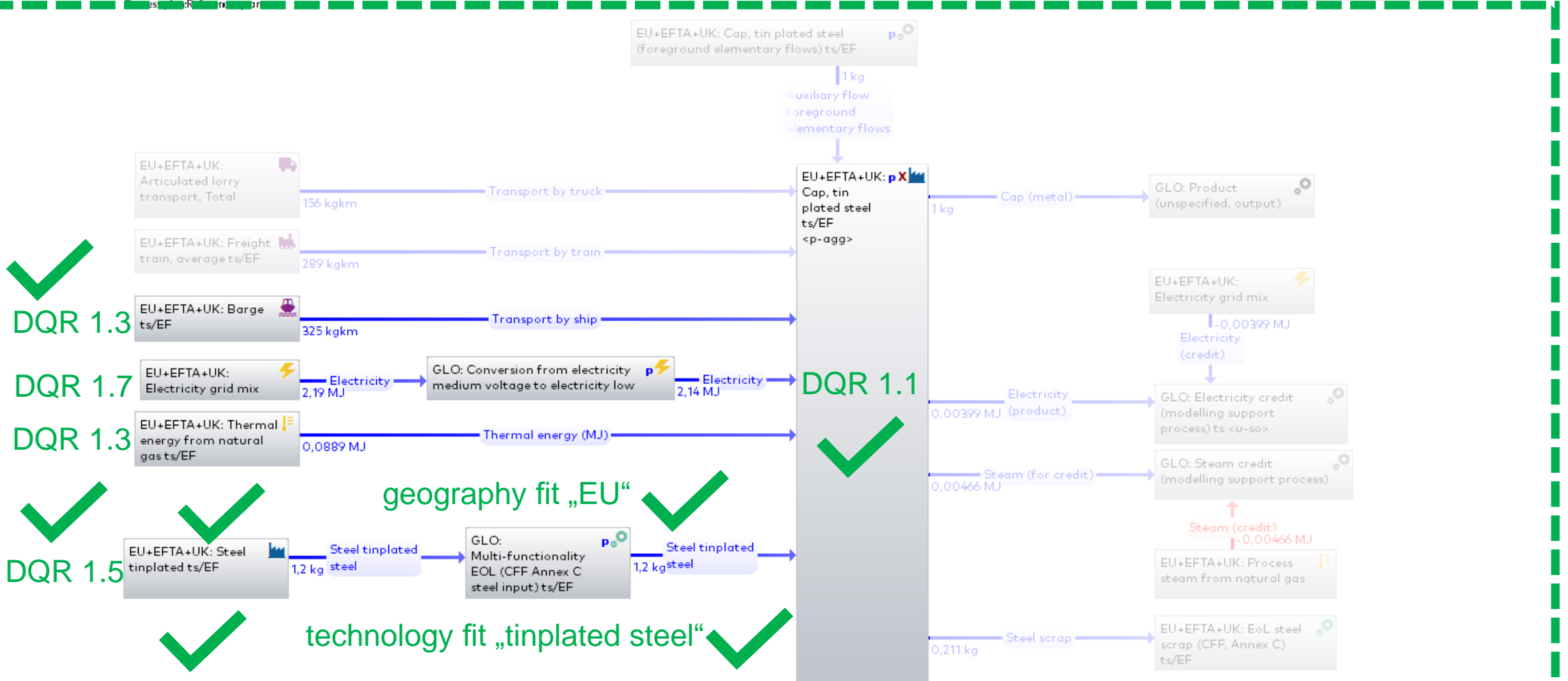


User Influence on Data Quality (e.g. non-food can)

Resulting system/dataset DQR better than 2,0

EU+EFTA+UK: Cap, tin plated steel

Selection: EU+EFTA+UK: Cap, [...]



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

Resulting true system quality 3 or lower → non-eligible

EU+EFTA+UK: Cap, tin plated steel (bad modelling)





The user of the PEF method shall:

- 1) 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
- 4) Re-calculate the DQR values (for each criterion + total) for datasets:
 - In Situation 2, Option 2 of the DNM (secondary data with company-specific activity data), and
 - In Situation 3 if the process is among the “most relevant”

DNM application for PEF study without PEFCR

		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
Situation 1: process run by the company using the PEFCR	Option 1	Provide company-specific data (as requested in the PEFCR) and create a company-specific dataset, in aggregated form (DQR≤1.5) ¹¹⁷ Calculate the DQR values (for each criterion + total)	
	Option 2		Use default secondary dataset in PEFCR, in aggregated form (DQR≤3.0) Use the default DQR values
Situation 2: process <u>not</u> run by the company using the PEFCR but with access to company-specific information	Option 1	Provide company-specific data (as requested in the PEFCR) and create a company-specific dataset, in aggregated form (DQR≤1.5) Calculate the DQR values (for each criterion + total)	
	Option 2	Use company-specific activity data for transport (distance), and substitute the sub-processes used for electricity mix and transport with supply-chain specific EF compliant datasets (DQR≤3.0). Re-evaluate the DQR criteria within the product specific context	

		Most relevant process	Other process
Situation 3: process <u>not</u> run by the company using the PEFCR and without access to company-specific information	Option 3		Use company-specific activity data for transport (distance), and substitute the sub-processes used for electricity mix and transport with supply-chain specific EF compliant datasets (DQR≤4.0) Use the default DQR values
	Option 1	Use default secondary data set in aggregated form (DQR≤3.0) Re-evaluate the DQR criteria within the product specific context	
	Option 2		Use default secondary data set in aggregated form (DQR≤4.0) Use the default DQR values

In short: easier requirements/options for not “most relevant”, i.e. “other” processes



Supplier data collection

- **Company-specific datasets (often also called primary data, producer data, facility-specific data, ...)**
 - » 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 with 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
- » User of the PEFCR shall adhere to these requirements

For PEF studies without 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.

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)

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.*



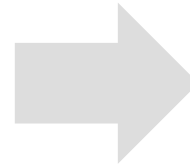
From activity data to a process dataset

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

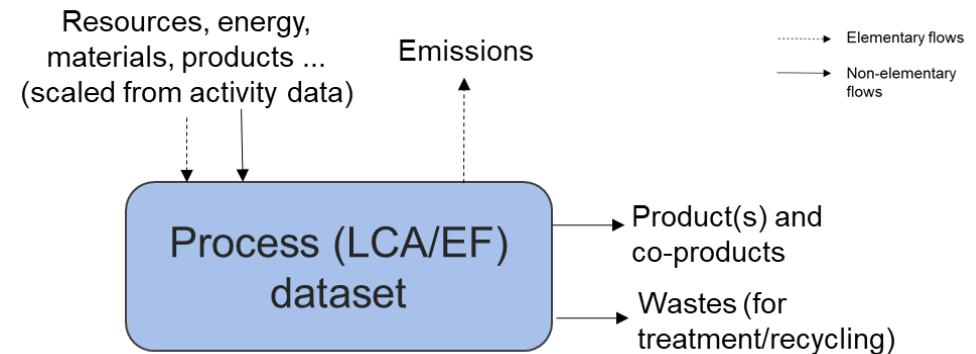
Source: [GHG Protocol Scope 3 Standard](#)



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)

Examples: 0.12 liter of diesel
0.23 tkm of (cooled) truck transport
...



¹⁾ Important is to qualify the activity data (e.g. what specific material?), quantify it (in a way it can be scaled to amount of product output), and document 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 yarn (mainly 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 LCA of Reference Year for Data Collection	Brand name								
	2020								
Please feel free to add or change any missing intermediate/raw materials/flows according to your specific process!									
For further questions, please contact:									
Name:									
Email:									
Company name:	Example Company								
Contact person for further enquiry:									
Email:									
Tel.:									
Product(s) and process specification						Info only necessary for EPDs			
		Chemical name	Molar Mass [g/mol]	Price ratio (in case of several products)	Net Calorific Value [MJ/kg]	Fossil share of potential carbon content [%]	Biogenic share of potential carbon content [%]		
If applicable	Main Product					X			
	Co-Product 1								
	Co-Product 2								
	Co-Product 3								
	Co-Product 4								
Intermediate Products in reaction and other side-products/waste flows									
Technology used		Technology Name							
		Please describe the type of chemical reaction							

- » 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)

Data Collection Support (Input Data)

					Company Name	Example Company								
					Product	Brand name								
					Unit Process Names	Technology Name								
					Process Location	City	Example Site							
						Country	DE							
	period				Area covered by production facilities [m2]									
	2020													
Inputs														
Raw Materials / Pre-Cursors														
Input Name	Further Characterization	Function	Water Content [%]	Comment	Unit	Annual Consumption	Data quality assessment - value has been	Truck	Train	Ship	Pipeline	Origin		
Raw Material 1	More detailed information if useful (e.g. in case heterogenous precursors, solutions, etc) Please give percentages	Reactant			kg		Measured							
Raw Material 2		Reactant			kg		Measured							
Raw Material 3		Reactant			kg		Measured							
Raw Material 4		Reactant			kg		Measured							
Raw Material 5		Reactant			kg		Measured							
Water Use														
Auxiliaries														
Electricity														
Input Name	Further Characterization	Source	Comment 1	Comment 2	Unit	Annual Consumption	Data quality assessment - value has been							
Electricity from country-specific grid mix		Electricity			kWh		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 Thermal Energy														

Data Collection Support (Output Data)

Outputs								
Product(s)								
Product Name	Further Characterization	Economic Value [€/kg] OR price ratios	Net Calorific Value [MJ/kg]	Water Content [%]	Unit	Annual Production	Data quality assessment - 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	
Waste for recovery								
Waste for incineration								
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	
Waste for landfill								
Water Output								
Emissions to Water								
Emissions to Air								
Output Name	Characterization of emission flow	Comment 1	Comment 2	Unit	Annual Production	Data quality assessment - value has been		
1,1,2,2-Tetrachloroethane	Direct process off gas emitted to air - no emissions from any fuel consumption mentioned above included			kg		Measured		
	Direct process off gas emitted to air - no emissions			kg		Measured		
	Direct process off gas emitted to air - no emissions			kg		Measured		

Data Collection Support (QA Checks)



Company	Example Company	
Product	Brand name	
Process	Technology Name	
Site	Example Site	
Data collection year	2020	

Mass Balance [kg]			Calculated from Stoichiometry
Input		Output	
Raw materials and Pre-Cursor (dry)	#DIV/0!	Product(s) dry	#DIV/0!
		Production Waste	#DIV/0!
		Unreacted Raw Material	
		Side reaction outputs	#DIV/0!
		Unrecorded Production waste (in WW)	
		Recorded waste in waste water	#DIV/0!
	Air Emissions from reaction	#DIV/0!	
	Water formed in reaction		0,00
Sum	#DIV/0!	Sum	#DIV/0!
Input / Output ratio		#DIV/0!	

Water Balance [kg]			
Input		Output	
Cooling Water	#DIV/0!	Waste Water to WWTP	#DIV/0!
Process Water	#DIV/0!	Water untreated	#DIV/0!
Water for Steam production	#DIV/0!	Water relooped	#DIV/0!
Water incl. in Raw Materials	#DIV/0!	Water incl. in Products	#DIV/0!
		Water Vapour (measured)	#DIV/0!
		Water Vapour (calculated)	#DIV/0!
Total Water Input	#DIV/0!	Total Water Output	#DIV/0!
Input / Output ratio		#DIV/0!	
Total Input	#DIV/0!	Total Output	#DIV/0!
Input / Output ratio		#DIV/0!	

Energy demand [MJ]		
Input		Output
Electricity (direct)	#DIV/0!	
Electricity (indirect from pressure air)	#DIV/0!	
Thermal Energy (from steam and fuels)	#DIV/0!	
Total Input	#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

Prominent Issues in Data Collection



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



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

- Process not properly treated/reported concerning co-products
Substitution with unsuitable alternative, allocation does not reflect purpose
- Waste information insufficient for LCI EoL modelling
Sold external, treatment unknown, composition unknown, ... *
- Unclear situation of used/produced (none-primary) materials
No proper distinction of post-production scrap, post-consumer scrap or any other secondary material *

* See [CFF webinar and training](#) for details



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



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)



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.



Other need-to-knows

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



Duration:

- ~ 3 - 6 months including data collection and verification

Resources:

- ~ 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
- ! Substantial 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:

- ~ 2 - 4 months including data collection and verification

Resources:

- ~ 2 - 5 days FTE technical staff for data collection in-house
- 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
- ! Substantial efficiency gains on all of the above, if developing EF-compliant datasets on several products concurrently, and/or with PEFCR models ready in an LCA software



EF secondary datasets

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: EF-compliant, specific data sets from suppliers can be used in a PEF study instead of secondary data sets, are in fact preferred
- » 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-of-life 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 **EF 3.1** 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) Chemicals for paint (EF 3.1 . Level-1 disaggregated in eLCD) (updated from EF pilot phase)	CEPE/ecoinvent	http://lcdn-cepe.org/
ecoinvent	Chemicals (EF 2.0) (tendered, EF pilot phase) Chemicals part 1 (EF 3.1 . Level-1 disaggregated in eLCD) (updated from EF pilot phase) Chemicals part 2, Apparel parts 1-2-3, Plastics, Other (EF 3.1) (tendered, EF transition phase)	ecoinvent	http://ecoinvent.lca-data.com/
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) Feed (EF 3.1 . Level-1 disaggregated in eLCD) (updated from EF pilot phase) Agrofood, Renewable (EF 3.1) (tendered, EF transition phase)	FEFAC	http://lcdn.blonkconsultants.nl/Node/
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.y5.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) Core datasets official ETPE part 1 (EF 3.1) (updated from EF pilot phase) Core datasets official ETPE part 2 ETPE (includes further <u>E</u> nergy, <u>T</u> ransport, <u>P</u> ackaging, <u>E</u> nd-of-life) Non-packaging plastics, electric and electronics, metals and minerals (EF 3.1) (tendered, EF transition phase)	Sphera	http://lcdn.thinkstep.com/

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



- » 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)
- » Available at: <https://eplca.jrc.ec.europa.eu/LCDN/developer.xhtml>

Files	Valid	Invalid	Total
Files	-	-	-
Datasets	-	-	-
Processes	-	-	-
Flows	-	-	-
Flow Properties	-	-	-
Unit Groups	-	-	-
Sources	-	-	-
Contacts	-	-	-
LCIA Methods	-	-	-
Life Cycle Models	-	-	-
External Files	-	-	-

Aspect Name	Filename	Dataset Name	UUID	Dataset Type	Message
-------------	----------	--------------	------	--------------	---------

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 EF-compliant 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: <https://eplca.jrc.ec.europa.eu/LCDN/developer.xhtml>
- » EF package to use with the tool is available at: <https://eplca.jrc.ec.europa.eu/LCDN/developerEF.xhtml>

Link Collection

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

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





Q & A



maki Consulting GmbH
Life cycle expert services

STUDIO FIESCHI
& SOCI
sostenibilità su misura



Questions & Answers

The contents of this webinar have been produced under service contract **090202/2022/867749/SER/ENV.B.1** with the European Commission. The slides' content has been approved by the Commission, while opinions expressed during the webinar are those of the contractors only and do not represent the EU's official position.

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