

Calculating and Communicating Lubricant Product Carbon Footprints: The ATIEL / UEIL Method in Practice.

Mathew Evans

ATIEL & UEIL Joint Sustainability Committee
– Carbon Footprint Working Group

Deputy chief chemist / Vickers oils

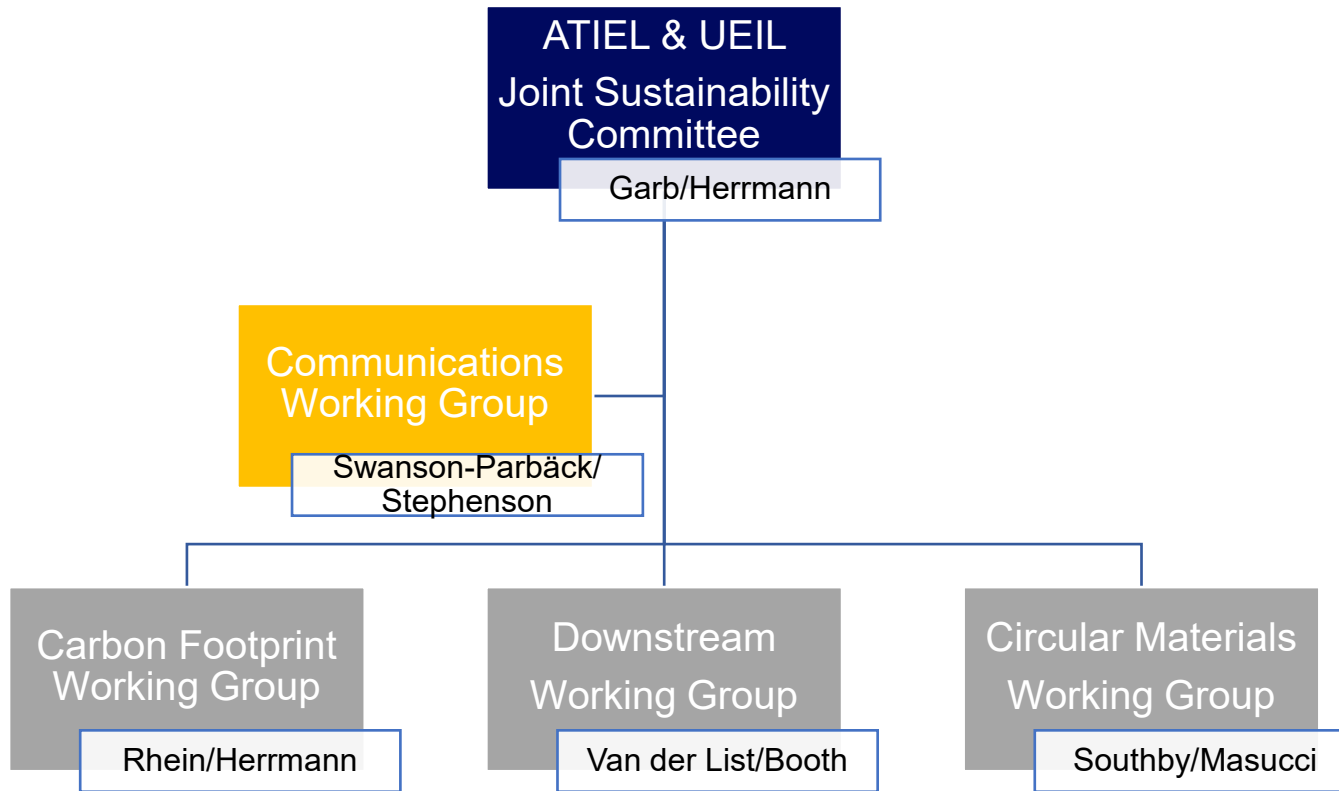


Agenda

- About UEIL and ATIEL
- PCF in a nutshell
- Why ATEIL / UEIL
- Methodology, key takeaways
- Data availability
- Generating and Communicating PCF's
- Collaboration
- End user engagement
- Compliance and legislation



ATIEL & UEIL Joint Sustainability Committee today



With the joint, inaugural meeting on June 13th 2024, ATIEL and UEIL have merged their Sustainability Committee activities into one committee.

In a last step, beginning of 2025 the new “Circular Materials Working Group” was added to the JSC.

Now the JSC-organization covers all currently relevant topics that need to be addressed.

Product Carbon Footprint

“Sum of Greenhouse Gas emissions and Greenhouse Gas removals in a product system, expressed as CO₂ equivalents [...]”,
ISO 14067:2018



PCF – in a nutshell

WHY do we need a lubricants sector specific standard methodology?

- ISO 14067 only provides broad framework (not lubricant specific)
- Transparency of PCF Calculation

WHAT does it describe?

- Scope of PCF calculation (cradle-to-(outbound)gate)
- System boundaries for PCF calculation
- How the PCF should be calculated
- How the PCF should be reported

HOW does it help the lubricants industry?

- Transparency → 3rd party reviewed
- Harmonization → ONE methodology
- Pressure on stakeholders → ONE voice



Joint UEIL/ATIEL PCF Methodology

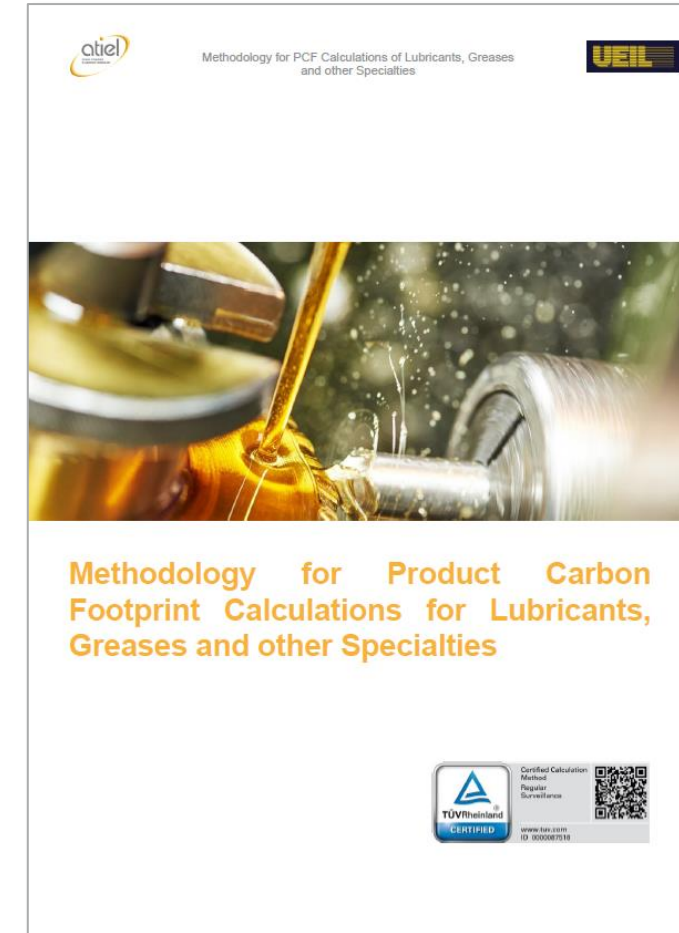
BASIS

- ISO 14067:2018
- GHG Protocol Product Standard



GOAL

- To **harmonize PCF-calculations** of lubricants and other specialities across the value chain
- Achieving **alignment in the lubricants industry**, resulting in transparency, comparability, and acceptability of PCF calculations for their stakeholders
- **Intended audience** is internal and external stakeholders globally, being, for instance: Customers, Suppliers, Lubricant industry, Legislators, Investors, LCA/PCF auditors and practitioners



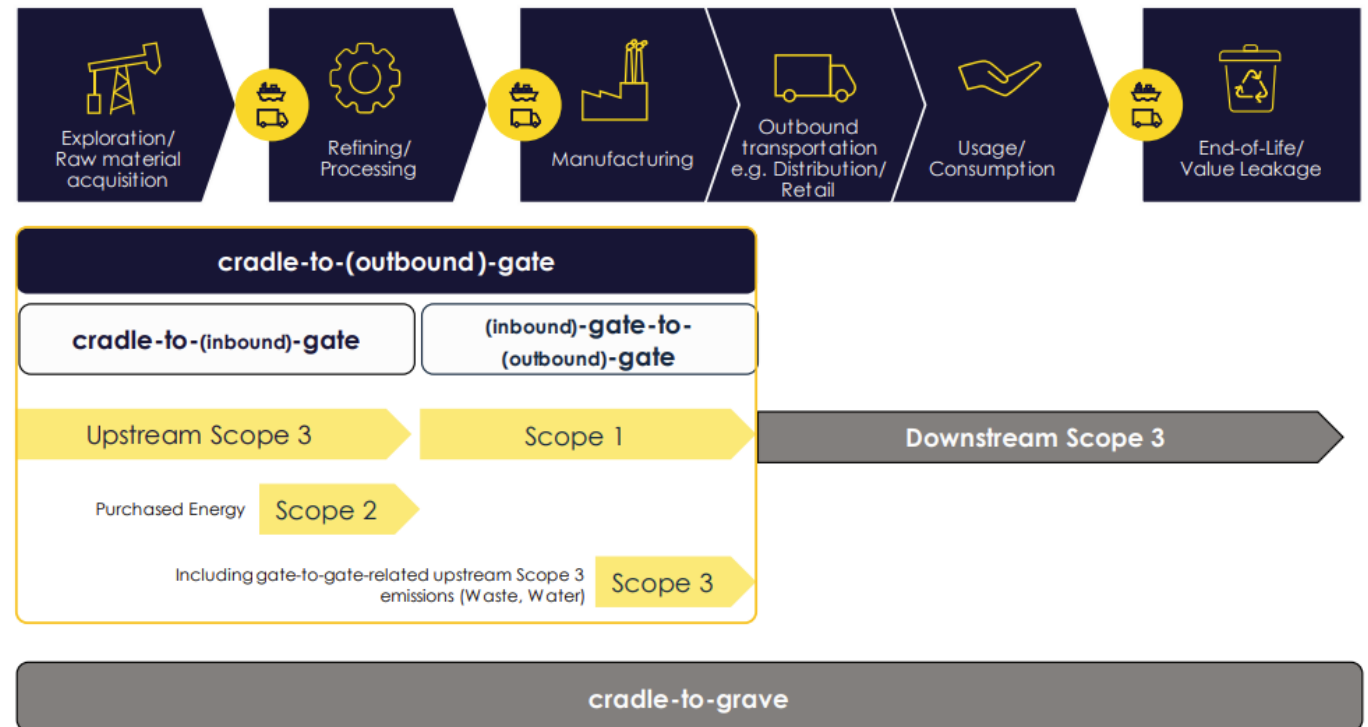
Joint UEIL/ATIEL PCF Methodology

Scope/Declared unit

- 1 kg of unpacked lubricant or other speciality at the factory outbound gate

Product System

- Comprises the life cycle stages from cradle-to-(outbound)-gate, resulting in a partial PCF calculation
- Covers the raw material extraction and manufacturing up to and including the product manufacturing of lubricants and other specialties, as well as internal storage and transport by the lubricant manufacturer

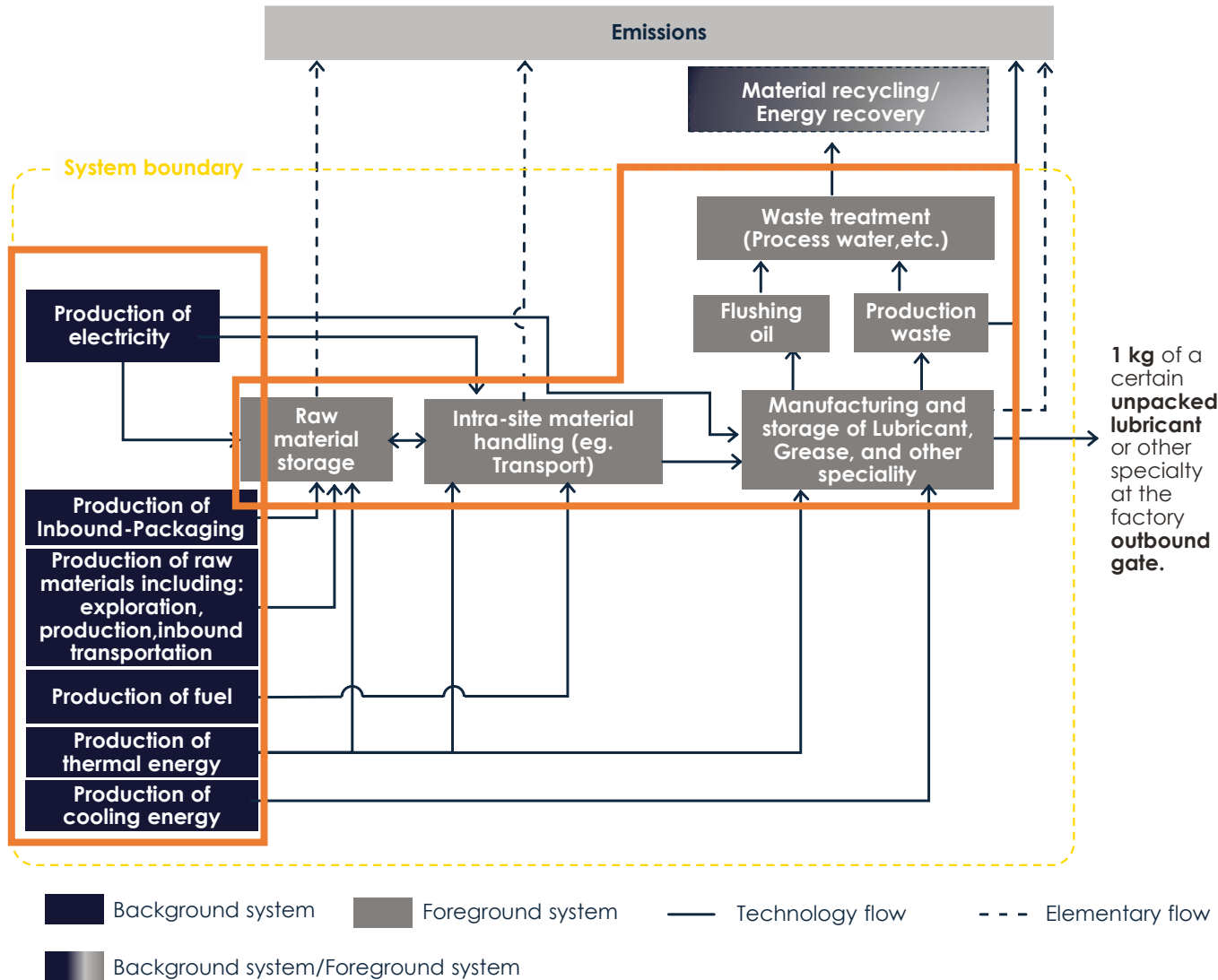


Joint UEIL/ATIEL PCF Methodology

System boundaries

Included (if not excluded due to cut-off criteria)	Excluded
Production-related raw materials	Production of capital goods
Fuel and energy-related utilities (electricity, steam, natural gas, biomethane, oil, etc.)	Business travel or employee commuting
Direct emissions from manufacturing	Services such as engineering or infrastructure services, R&D activities
Other utilities consumed (process water, inert gas, etc.)	Downstream transportation
Production losses and treatment of waste and wastewater	Downstream packaging
Upstream transportation	
Upstream packaging	

Joint UEIL/ATIEL PCF Methodology



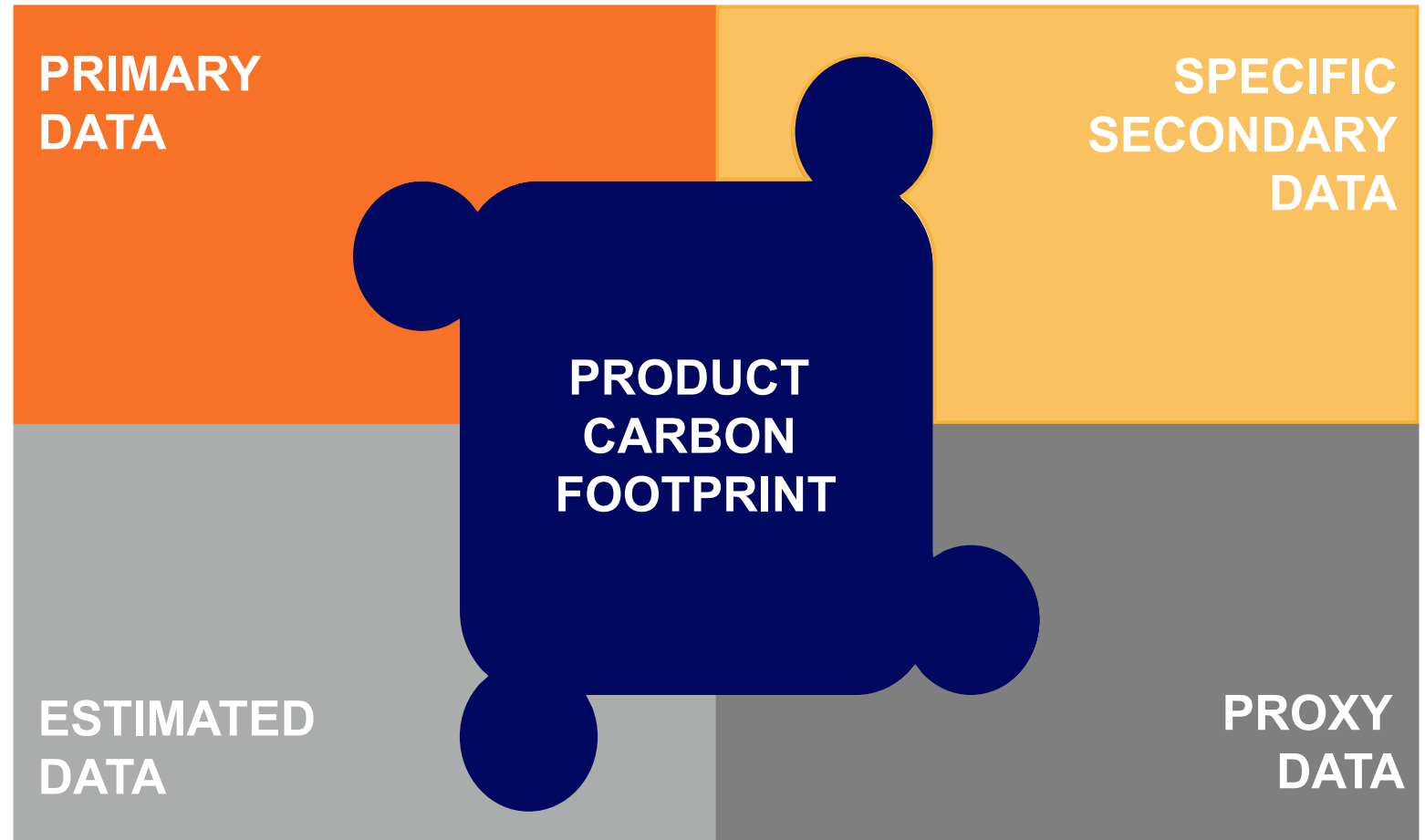
Generic Product System

- **Stereotypical production process of a lubricant manufacturer** within the defined system boundary
 - For PCF-calculation, data for all elements within the system boundaries **have to** be collected
- In the **foreground system**, at the lubricant manufacturer's production site, all processes that are under the control of the lubricant manufacturer are presented.
- In contrast, the **background system** consists of all processes that the lubricant manufacturer does not directly control, such as the production of electricity, fuel, thermal energy and raw materials...

Joint UEIL/ATIEL PCF Methodology

Data Categories

- 4 data categories exist for collecting foreground and background data
- For the **foreground system**, **primary data shall be used**
- For each data source, data quality has to be assessed
- Note: Primary data not necessarily must have the highest quality or precision!



Data availability

Commercial databases

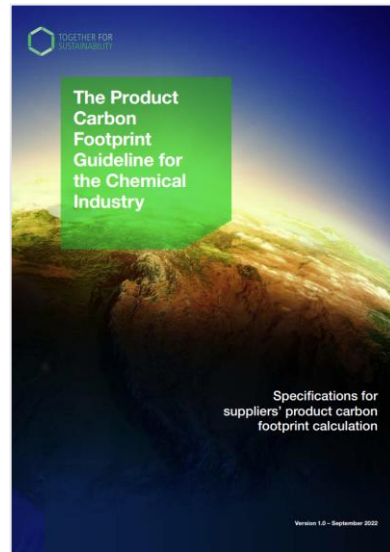
- Commercial databases have the advantage that the data contained have been generated using one methodology and transparent rules, e.g.
 - Ecoinvent
 - Sphera
 - Carbon Minds
 - Etc.
- Some even offer regional datasets
- Unfortunately, only few offer the relevant datasets for the lubricants industry and update frequencies are much different

Publicly available sources

- There is a multitude of public sources, but their scope is often only limited (e.g. energy, country, region)
 - [GEMIS](#)
 - [DEFRA](#) (UK only)
 - Etc.
- None of them is specific to the lubricants industry and especially their materials
- **European Commission is working on a Lifecycle Inventory Database: EF 4.0**

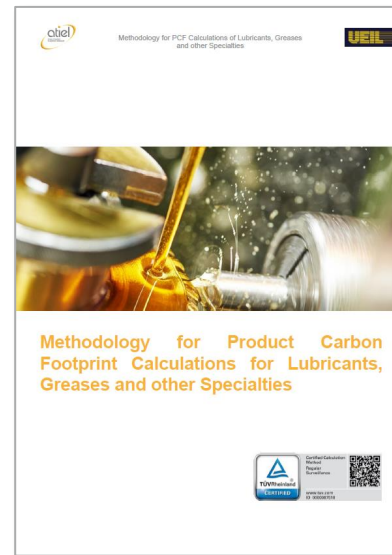
Methodologies – We are not alone

Product Carbon Footprint
Guideline for the
Chemical Industry (**Tfs**)



Cradle to gate

Product Carbon Footprint
methodology for the
Lubricants Industry
(**UEIL/ATIEL**)

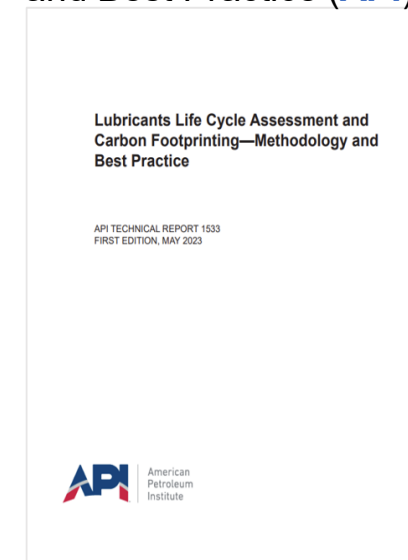


Cradle to gate

Product Carbon Footprint
methodologies of
downstream industry
sectors using lubricants

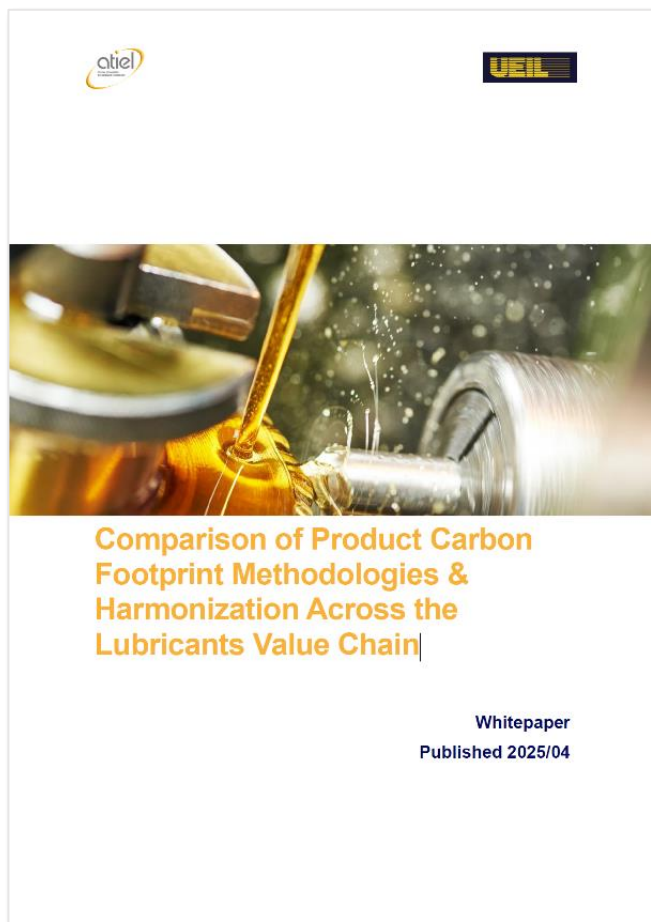
Cradle to gate

Lubricants Life Cycle
Assessment and Carbon
Footprinting – Methodology
and Best Practice (**API**)



Cradle to grave

Comparison document



Scope of analysis:

Owner	Name	Version
Together for Sustainability (Tfs)	The Product Carbon Footprint Guideline for the Chemical Industry	V2.1 2024/02
Catena-X (CX)	Catena-X Product Carbon Footprint Rulebook	V2.1 2023/04
Union of the European Lubricants Industry/European Association of Independent Manufacturers (UEIL/ATIEL)	Methodology for Product Carbon Footprint Calculations for Lubricants and other Specialities	V1.1 2023/06
American Petroleum Institute (API)	Lubricants Life Cycle Assessment and Carbon Footprinting - Methodology and Best Practice	V1.0 2023/05

Key findings:

- All support calculations by ISO 14067 and found methodologically aligned
- alignment not only provides a clear structure for PCF calculation but also ensures a uniform approach across industries
- Some methodological differences identified and being addressed but considered having minor impact
- Main challenge is the data availability

PCF application tool

Key features:

- How to use: Guidance with detailed instructions
- Input tabs: capture all the required data for cradle to outbound gate.
- Output tab: Generate PCF results

Why develop this tool:

- Harmonisation and transparency
- Consistency
- Market advantage

❑ 475 downloads to date



PCF Calculation Tool snapshots

Excel-based tool to give guidance on how to calculate PCFs manually if a company is not ready to implement an integrated software solution.



ATEIL & UEIL Joint Sustainability Committee

PCF calculation tool - how to use guide





User Instructions for Input data on Raw material Emissions

In this excel spreadsheet you will find all upstream realted emissions required for the PCF Calculation.

Step 1: Please fill in the blank cells from column B to D the formulation and in column E the PCF value of the respective raw material. If you have more emissions occurred to direct land use, biogenic or total carbon content, please use the collapse function on top. In this spreadsheet, the quantitative as implemented. You find next to each emissionsfactor/ PCF value a dropdown for the data quality. This should only provide you with an overview while the

Step 2: If all upstream realted logistic emissions are already included in the PCF value of the raw material (which would be in line with the UEIL method answer "yes" and ignore the brownish part of the spreadsheet. If you obtained from your supplier already a calculated CO2e value for the upstream logistic available" and fill in the respective value in column u. If none of both described scenario coincides, please fill in the average distance from your supplier emissionfactor of the main transportation mode. In case you would like to have a more detailed calculation by adding multiple transportation modes, use

Step 3: If all upstream realted packaging emissions are already included in the PCF value of the raw material, you can use via drop down in column A, spreadsheet. If you obtained from your supplier already a calculated CO2e value for the upstream packaging, you can fill in column AJ "no, but emission AK. Please make sure, that the calculated emissions are already allocated on 1 kg of this specific raw material. If none of both described scenario coincides, normalized on 1 kg of raw material (e.g. if you have a 15kg drum (empty weight), in which 20kg raw material is stored, then you need to divide 15kg/20kg respective emission factor. In case you would like to have a more detailed calculation by adding multiple packaging types, use the collapse function on

In case you might have different supplier for one raw material, we recommend a mass-based pre-allocation.

Quick Guide to Get Started

INPUT Tab: Insert your data in white cells (m is hidden. Coloured cells are automatically calculated)

OUTPUT tab: calculations are automated and step



Follow the step by step instructions



For additional clarification of models

Introduction to the PCF calculation

Following the release of the ATEIL / UEIL PCF subgroup was formed to create an interactive toolbox is an Excel template designed to model product from a cradle-to-gate perspectives.

[Link to methodology \(right click to open\)](#)

The template is organized into three main tab, gate perspective:

1. PCF Calculation Output: This tab displays required reporting criteria.

2. Raw Material Emissions: This tab includes logistics, and upstream packaging.

3. Manufacturing Emissions: This tab covers manufacturing process of the product.

The template includes annotations and helps compiling your data accurately.

Throughout the template you will find various and in turn various levels of complexity.

Upstream Emissions: PCF _{total} of Raw Materials						Upstream Emissions	
Supplier	Raw Material	RM Treat Rate [%]	PCF _{total} [kgCO2e/kg]	Data Source	Calculated PCF _{total} [kgCO2e/kg RM]	Upstream logistic included in PCF _{total} of RM?	Additional logistic emissions [kg CO2e/kg]
#1					0,00		
#2					0,00		
#3					0,00		
#4					0,00		
#5					0,00		
#6					0,00		
#7					0,00		
#8					0,00		
#9					0,00		
#10					0,00		
#11					0,00		
#12					0,00		
#13					0,00		
#14					0,00		
0,00%						0,00	
						kg CO2e/kg Product	

[illegible]

Communicating PCF's

- Reporting requirements outlined in the method
- PCF calculation tool reporting aligns with method



ATIEL & UEIL Joint Sustainability Committee



PCF calculation template

Reporting requirements: Although the ATIEL/UEIL methodology includes lubricant manufacturers as well as their suppliers, this application tool focuses mainly on lubricant manufacturer. The reporting requirements for suppliers may be different in some aspects.

Data quality: We prioritize user friendliness of this application tool. Therefore, data quality factors are fixed to "3" as a default value to reduce the complexity of the calculation. Every user may overwrite this value if they have additional information, but the calculation itself is not included in this tool.

Reporting Requirements Methodology UEIL / ATIEL

Lubricant Manufacturer		
Company name (and ID)		
Product trade name / article code		
Calculation date		
Declared unit	the production of 1 kg of a certain unpacked lubricant or other specialty at the factory outbound gate	
Reference flow	1 kg of a unpacked certain lubricant or other specialty at the factory outbound gate	
Description of the life cycle stage under the study	cradle to gate outbound	
Used guideline or standard for PCF calculations	ATIEL/UEIL methodology version 1.1	
Biogenic carbon content	0,0	[kg Cbio / kg Ctotal]
Total carbon content of products	0,0	[kg C / kg RM]
Total GHG emissions and removals representing the partial PCF (PCF _{partial})	0,0	[kg CO ₂ e / kg product]
Selected cut-off criteria and cut-offs	to be confirmed	< 5%
Selected allocation procedures according to ISO 14040/44 and ISO 14067:2018	see diagram allocation hierarchy	A practical example of physical relationships could be the formulation of multiple lubricants or other specialties. The PCF of a raw material to calculate the PCF of a lubricant.

Heading: add additional information about the process. Add some explanation as to why we show this. Use clean image without highlight.



```

graph TD
    Q1{Is there a multifunctional unit process?} -- No --> A1[no allocation needed]
    Q1 -- Yes --> Q2{Is it possible to subdivide the process?}
    Q2 -- Yes --> A2[Yes]
    Q2 -- No --> A3[No]
        
```

Customer engagement with PCF's

- Feedback reflects both personal interactions and broader insights from **ATIEL / UEIL discussions**.
- Increasing number of **large and sustainability-focused customers** now requesting Product Carbon Footprint (PCF) data as part of their procurement or ESG due diligence.
- **PCFs are becoming a standard expectation**, particularly among multinational or OEM customers, even when not yet a purchasing driver.
- **Currently, PCF data seldom influences buying decisions directly**, but it strengthens trust, transparency, and brand perception.
- Growing interest in **comparing methodologies and data quality**, suggesting that robust, verifiable PCF systems will become a differentiator in the future



Compliance and legislation

- **PCFs are becoming embedded in EU legislation**, notably through the **Ecodesign for Sustainable Products Regulation (ESPR)**, which will require verified product-level data.
- **Digital Product Passports (DPPs)** will demand **traceable, standardised lifecycle data**, reinforcing the value of the **ATIEL / UEIL methodology**.
- Linked frameworks such as the **CSRD** and **Green Claims Directive** will tighten expectations for **transparency and data validation**.
- The industry must **prepare now** by developing harmonised PCF systems and supplier data protocols.
- **ATIEL / UEIL's proactive approach** positions the lubricant sector to **lead compliance efforts** and stay **ahead of regulatory change**



Global Coordination and Collaboration

International Lubricants Sustainability Liaison Group

Shared Priorities

- Product Carbon Footprint
- Avoided Emissions
- End-of-Life



Future collaboration

- Downstream industry sectors using lubricants

(2023)

- Guidance on different emission scopes, essential to assess carbon footprints



(2022)

- Practical example of how lubricant manufacturers can start assessing their corporate emissions

(2022)

- Introducing the product-related emission perspective and how it relates to LCA



(2023)

- Harmonised approach to calculating PCFs across the lubricants, greases and specialties sectors

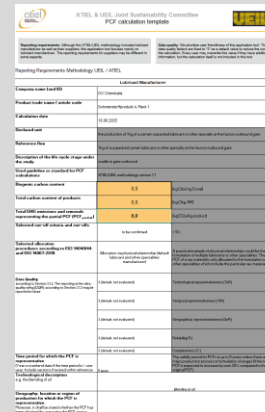


www.tuv.com
ID 0000087518

(2024)

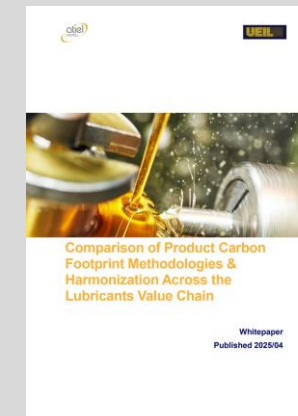


- Practical guide of how lubricant manufacturers can start assessing their product-related emissions



(2025)

- Detailed comparison of PCF-Methdologies for the Lubricant Industry aiming for harmonisation (Catena X, TfS, ...)



Thank you

www.atiel.eu

www.ueil.org

