Product Carbon Footprint Calculation Methodology

Contents

1. Objectives 2
2. External Standard Alignment 2
3. Product Carbon Footprint Scope 2
   3.1. Cradle-to-Gate PCF 2
   3.2. Cradle-to-Grave PCF 2
   3.3. Cut-off Criteria 3
4. Data Collection and Quality 3
   4.1. Primary Data 3
   4.2. Secondary Data 3
   4.3. Data Quality 3
   4.4 Mass Allocation 4
5. Calculation Methodology 4

1. Objectives

This document outlines Solenis' methodology for calculating cradle-to-gate (partial) Product Carbon Footprints (PCFs) and cradle-to-grave (total) PCFs. These calculations are performed for purposes of customer communication and supporting Solenis' decarbonization research projects.

2. External Standard Alignment

Our methodology strictly adheres to the ISO standards 14044 and 14040, ensuring the rigor and consistency of our results. Moreover, we follow the ISO14067:2018 standards for the PCF method. This approach allows us to accurately assess the environmental impact of the Solenis Portfolio and establishes a strong foundation for future sustainability initiatives. The carbon footprint data cannot be used for comparison per ISO 14067:2018, as the standard allows for variations in results based on critical assessments.

3. Product Carbon Footprint Scope

3.1. Cradle-to-Gate PCF

The cradle-to-gate approach considers the production process including raw material extraction, manufacturing, inbound transportation and packaging in accordance with ISO14044 and ISO14067 standards. This approach ensures consistency and transparency in measuring and reporting our product carbon footprint. Supplier primary data is used when possible alongside regional raw material emissions factors. Energy emissions data for each production site is allocated to products on a mass basis. The calculated emissions for each product are expressed by a functional unit of CO_2 equivalents per kg.

3.2. Cradle-to-Grave PCF

The cradle-to-grave approach includes the partial PCF and additionally considers the product use phase including outbound transportation, usage process utilities and product disposal. This approach is used for a subset of Solenis products to meet customer demand for increased PCF scope. Results are reported as CO_2 equivalents per m^2 of surface cleaned.

3.3. Cut-off Criteria

To maintain the feasibility of the PCF assessment, materials contributing less than 1% of the final product total mass have been excluded from consideration. Inter-site transportation impacts are also excluded, as distances within the production sites are minimal and most products are made with on-site intermediates.

4. Data Collection and Quality

4.1. Primary Data

We have initiated gathering supplier data for our many materials. We are currently evaluating best practices and exploring tools to ease the data sharing process. As we build the relationships with our suppliers, we will develop towards a more automated approach and will ramp up our primary data collection early next year. Currently, we are focusing on high-impact, large volume chemicals. We are also exploring alternatives through various innovation efforts, which have been achieved through close collaboration with our supply-chain.

4.2. Secondary Data

In the initial phase, we rely on general aggregate life-cycle-assessment database values to calculate the product carbon footprint.

4.3. Data Quality

For supplier data, we scrutinize all external data to ensure it follows ISO standards, uses proper methodology and ideally, is externally verified. Through our 6 step process, we determine if the data can be approved for our internal use, and at what rating (1-5). We also have a clear process to reject data and request more information if the data does not reach our standards.

To ensure we strive towards using best data available, we use a data quality rating system that relies on our LCA experts to create the proxies for our raw materials where no supplier information is available. With backgrounds in chemistry, environmental science and chemical engineering we evaluate each proxy based on chemical and/or technology match.

We continuously strive to increase our data accuracy by staying up-to-date with the latest databases and industry know-how.

4.4 Mass Allocation

At Solenis, we use the physical allocation by mass method, dividing the total environmental impact based on each product's mass. Emissions, heat, and electricity are allocated at each plant by dividing the total for each category by the total product output for the year.

5. Calculation Methodology

Solenis uses industry leading LCA software to calculate PCFs. Data integration using Application Programming Interface (API) has been developed to calculate the product portfolio at scale. Products and raw materials are identified using unique IDs which can be referenced by the API. The PCFs are calculated using the IPCC2021 GWP100 (including CO2 uptake) method, following IPCC guidelines. The output includes four subcategories:

- CO2 uptake,
- Biogenic
- Land transformation
- Fossil

6. Summary

At Solenis, sustainability is central to our operations and innovation. We are committed to reducing our environmental footprint and advancing a greener future through rigorous evaluation of our products. We are committed to covering 75% of our product lines with Product Carbon Footprint assessments by 2030.

Aligned with our Research and Development (R&D) mission, we prioritize developing products with reduced environmental impacts relative to market alternatives. By 2030, we aim for 30% of our innovation projects to focus on reducing the carbon footprint of the final product. Adhering to a rigorous methodology to benchmark and assess our own products allows us to focus on continuous improvements towards a more sustainable product portfolio.