climatiq

GUIDE FOR MANUFACTURERS

PRODUCT CARBON FOOTPRINTS

Getting started with PCF Studio

ISSUED BY
Climatiq

EDITION
April 2026

CONTENTS

What's in this guide

We address the questions that usually start coming after you've received a few product carbon footprint (PCF) requests, and how you can handle them smoothly.

SHORTCUT • 1

If you want to understand **what PCFs are** → jump to Part 1.

SHORTCUT • 2

If you want to know **what data to collect** → jump to Part 2.

SHORTCUT • 3

If you want learn **how to use PCF Studio** → jump to Part 3.

WHY PCFs?

Why you're receiving PCF requests

Suddenly, it lands in your inbox, a big RFP requires a product carbon footprint, and it's your responsibility. Now you have ten questions you can't answer and you don't know where to start. *What data do I need? How do I get that data? And how do I calculate it?* A finished PCF feels miles away—usually, you stall or reply with an embarrassing "we're working on it".

The pressure is real, and it's growing

While fewer European companies now fall within CSRD, thousands of enterprises have committed to science-based targets, and typically discover that 70–90% of their total emissions sit in their supply chain. That means that they have to get product-level carbon data from suppliers to show progress on their targets.

For you as a manufacturer, that means that every prospect or customer who has climate targets is eventually going to need a credible emissions estimate for the products they buy from you. Even if you don't sell to these big companies, they're somewhere in your supply chain, and the requirement will eventually cascade down to you.

> ***"It's a downward chain where if a client has something, then the supplier also has to provide, especially with regards to ESG or footprinting disclosures."***
>
> — SUSTAINABILITY MANAGER AT MANUFACTURING COMPANY

PCFs are becoming an evaluation criteria. If you can't share credible PCF data, you will be excluded from RFPs, removed from strategic initiatives, and be pushed down on price to stay competitive.

In early 2026, the GHG Protocol announced revisions to the Product Life Cycle Accounting and Reporting Standard, pushing scope 3 towards product-level rather than supplier-level reporting. The shift makes it loud and clear: supply chains are moving towards product-level emissions data, and this pressure is only going to get stronger. That puts the pressure on manufacturers to provide audit-ready PCFs across their product catalogs—fast.

The bigger the customer, the bigger the need for PCFs

Already, enterprises including DuPont, dsm-firmenich, and BT have made PCFs either a requirement or a major advantage in supplier selection. We've spoken to hundreds of manufacturers, and we keep hearing the same things come up again and again.

> *"Our major, major customers—like P&G, Unilever, who have their own climate targets ... those are the ones who would always send requests for PCFs ... The ones who spend the most money in our shop, they also require the most environmental data."*

EMISSIONS REDUCTION LEAD
FOOD MANUFACTURING

> *"In terms of number of clients [asking for PCFs], it's not that much—maybe 15 to 20. But when we look at the revenue they're responsible for, it goes up to 40% or 50%."*

SENIOR SUSTAINABILITY ANALYST
FOOD AND BEVERAGE MANUFACTURING

> *"Today [customers] don't insist that we should have it immediately, but they say it will, sooner or later, be a requirement."*

OWNER AND DIRECTOR
CHEMICAL MANUFACTURING

> *"Customers are willing to pay more for products with PCFs."*

SENIOR SUSTAINABILITY ANALYST
FOOD AND BEVERAGE MANUFACTURING

WHAT THIS MEANS

The consensus is clear: big companies are more willing to buy from transparent suppliers, and will pay a premium for products with PCFs. Even if you don't sell to these companies, PCF requests will be passed down the supply chain.

Today, a missing PCF might mean an awkward conversation, but soon it will mean lost deals and missed quarters.

01

PART ONE

What is a PCF?

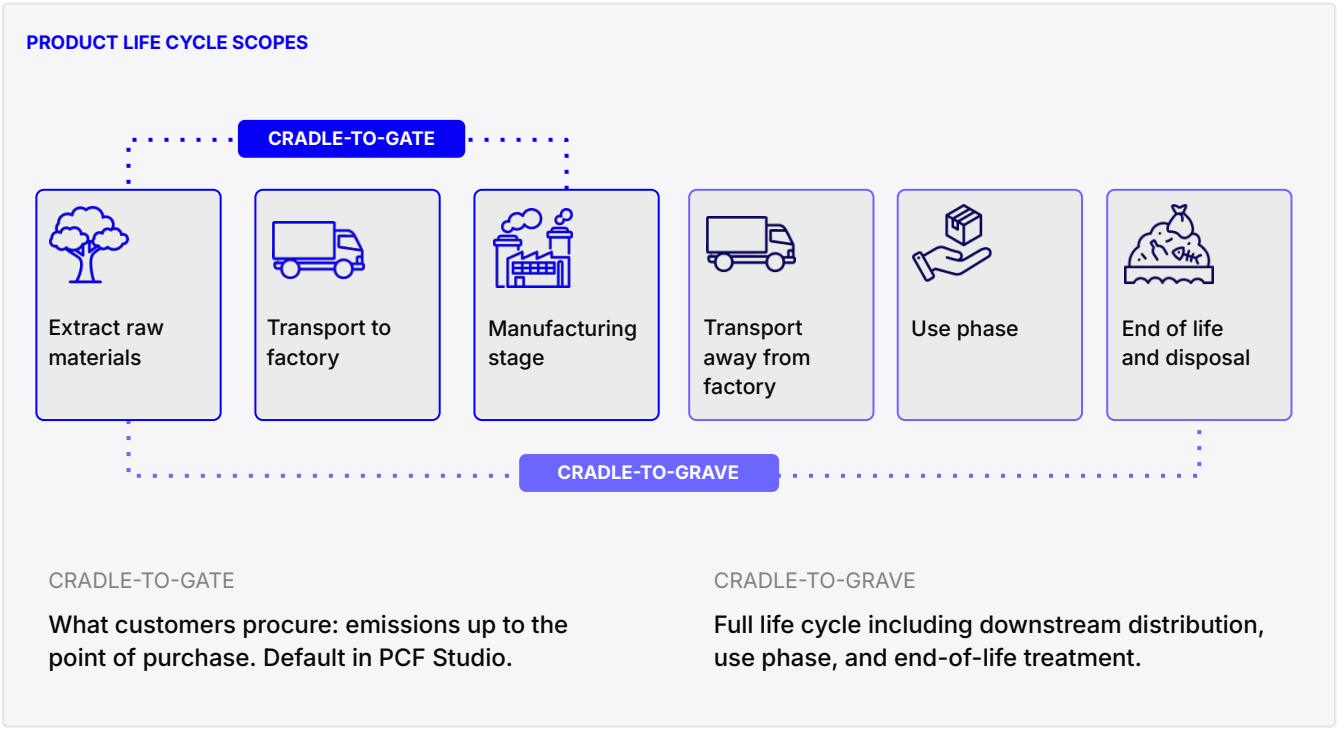
Cradle-to-gate vs cradle-to-grave, and how a product carbon footprint differs from a life cycle assessment.

DEFINITION

What is a PCF?

A **product carbon footprint (PCF)** represents the total greenhouse gas emissions generated by a product throughout its life cycle. All emissions are aggregated and expressed in **CO2 equivalent (CO2e)** to provide a single, comparable metric. Compared to **corporate carbon footprints (CCFs)**, a PCF focuses just on the footprint of an individual product rather than an entire company.

When creating PCFs, you have two options: **cradle-to-gate** and **cradle-to-grave**. These refer to what life cycle of the product needs to be measured.



Most manufacturers need a cradle-to-gate study, as their customers want to know the emissions they have procured up to the point of purchase. PCF Studio calculates cradle-to-gate product carbon footprints by default, covering material sourcing, inbound freight, and manufacturing inputs in a single coherent calculation.

How PCFs compare to LCAs

If you've spent much time in the world of sustainability reporting, you've almost certainly encountered both terms—**product carbon footprint (PCF)** and **life cycle assessment (LCA)**—often used as if they mean the same thing.

In a meeting, someone will talk about "an LCA" when they're actually talking about a customer request for a PCF. In a report, the two can appear side by side as if interchangeable.

PRODUCT CARBON FOOTPRINT

PCF

WHAT IT MEASURES

One impact: CO2e emissions across a product's life cycle.

BEST USED FOR

Customer requests, regulatory requirements, RFx processes, supplier disclosures.

LIFE CYCLE ASSESSMENT

LCA

WHAT IT MEASURES

Many environmental impacts: water use, eutrophication, land use, toxicity, CO2e, and more.

BEST USED FOR

Comprehensive ecological assessments, eco-labeling, multi-criteria product design.

QUICK TAKEAWAY

Unlike an LCA, which measures many environmental impacts, a PCF only includes one: **CO2e**. For most organizations responding to customer requests, regulatory requirements, or producurement processes, a PCF delivers the product-level carbon data they need without the time and cost of a full LCA. For more on this topic, you can check out our dedicated blog article.

02

PART TWO

What data do you need?

The data hierarchy—primary, secondary, and estimated—plus a practical framework for what to collect, where to find it, and how to handle data gaps.

THE FOUNDATION OF EVERY PCF

What data do you need

The foundation of any PCF is data—a lot of it. You need to know what materials went into your product, the sourcing locations of each item, how far they traveled to get to your manufacturing site, how much energy was used to create the product... You then need emission factors for each activity to convert the data you've collected into an emissions estimate.

The data hierarchy

01

BEST

Primary data

In carbon accounting, primary data is the gold standard. Primary data refers to data that is **measured or calculated directly from a specific process or supplier**: actual energy readings from a factory, a supplier-provided PCF, or measured transport distances, for example.

Primary data yields more accurate PCFs but it is very difficult, time-intensive, and costly to collect. Most companies can't simply stroll into a power station and collect energy readings. That's why secondary data is much more common, and why the vast majority of PCFs are a mix of the two. Even the supplier-provided PCF you receive is likely part calculated using secondary data.

The Partnership for Carbon Transparency (PACT)—the global initiative established for standardizing the calculation of PCFs—captures this nuance through data quality indicators (DQIs), which are a set of scores covering how representative the underlying data is for your specific product, supplier, and time period. The point isn't to chase a perfect "100% primary" score but to understand where your data can be improved. Improving your data is a journey, and there's no point waiting for perfect data to calculate your first PCF.

02

ACCEPTABLE

Secondary data

Secondary data is **drawn from databases and reliable sources** like ecoinvent and Carbon Minds. Secondary data relies on industry averages, like an average emission factor for steel production in Europe. Compared to primary data, secondary data enables much faster calculations that are scalable across business operations. The Climatiq database compiles emission factors from secondary data sources so they're all easily accessible in one place and in a consistent format. Every factor in the database is expressed in a consistent unit, tagged with its source, publication year, geographic region, LCA boundaries, GHG Protocol scope, and IPCC assessment report version. The schema is the same regardless of which source the data came from, meaning you can mix and match factors from a range of providers.

03

LAST RESORT

Estimated data

Even then, most companies find they still have **gaps in their business activity data**. Emission factors are only part of the equation: without granular data covering their business activities, they're effectively useless. But today AI can help companies to fill gaps in their activity data with well-grounded estimates. While these estimates aren't perfect, they are far more useful than a blocked project with missing data.

- **PRACTICAL REALITY**

Don't wait until you have perfect data to publish your first PCF. Almost every real-world PCF blends all three types. What matters is being explicit about which data is which—so reviewers can see exactly where the precision is, and where the assumptions live.

How much data do you need?

Most people think they need perfect data to get started calculating PCFs. That's because istorically, data availability has been a major blocker to creating PCFs—especially with legacy tools or consultant templates that demand endless data points to deliver a result.

But incomplete data is the norm, not the exception. This shouldn't be an obstacle for making progress on carbon transparency.

PACT says that "waiting for 100% primary, fully-verified PCFs means never starting," and encourages using partial, estimated data to create product-level emissions estimates.

> ***"[Legacy tools are] just too difficult for what you get out and that's why we've not done it. If you've got the tiniest piece of data missing, it just doesn't work, so the calculation won't run."***
>
> — SUSTAINABILITY ASSOCIATE AT MANUFACTURING COMPANY

PCF Studio is built around that reality. The more precise your inputs, the more precise the results. Whatever data you have available, you can get a starting point:

AVAILABLE DATA	HOW PCF STUDIO HANDLES IT
Materials and components	
Supplier-provided PCF for the component	Can be used directly in the calculation
BoM: Material composition + weight	Each material is mapped to a scientifically-vetted emission factor automatically
BoM: Component descriptions + weight	Each component is mapped to the closest available vetted emission factor, with options to verify and override it
BoM: Component descriptions + other unit of measurement	Each component is mapped to the closest available emission factor. Weights can be estimated from other units such as length or area, based on typical values for that component and provided unit
Product name only	BoM is estimated based on product name, using tailored AI prompts for the best possible inputs

AVAILABLE DATA	HOW PCF STUDIO HANDLES IT
Transport	
Supplier address + transport mode	Route and distance is calculated automatically and combined with fitting transport mode factors
Supplier address	Route and distance is calculated automatically, and mode inferred from likely route
Supplier country only	Country is used as origin point for distance calculation, and mode inferred from likely route
Manufacturing energy	
Machine-level metering tied to specific product	Can be entered directly
Process-level energy data	Can be entered directly
Production process descriptions only	Energy use is estimated from process data
No data	Energy use is estimated from product name and BoM

QUICK TIP

Before you start, you first need to decide what unit is most appropriate for your PCF: if you usually sell your product in packs, then this is the better basis for your PCF. This might differ depending on who you sell to: for example, if your buyer is a manufacturer, they probably buy multipacks rather than individual units.

PCF Studio offers you a more pragmatic approach to creating PCFs so that you can get started either way, data or no data. It maps your materials to scientifically-vetted emission factors using AI, with transparent, adjustable estimates for any data gaps so that you're still in control and can defend your numbers.

The emergence of intuitive tools like PCF Studio has democratized PCF development, removing the need for deep technical expertise and perfect data. Organizations can now rapidly deliver high-quality PCFs at low cost, which is a decisive advantage when responding to customer demands and securing competitive tenders.

03

PART THREE

Delivering your data in PCF Studio

A walkthrough of the step-by-step workflow—from importing your bill of materials to producing an audit-ready PCF.

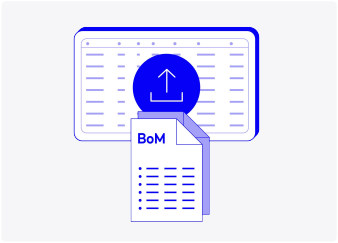
FROM DATA TO DISCLOSURE

Delivering your data in PCF Studio

PCF Studio is our tool for calculating accurate product carbon footprints in minutes instead of months. It guides users through each step: importing a bill of materials, mapping materials to emission factors using our Mapping Agent, and calculating results with a full audit trail. It is easier than traditional LCA tools, cheaper than consultants, and more reliable than spreadsheets. In this part, we'll walk you through making a calculation in PCF Studio.

Introduction

PHASE 01



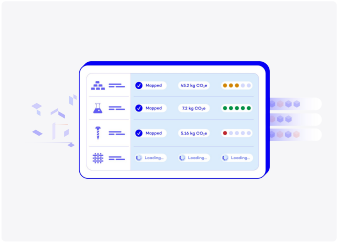
Upload your product data

Define the product, components, locations, and units by importing or building a bill of materials.

STEPS

01 • Input product basics
02 • Upload or generate your BoM
03 • Add component data
04 • Add or generate manufacturing energy data

PHASE 02



AI maps materials to emission factors

Automatically match each input to an emission factor from the Climatiq database using AI.

STEPS

05 • Review your results and edit matched factors

PHASE 03

Easily share PCFs with your customers

Run the calculation, review the breakdown, and export an audit-ready PCF report that is ready to share with customers.

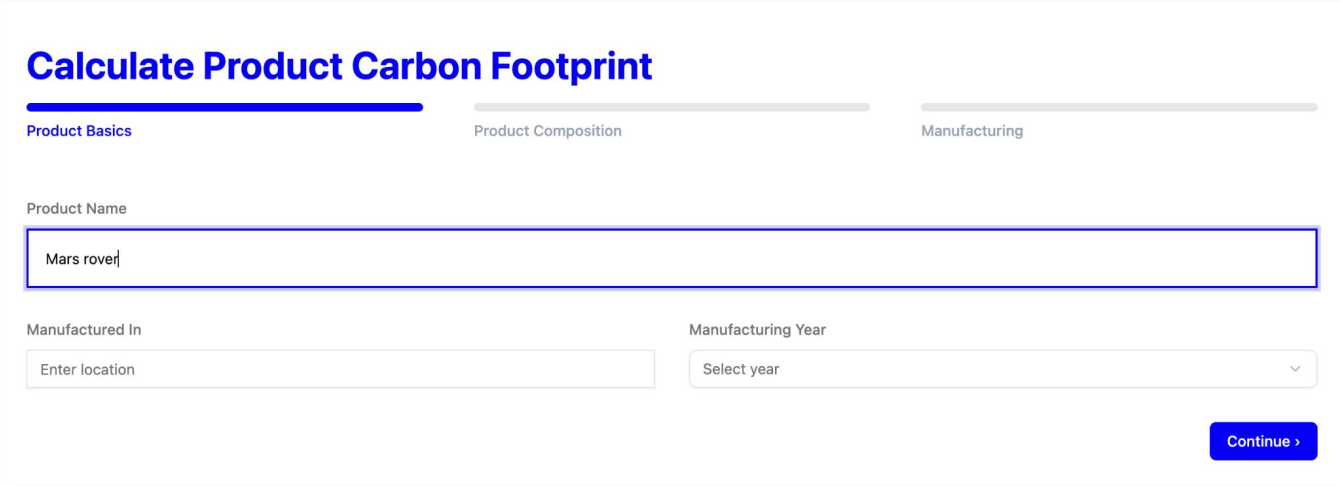
STEPS

06 • Share or export results

PHASE 01 UPLOAD YOUR PRODUCT DATA

STEP 01 Input product basics

In the first step, you'll need to add a product description, manufacturing location, and manufacturing year. This lays the foundation for your PCF, and the product name will come in handy if you need to generate component data, so make sure it's as precise and descriptive as possible rather than just a placeholder or branded name.



STEP 02 Upload or generate your BoM

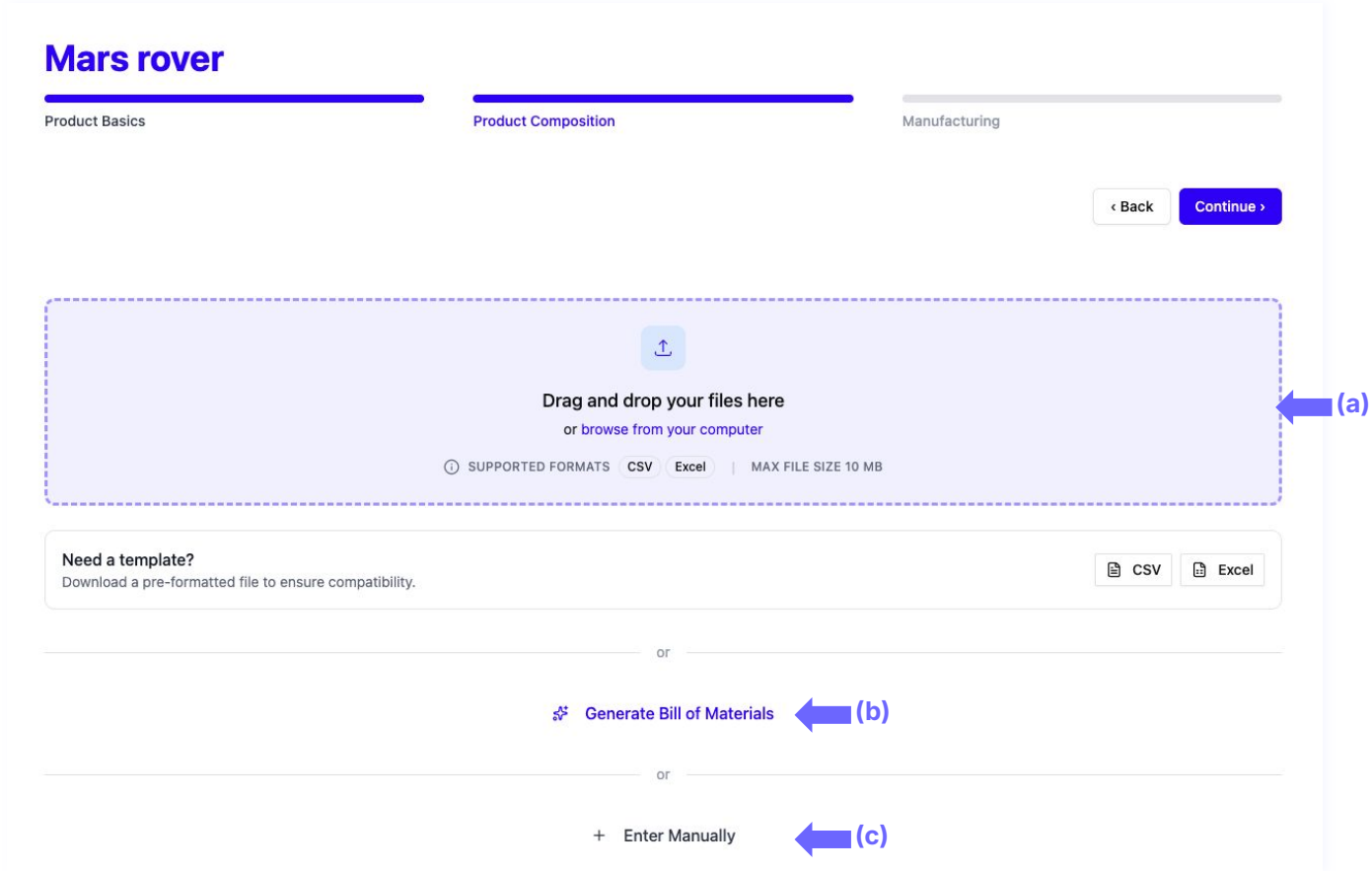
Building a product carbon footprint starts with understanding what goes into your product. PCF Studio is designed around your bill of materials as the primary input, turning what is typically the most labour-intensive part of a PCF calculation—sourcing, mapping, and validating component-level data—into a guided, largely automated process.

You have a few options to add your product data. (a) Firstly, you can **drag and drop a CSV or Excel file** containing your BoM data and let PCF Studio process your data automatically.

To make the upload process as straightforward as possible, **we provide a file template** containing all the fields and format you'll need in your BoM which you can download at this step, fill out, and reupload.

(b) Alternatively, if you don't have a BoM, you can click "**Generate Bill of Materials**" and PCF Studio will use your product name to generate a probable list of components using AI. This is especially useful for product ecodesign when you don't yet have a finalized BoM to work with.

(c) Finally, if you'd rather add your product data yourself, you can click "**Enter Manually**" and add each component individually. The type (component or packaging), description, per-unit weight, and location are mandatory fields.



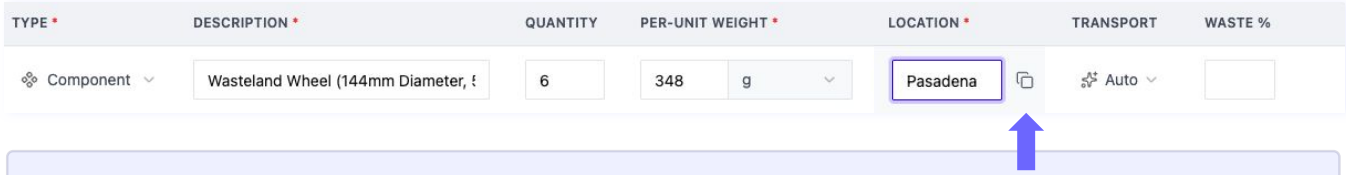
STEP 03 Add component data

Unless you entered your data manually, you'll next need to add and verify your component data.

If you uploaded your BoM, it's worth double checking that everything was parsed into PCF Studio correctly.

If you generated a BoM, you'll want to take extra care to verify each component for accuracy based on the information you have.

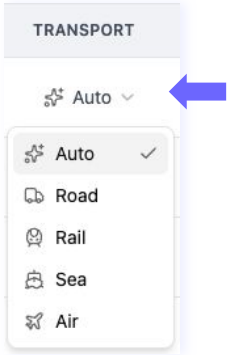
In both cases, you'll need to manually add the procurement location of each component and also specify the type (component or packaging).



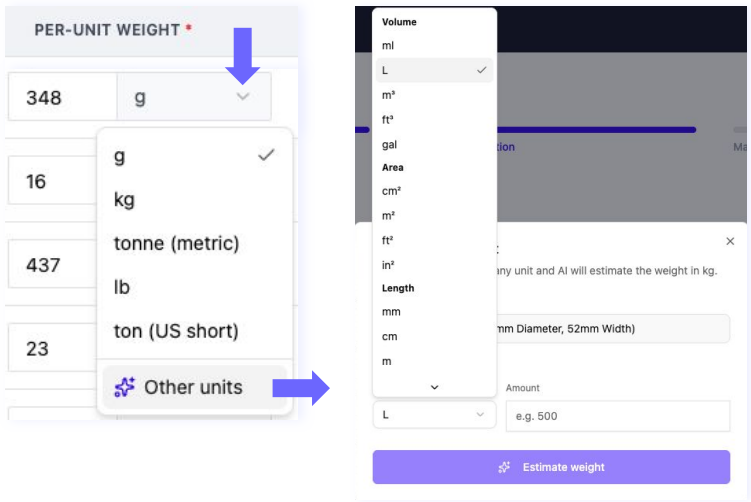
- **QUICK TIP**

To make this easier, **if you use the same location** across many or all of your components, you can click the two squares to the right of the location field to copy the location to all rows. Beware this will overwrite any manually-inputted locations, so modify locations *after* and *not before* clicking this icon.

The **transport** type can also be added manually, but this input is optional. If you leave it on "Auto", PCF Studio will automatically calculate transport emissions using the most likely route and transport method through our GLEC-certified freight calculation engine.



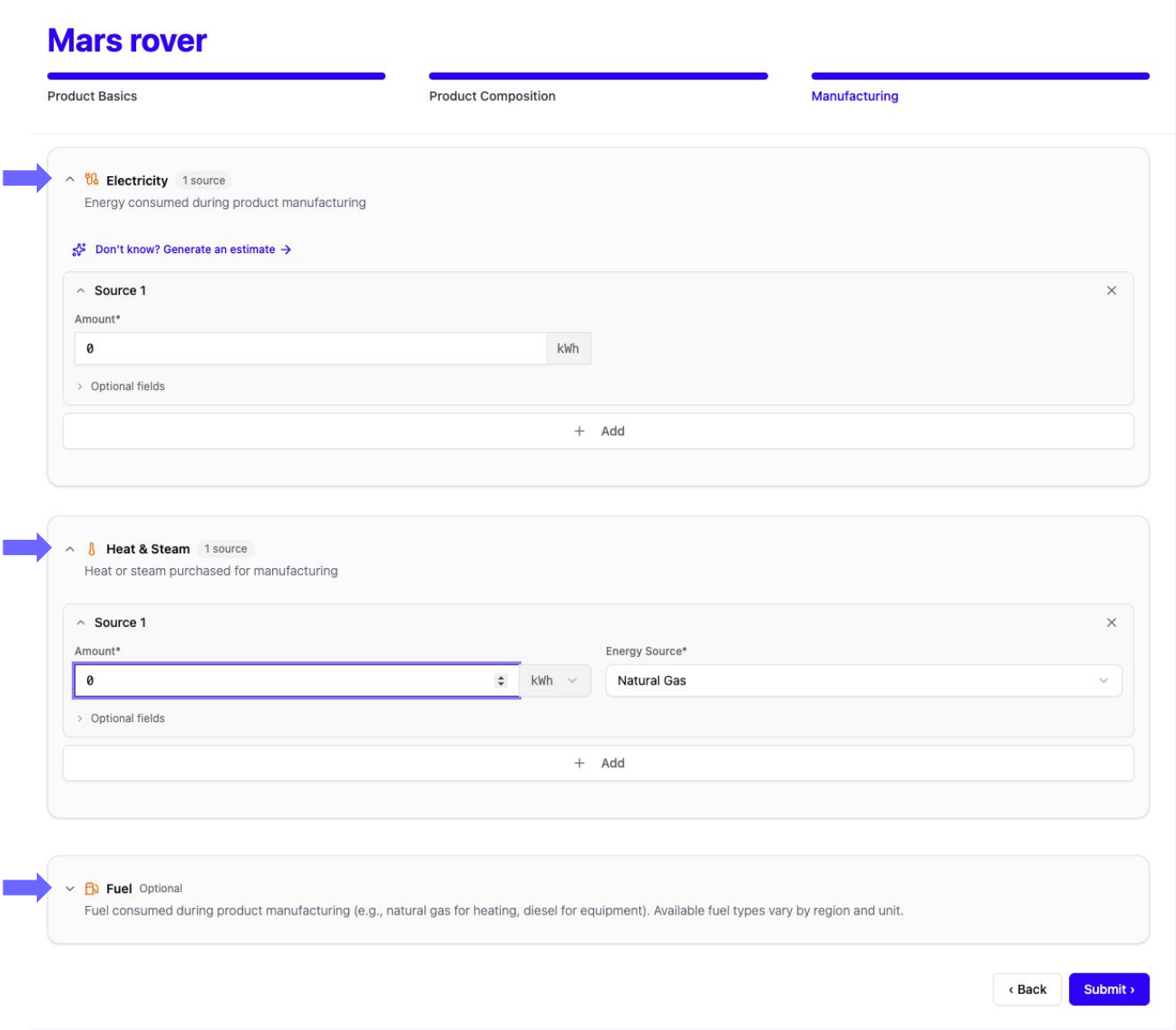
When entering the **weight**, you have the flexibility to change the unit of your measurement to more accurately reflect your BoM. Whether liters or millimeters, PCF Studio will use AI to convert the input into grams in the background, saving you the hassle of making manual, messy conversions.



Waste % is also an optional manual field.

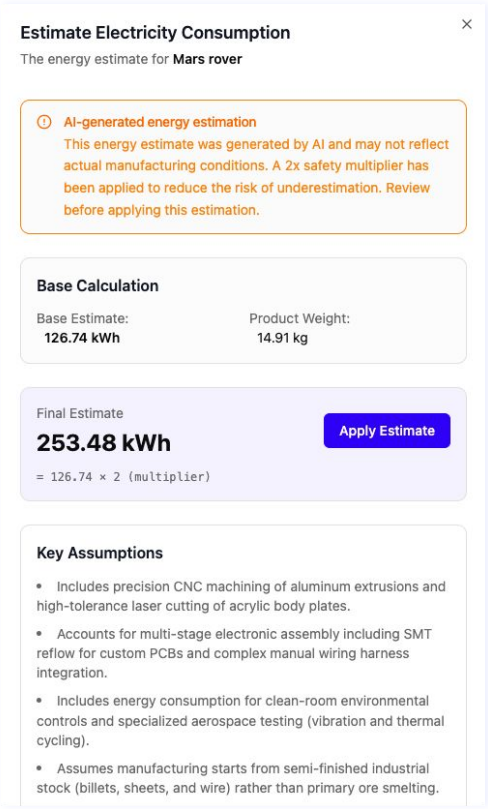
STEP 04 Add or generate manufacturing energy data

In the manufacturing step, you can add the energy used in your manufacturing process. You have the option to **add electricity, heat and steam, and fuel as energy sources**—and you can use a combination of sources if needed to reflect energy used across individual manufacturing stages or components.



If your energy supplier provides emission factors, you have the **option to add a custom emission factor** by clicking “Optional fields” and inputting the emission factor value under “Contract Emission Factor”.

Many manufacturers told us the lack of product-level energy data was a blocker to creating PCFs. So we made it possible to **generate an energy estimate directly within PCF Studio**. When you generate an estimate, PCF Studio uses AI to estimate electricity usage. While doing so, it gives you a clear breakdown of the assumptions made to generate the estimate so you have full visibility. We apply a 2x multiplier to this estimate to reduce the risk of underestimation.



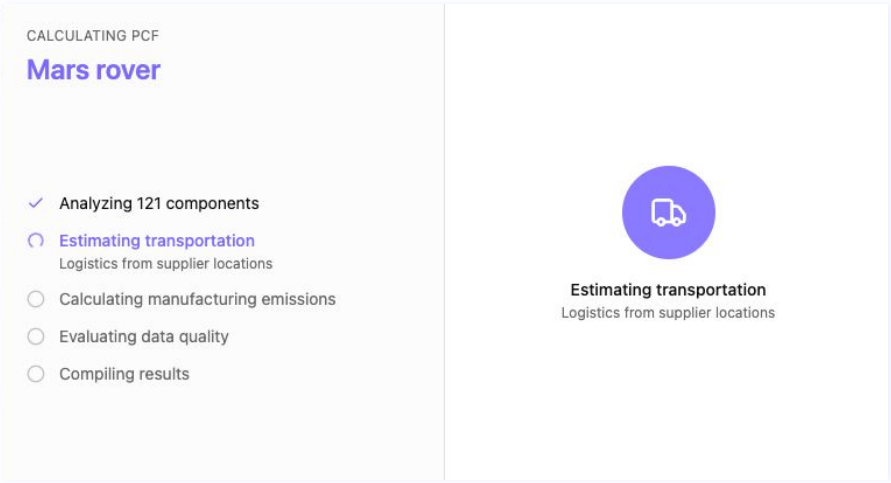
Once you input or generate your energy estimate, **PCF Studio applies the correct emission factors for your manufacturing location automatically**, without requiring you to source grid intensity data or fuel coefficients independently. Calculations are handled in the background by our **ISO-certified energy API**.

PHASE 02 AI MAPS MATERIALS TO EMISSION FACTORS

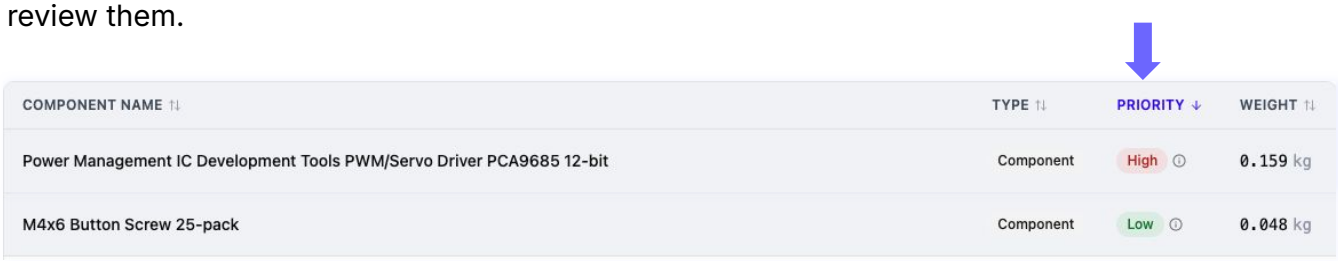
STEP 05

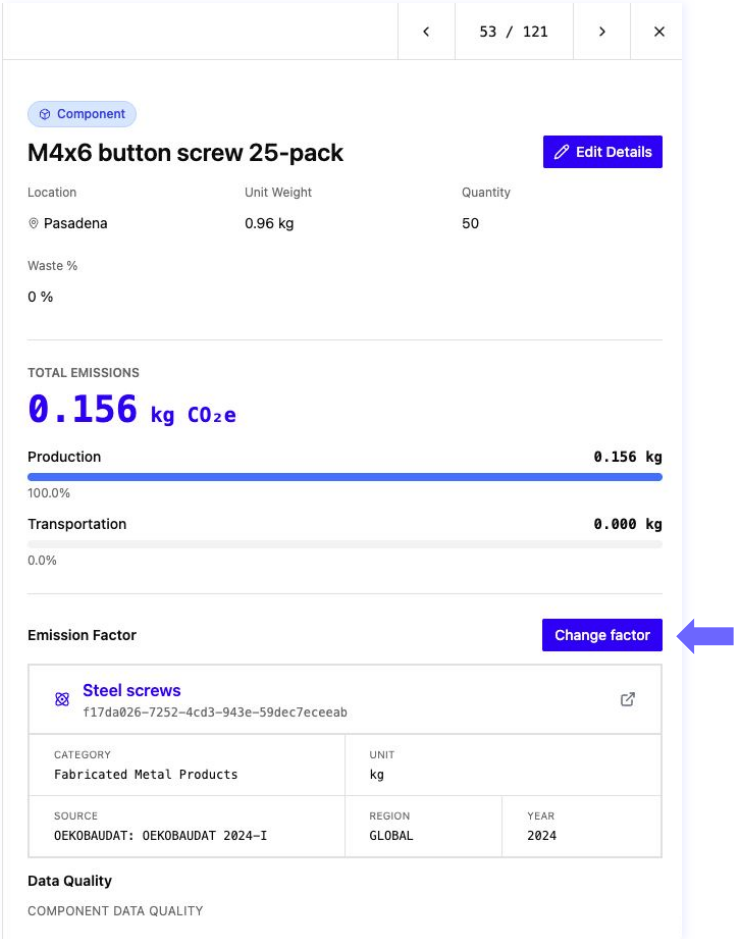
Review your results and edit matched factors

Click “Submit” and PCF Studio will then begin calculating your result.



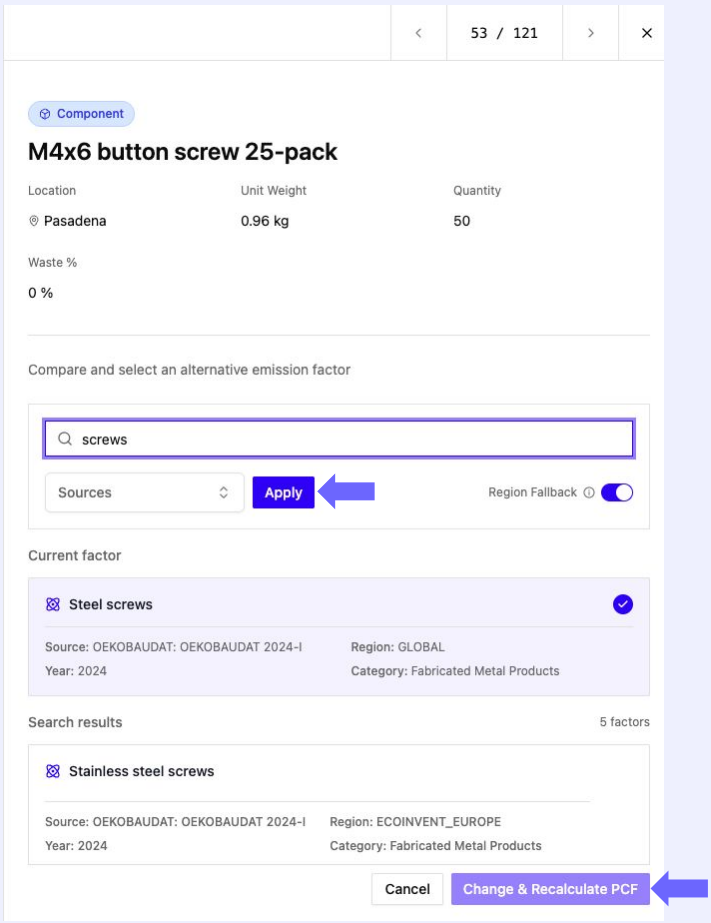
In the background, our Mapping Agent matches components and activities to emission factors from our scientifically-vetted database. Once you reach the results page, you can review these matches by clicking on a component. This will **open a window showing you the footprint of that individual component and what factor it was matched to, alongside a data quality rating**. Data quality ratings flag the confidence in matches from the Mapping Agent so you can easily review them.



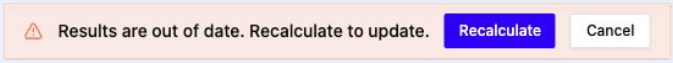


QUICK TIP

If you feel that **this emission factor is not a good match for your component**, you can click on "Change factor" to see a selection of other returned emission factor matches for your component, or otherwise search the database manually for a new match by using the search bar. Using the arrows at the top of the window allows you to quickly navigate between components to review emission factor matches.



Once you select a new factor, you'll see a notice warning you that your results are out of date and need recalculating. You can easily do this by clicking "Change & Recalculate PCF" and then "Recalculate" on the main results page. This gives you full flexibility to finetune your result as needed to optimize the accuracy of your PCF. **PCF Studio can save multiple versions of the same PCF for you for future reference**.



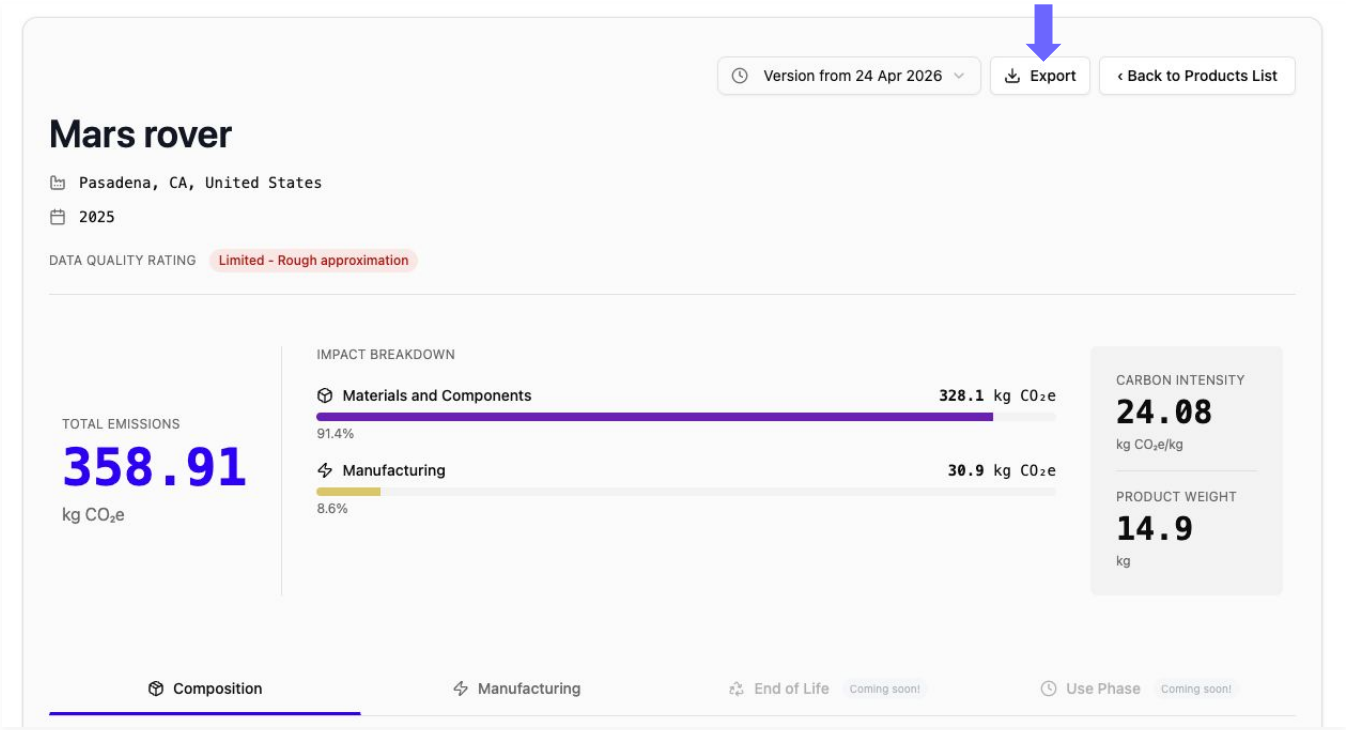
You can do the same thing for factors that were matched to your manufacturing stage. These are visible if you click the "Manufacturing" tab and then click on any energy source in the table.

PHASE 03 EASILY SHARE PCFS WITH YOUR CUSTOMERS

STEP 06

Share or export results

Once you've finalized your result, you can export your PCF to share with team members, stakeholders, and prospects. You'll find an "Export" button on your results page which gives you the option to **download a CSV** containing a product total PCF or a breakdown across components. Soon, you'll also have the option to download your results as a **PDF** or **JSON**.



The export breaks your PCF result down with all relevant metadata. You have the **option to download a simplified version**, containing just the PCF itself, or a full breakdown where all components and emission factors are shown. The export contains emission factor IDs, a version ID, and a PCF ID for full traceability and auditability.

DOING THE HEAVY LIFTING

What PCF Studio handles automatically

AI-POWERED MAPPING

Automatic emission factor mapping from Mapping Agent

Selecting the right emission factor for each material, process, or transport leg in a BoM is one of the most time-consuming parts of PCF creation. Finding and validating factors is slow, repetitive, and risky, because data is scattered across datasets, portals, PDFs, consultants, and spreadsheets. It requires deep knowledge of the underlying data sources, the right geographical and temporal scope, and an understanding of which lifecycle boundaries are included in each factor.

With PCF Studio, each material and component in your BoM is automatically matched to the most appropriate emission factor in Climatiq's database using AI-powered search. Rather than spending hours manually searching through data sources, Mapping Agent eliminates the manual lookup process that makes spreadsheet-based PCFs so time-consuming. It provides an auditable record of each factor selected so you can defend your methodology to customers, and they have trusted data to present to their auditors.

RELIABILITY AT A GLANCE

Data quality indicators

A data quality indicator indicates how reliable and representative the emissions data used in a PCF calculation is. It evaluates three dimensions: technological representativeness (how well the data reflects the actual technology), temporal representativeness (alignment with the production year), geographical representativeness (alignment with the actual location). Data quality is expressed as a score between 1 (best) and 5 (worst), giving you a clear signal of where emission factors may need review.

SMART INPUTS

Gap filling of component and energy data

Where energy data is not available at product-level—as is often the case—PCF Studio generates energy estimates to keep your calculation moving. Estimates are transparent and adjustable, giving you a credible starting point that you can refine as better data becomes available.

When primary data is not available for a given component or process, PCF Studio provides transparent, adjustable secondary data by combining our database with AI. You can override a suggestion at any time.

BUILT-IN COMPLIANCE

Certified calculations for energy and freight

PCF Studio supports calculations for electricity, fuel use, heat, and steam. Drawing on data from the International Energy Agency (IEA), Association of Issuing Bodies (AIB), Environmental Protection Agency (EPA) and more, our ISO-certified energy API automatically calculates the greenhouse gas emissions from energy consumed.

Freight calculations follow GLEC-accredited and ISO 14083-certified methodology so you get defensible, standard-compliant transport emissions estimates without having to model logistics manually or source separate tooling.

THIS IS WHAT YOU CAN EXPECT

What the output looks like

PINPOINT HOTSPOTS

Results summarized across lifecycle stages

Every PCF in PCF Studio is broken down by lifecycle stage (materials, manufacturing, and soon, end of life and use phase) so you can see exactly where emissions are concentrated. This detail is essential for identifying where reduction efforts will have the most impact, supporting customer conversations, and allowing for product eco-design.

TOTAL TRACEABILITY

Audit trails

PCF Studio is designed to produce results that are not just numerically complete, but explainable: to customers requesting carbon data, procurement teams evaluating suppliers, and auditors verifying methodology. Every output is structured to support traceability and accountability.

Behind every PCF result, PCF Studio surfaces the emission factors and IDs used, the associated data quality indicators, and the methodology applied throughout the calculation. This means you are never in a position of presenting a number you cannot explain.

COMPLIANCE READY

Aligned with standards

Results are aligned with the GHG Protocol Product Life Cycle Standard and ISO 14067, giving you a CO2e figure you can use in RFPs, customer disclosures, and regulatory reporting.

BUILT FOR SPEED

Result ready in minutes

Traditional tools take months of training and then weeks of work on each project to produce a result. PCF Studio changes that: including refining and finetuning, users go from zero to finished PCF in less than an hour. When RFPs land with tight deadlines, that speed is the difference between winning and losing.

climatiq

READY TO GET STARTED?

Reply to the next PCF request with confidence

Perfect data, specialist consultants, and months of work are no longer needed for product-level emissions insights. For manufacturers under pressure to deliver product carbon footprints, PCF Studio turns your product data into shareable PCFs in minutes.

Unlike LCA tools or consultants that are slow, complex, or opaque, PCF Studio enables fast, transparent PCFs that can scale across product portfolios, support large customers with SBTi targets, and win business.

LAUNCH OFFER

EXPORT YOUR PCF NOW

Get started

To get hands-on with PCF Studio, you can already sign up and try it for free—the first 10,000 PCFs created in PCF Studio are on us.

Try for free ↗

GO DEEPER

Get more insights

If you're looking for more information on our methodology, you can check out our documentation and Methodology Hub.

Documentation ↗ **Methodology Hub** ↗