

2025

CARBON ACCOUNTING

FOR SUSTAINABLE FOOD SMES



IS YOUR BUSINESS NET ZERO?



Local, Organic Food Businesses reduce the emissions associated with diets in the following ways:

Shorter Supply Chains

- Avoids carbon-intensive air & sea freight
- less distance and therefore lower CO₂ emissions from trucks
- fewer intermediary stops reduces energy used for refrigeration, lighting, and heating.

Production Methods

- Organic farming increases soil carbon and biodiversity, and helps the soil release fewer greenhouse gases
- In-season farming without heating means reduced emissions.

Less Waste

- Better feedback between producer, distributor and consumer improves demand forecasting, reducing overproduction and unsold stock
- Minimal packaging
- Fresher goods reduces spoilage

We know Local, Organic Food Businesses contribute to net zero. But how much? There is very little practical and academic knowledge of the ways to track and evidence food SME emissions reductions.

To target this gap, Better Food Traders decided to investigate the emission footprint of localised, organic and circular food businesses.

HOW CAN YOU CALCULATE YOUR FOOD BUSINESS' CARBON EMISSIONS?

Carbon footprint calculation has an important role in evidencing the benefits of local, organic food trade.

Measuring carbon emissions is only one dimension of sustainability, but widely-recognised. It will become increasingly important, especially if you are considering selling into the public sector because they have emissions targets - therefore opportunities will likely be growing in this sector.

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We explored how small food SMEs can calculate their carbon footprint, and the associated challenges and gaps.

This report will reveal our findings and point towards important further research that this sector needs.

CARBON ACCOUNTING FOR BEGINNERS

Emissions accounting is technical, and the learning curve for SMEs is steep.

Carbon calculations are typically focused on either a **product** or a **business**.

Product-focused “Life-Cycle Analyses” evaluate the greenhouse gas emissions of a particular product, including raw materials, processing, production, distribution and storage, use and end-of-life.

Business-focused carbon footprints evaluate the overall emissions associated with the business, including those associated with its products and all other emissions related to running the business.

We spent a month trying to find a suitable method of carbon footprinting one BFT, so we could start to explore the hypothesis that localised, organic and circular food businesses contribute to net zero.

But carbon calculations are not as straightforward as we expected, and there are some big gaps and assumptions being used by the carbon-footprinting industry. Cost and time also present barriers.

GREENHOUSE GASES

The world's most widely used greenhouse gas accounting standards for companies is the Greenhouse Gas (GHG) Protocol. The GHG divides emissions into three 'Scopes':

Scope 1:

Direct emissions from owned or controlled sources (e.g. fuel combustion, company vehicles).

Scope 2:

Indirect emissions from the generation of purchased electricity, steam, heating and cooling.

Scope 3:

All other indirect emissions that occur in a company's value chain.

for example, supply chain emissions & waste management.

Measuring Scope 3 is the greatest challenge of carbon footprinting. This is because it requires a clear picture of the whole supply chain, achieved through detailed information from suppliers, carriers, and even customers.

SCOPE 1, 2 & 3 FOR FOOD BUSINESSES

Scope 1: Direct Emissions

e.g.

- Freight
- Delivery
- Refrigerant Gas

Scope 2: Indirect Emissions from purchased energy

e.g.

- Heating of buildings
- Lighting of buildings
- Cooling of buildings

Scope 3: Supply Chain Emissions

e.g.

- Food production and farming
- Food processing
- Waste (food and packaging)

The largest category of emissions for Food Businesses will be Scope 3.

This is due to the high indirect emissions from farming, manufacturing and waste.

The most comprehensive approach is combining an Life Cycle Analysis and business footprint (see page 3).

However, perfect shouldn't be the enemy of the good: this report will lay out your options for getting started.

KEY CONCEPT: BASELINE

The first thing to do is establish a baseline.

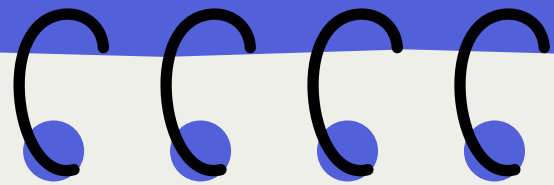
This is typically an estimate of emissions for a specific year against which you will track progress.

For example: your business may have emitted 150 tonnes of CO₂e in 2022.

That becomes your baseline.

After switching your fruit suppliers, in 2023 you emit 120 tonnes.

You can report a 20% reduction from the baseline year.



Expect the baseline exercise to reveal the areas you need to start collecting more data!

WHY IS A BASELINE IMPORTANT?

1. **Benchmarking** shows where you're starting from.
2. **Goal-setting** will be more realistic (e.g. 50% less than 2022).
3. **Tracking** progress will be possible in years to come.

KEY CONCEPT: EMISSIONS FACTORS

To calculate the carbon emissions of your business, you need Emissions Factors. Emissions Factors are estimated emissions of an activity, eg kilograms of CO₂ emitted in the process of growing and harvesting a tonne of potatoes.

This describes the rate that the activity releases greenhouse gases (GHGs) into the atmosphere.

Consultants and online calculators use Emissions Factors to calculate a business' footprint.

Emissions factors are just a tool to better understand emissions associated with your business, but they need to be accurate to be meaningful.

Emissions factors can be either Spend-Based or Activity Based:

Spend-Based

e.g. the amount of greenhouse gas emissions per £ spent

Activity-Based

e.g. emissions per kilometers driven.

WHAT TO LOOK OUT FOR

Source: Small World Consulting
“Questions to Ask Your Carbon Consultant”



The source of emission factors should be clear and reliable.

The methodology behind any calculation should be clearly available, including data sources and how final emissions factors are calculated.

There is always a lag in new data being published, so Spend-based emissions factors should be adjusted for inflation.



Your carbon accountant should be able to show you the methodology behind their model and how they use it, in an understandable way.



**Reliable data which includes Scopes 1, 2 and 3 for each industry can be sourced from:
DEFRA, Exiobase, & SWC MRIO**

To read more, [click here.](#)

HOW DO I MAKE SURE MY CALCULATION IS ACCURATE?

All company supply chain emissions assessments are estimates with considerable uncertainty. Nevertheless, you can develop a 'good enough' footprint estimate to prioritise areas for reduction, set targets and track changes over time.

For example:

You may not have figures for the weight of the waste your business sends to landfill per week.

The council takes one 1100L wheelie bin each week. Maximum load is 77kg per bin.

Therefore, taking an estimate of how full your bins are on average, each week, can help you ascertain an estimated figure for an annual weight of waste, allowing you to calculate estimated associated emissions.

It's important to know that **the accuracy of carbon calculations can vary enormously**.

The accuracy will depend on the emissions factors, i.e. the data behind the estimates, and the availability of business data.

WHAT SHOULD I LOOK OUT FOR?

Using less specific Emissions Factors can lead to significant over or under-estimations of your business' carbon emissions.

Categories can be very large. 'Food' is a common Emissions Factor category, despite substantial differences between meat, vegetables, dairy etc.

Imagine you bought one kg of mixed root vegetables and one kg of beef.

	Emissions Factor (kgCO ₂ e)	Total emissions (kgCO ₂ e)
Food	3.7 (DEFRA, 2024)	1 x 3.7 = 3.7
Carrot EF	0.4 (Poore & Nemecek, 2018)	1 x 0.4 = 0.4
Beef EF	99.5 (Poore & Nemecek, 2018)	1 x 99.5 = 99.5

Using the generic 'Food' factor, you estimate that both your kg of mixed root vegetables and beef have the same emissions: 3.7kgCO₂e.

This over-estimates vegetable emissions by 9x and underestimates meat by 27x.

Many calculations use generic categories of 'Food and Drink', reducing their accuracy.

WHAT SHOULD I LOOK OUT FOR?

Secondly, there are currently **no standardised emissions factors (EFs)** that capture whether food is grown **organically, regeneratively, or conventionally/chemically**. This is a huge gap that needs to be addressed by researchers and carbon-footprinting consultants.

Imagine your business sources 1,000 kg of mixed root veg per year. Given the lack of appropriate EFs, let's use **hypothetical (but researched-informed) EFs**:

	Emissions Factor (kgCO ₂ e/kg)	Total emissions (kgCO ₂ e)
Generic	0.4 (Poore & Nemecek, 2018)	1000 x 0.4 = 400
Conventional	0.5	1000 x 0.5 = 500
Organic (International)	0.3	1000 x 0.3 = 300
Agroecological & Domestic	0.1	1000 x 0.1 = 100

Using a generic EF gives you an estimate of 400kgCO₂e - for UK agroecologically grown root veg, this would be an overestimate of 300%.

Food SMEs who invest in the most local & best farming practices can't easily show their climate advantage if they're stuck with generic data.

METHODS

To make a calculation, you will be likely using one or a hybridisation of the following methods:

1. Spend-based Emissions Factors (Easy to use but least specific)
2. Activity-based Emissions Factors (Requires more data but more specific)
3. Life-Cycle Analysis (Most specific but requires most data)

Most calculations will take a hybrid approach, using the most precise method where the data is available.

Given the wide variation in carbon footprinting methods, it is essential to use **consistent tools and approaches year after year**. This is the only way to produce reliable data. A consistent methodology will allow individual businesses to track their own progress over time.

However, comparing emissions across different businesses is much more challenging. Unless data collection and calculation methods are standardized, such comparisons are unreliable. This lack of alignment makes benchmarking within the food sector difficult and often misleading.

CASE STUDY: FOOTPRINT USING FREE TOOLS

Better Food Traders worked with **Cambridge Organic Food Company** to see if we could produce an accurate baseline carbon footprint of their business for one year of activities, using free online tools.

After a few months of exploring our different options for analysis, we found the **NatWest Carbon tool** was the best suited free online calculator to use to do a full carbon audit of the business.

The data categories that we included were:

- Employee Travel
- Travel & Freight
- Fuel & Electricity
- Water
- Refrigerant Gas
- Waste



CASE STUDY: DATA COLLECTION

To collect the data, we had to work across different teams in the business. It's unlikely that one person would have access to all the areas of information required for a carbon audit.

Once we had the data, **getting it into the right format for the calculation was tedious**, in particular calculating the weight of freight/goods in.

Some data just wasn't available, so we had to make estimates: for example, the weight of waste produced.

In total, collecting the data took ~4 hours.

Adjusting it for the calculator took an additional ~5 hours.

We made some significant extrapolations to save time on calculating the distance and weight of incoming and outgoing freight.

If we had looked for all of this data, it would have taken an additional ~12 hours.

The more data you are able to find, the more useful your estimate will be.

WHAT CAN SME FOOD BUSINESSES DO?



Follow the **CRAWL > WALK > RUN** framework

STEP ONE: CRAWL

Start with the basics.

Begin by measuring scope 1, 2 & 3 emissions using a free calculator and spend-based data.



Focus on collecting data for your largest suppliers and categories

To get a carbon calculation you have to collect and input the correct data yourself.

This will give you a quick but reliable estimate of your carbon footprint, so you can identify major emissions hotspots in your value chain.

STEP ONE: CRAWL

When using a carbon calculator:



- Ensure it includes scope 1, 2 & 3
- Understand how the quality of your data will impact the accuracy of your result
- Emissions factors may not reflect different food categories, e.g. Veg, Meat, Dairy or transport options.

There are many free web calculators that SMEs can use

We have tried and tested 3:

Farm Carbon Toolkit



NatWest Carbon Planner



Small Business Carbon Calculator



FARM CARBON TOOLKIT



What can the Farm Carbon Toolkit do?

- Measure the carbon footprint of farms
- **Emissions** and **sequestration**
- Benchmark your result against other calculator users

What is the Farm Carbon Toolkit useful for?

- Designed for food producers, making it a valuable recommendation for BFTs to share with their supply chains.
- Offers insights into key impact categories to help you actively reduce your footprint.

Strengths of the Farm Carbon Toolkit:

- User-friendly interface and clear, accessible graphics that support easy interpretation of results.
- Benefits from active development and integration efforts by the FCT team.

What BFT users say:

“The FCT is made for farmers, but BFTs can use it to get an idea of the categories they need to be thinking about”

Alison, Bwyd Sir Gar

NATWEST CARBON PLANNER



What can the Natwest Carbon Planner do?

- A straightforward estimate of your business' footprint
- Suggests **actions to reduce your footprint.**

What is the NatWest Carbon Planner useful for?

- Making the first step into carbon footprinting your business.

Strengths of the NatWest Carbon Planner:

- Clearly explains what data is required and how to find the correct format and figures.
- The data you input is saved and you can return to it each time you log in.

From the currently available options, we recommend the NatWest Carbon Planner for a first attempt at footprinting your business.

However, there are limitations to this tool:

- For food businesses, it doesn't have an Industry average carbon footprint.
- Doesn't capture renewable energy types
- The methodology is not transparent.

SMALL BUSINESS CARBON CALCULATOR



The Small Business Calculator is a very easy to use, simple tool.

The Small Business Calculator **can only provide a very quick and rough estimate** of your carbon emissions.

What is the Small Business Calculator useful for?

- Producing a carbon footprint estimate very quickly and with limited data.

Strengths of the Small Business Calculator

- Uses spend based data.

This means businesses only need a copy of their accounts to use the tool.

Be Careful!

The estimates provided by the Small Business Calculator have very limited accuracy as the model is very simplified.

STEP TWO: WALK

Follow the CRAWL > WALK > RUN framework

INCREASE ACCURACY

Collect primary data rather than spend-based data, i.e. weight of goods purchased rather than price of goods purchased.

Research the methodology used to calculate your footprint, i.e. ensuring spend-based emissions factors are adjusted for inflation.

Work with a **paid online tool** such as CarbonCloud or Carbon Analytics. Ensure that these tools are developing the accuracy of your footprint by researching the methodology used.

STEP THREE: RUN

Follow the CRAWL > WALK > RUN framework

RUN: MAXIMUM PRECISION

Calculate a precise picture of your full footprint by working with a consultant.

A huge range of businesses offer carbon measurement and reduction services, but the methods, data and emissions factors they use are **not standardised**.

Therefore, be careful when choosing a consultancy to work with.

Expect to pay at least £5000, up to £20000.

We recommend:

- Small World Consulting for their rigorous approach, expertise in food emissions factors, and Scope 3 reporting.
- Bioregional for the SME Carbon Accounting Toolkit.

CASE STUDY: RIVERFORD ORGANICS

Riverford Organics have monitored their emissions since 2017. This has been possible through a Knowledge Transfer Partnership with Exeter University's Centre for Energy and the Environment.

According to Riverford, understanding their carbon footprint has helped them make changes to their business, specifically by setting emissions reduction targets.

For example, they aim to **reduce emissions per delivery** from 4.75kg in 2018-2019 to less than 2.5kg in 2030.

From their carbon calculations, they have learnt that the most effective way to do this is to **target their transport emissions, which represent 69% of their total carbon footprint** in the financial year 2022-23. Their actions are: more efficient routing, investing in low emission vehicles and renewable energy sources.

WHAT DATA AND RESEARCH IS NEEDED?

The question of whether organic farming has fewer GHG emissions than conventional methods has **not been fully answered by research.**

Organic farming likely has less total emissions than conventional methods due to healthier soils and fewer synthetic fertilizers and pesticides.

This is not currently represented in **any available emissions factors.**

However, some studies argue that organic hypothetically causes carbon increases. This would be due to lower typical yields or even a 'rebound effect' of land-use change further afield to grow food to compensate for a shortfall in local produce.

These studies project scenarios and carry their own assumptions!

Practitioners would benefit from:

- realistic, specific calculations
- more granular emissions factors based on location and production methods - such as Organic and Regenerative.

WHAT NEW TOOLS ARE NEEDED?

Ultimately, we found that the free online tools currently available are:

- not granular enough
- rarely fully transparent about the methodology they use, making it difficult to adjust them to nuances in the business model, for example, circular practices that Better Food Traders use like drop-shipping.

This makes it difficult to trust the final calculation.

Practitioners need a tool which is:

- Free or low-cost
- Transparent and clearly-explained methodology
- Simple to use
- Easy to upload data
- Educational
- Gives the user a more specific choice of emissions factors to use e.g. Electric Vehicles; or Specific Food types (Dairy, Meat, Vegetables).



Source: Seasons Wholefoods

FINAL CONCLUSIONS

We need to be able to be specific about production methods and estimating their climate impacts **because agriculture accounts for up to 70% of food business' emissions** (Crippa et al, 2021).

This is especially important for local food SMEs who invest in sourcing the best possible produce with the lowest associated carbon emissions.

Without more specificity, they are **unable to communicate their advantage**.

With **improved tools to calculate their impacts** and more specific calculations, we could see the local food sector reduce their emissions and grow their share of sustainable food consumer base.



Source: Field Bakery



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FOOD
TRADERS**