

## What is PAS 2050 and why is it important?

PAS 2050 is a publicly available specification that is used to assess the life cycle greenhouse gas (GHG) emissions for both goods and services. It is published by the British Standards Institute (BSI). PAS 2050 can be used to carbon footprint your products, identify hotspots and reduce emissions in your supply chain.

It allows you to conduct internal assessment of existing GHG emissions, evaluate alternative methods of producing raw materials and devise programmes to reduce GHG emissions. PAS 2050 can be used within or between businesses across the supply chain. It will help meet the targets set for GHG emissions, increase efficiency and reduce costs. It can be used in a wide-range of business activities.

## How can it help my business?

The carbon footprinting tool can be used to drive GHG reductions in your own production systems. It will help highlight where GHG emissions are high. It will allow you to decide which part of the production process is most viable to change and working with suppliers and customers, will allow these reductions to take place. A benchmarking exercise could be an important part of reducing emissions and making improvements over time. This could show how well your business is doing and identify potential savings by reducing GHG emissions and energy use.

## How is PAS 2050 used?

Agriculture covers complex and diverse processes and GHG emissions relate to many activities. You will need to consider carefully the process you intend to investigate on your farm, as all processes and activities relating to the system boundary of your product need to be considered. Elements to consider include production materials, energy use, production processes, the operation of premises, transportation and storage.

You will need to collect activity data to take into account GHG emissions to the atmosphere and removals from the atmosphere. Activity data can be of either primary (first-hand information) or secondary sources (published study or other source). A data collection plan needs to be set up with targets for primary data collection and highlight where secondary data needs to be collected – it should cover all data needed for carbon footprint assessments. Secondary data can also be used as a source of emission factors. This information can be used to fill gaps in primary activity data and calculate the impact of a life cycle. The relevant databases for this information are listed in the PAS 2050 document.

Product life cycle processes included in GHG assessment include; energy use, combustion processes, chemical reactions, loss of refrigerants, process operations, service provision and delivery, land use and land use change, livestock production and agricultural processes, waste management. Transport emissions will also form an important part of the supply chain.

The step-wise process for calculating GHG emissions using PAS 2050 is outlined below:

### **Step 1 – Scoping**

- Describe product to be assessed
- Draw a map of product life cycle
- Set the system boundary
- Prioritise data collection

### **Step 2 – Data collection**

- Set up data collection plan
- Collect primary activity data
- Collect secondary data as required
- Check data quality

### **Step 3 – Footprint calculations**

- Compile activity data
- Multiply activity data by emission factor to determine footprint
- Check calculations

### **Step 4 – Interpret results and reduce GHG emissions**

- Identify the hotspots
- Identify reduction opportunities

## **What information will I need?**

In terms of your particular farming practice, each process and activity that occurs within the system boundary will need to be considered. This will include production materials, crop production, energy to run machinery, transportation and storage. It will not include emissions associated with the production of machinery and buildings, human energy inputs, transport of consumers to the point of purchase or transport of employees.

The carbon footprint must include all emissions of the 63 GHG's listed in PAS 2050 and these will include carbon dioxide, nitrous oxide and methane, as well as halogenated hydrocarbons. Each type of GHG molecule makes a different contribution to global warming – known as Global Warming Potential (GWP).

In terms of considering agricultural or horticultural products the following data needs to be considered; Inputs (e.g. fertilisers, pesticides), energy use for growing conditions (e.g. glasshouse),

direct emissions from crop or livestock production, direct emissions from bedding materials and manure management, waste generation, emissions from land use change and carbon removals from the atmosphere (carbon storage).

Data of this type can be collected from either primary or secondary sources and these are referenced in PAS 2050.

### How do I conduct a carbon calculation and interpret the results?

Using PAS 2050, there are 5 main steps to conducting a carbon calculation. You will need to:

- Determine the emissions/removals from activity within your system boundary.
- Convert primary activity data and secondary data to GHG emissions and removals per functional unit.
- Convert GHG emissions and removals data to units of CO<sub>2</sub> EQUIVALENT by multiplying GHG emissions figures by Global Warming Potential (GWP).
- Calculate impact of carbon storage in the product.
- Sum the CO<sub>2</sub> EQUIVALENTS to determine the total carbon footprint.

Footprint calculations will represent a total amount for each material and should highlight hotspots across the life cycle for a particular product. At a simple level they are calculated from the sum of **activity data x emission factor** for all of the processes involved. This is a useful tool to benchmark the carbon footprint of a product or process with similar products or processes. The PAS 2050 product footprint is only used as an estimate of GHG emissions and uncertainty analysis can also be used. It will however highlight where savings might be made.

### How do I reduce the carbon footprint of a certain process?

The process of carbon footprinting can be used to identify inefficiencies in a process. You might be able to make that process more efficient and this can help reduce carbon emissions and energy use. It can also convey a positive message from an environmental perspective. A cost-benefit analysis approach can also be used e.g. the cost of purchasing a new technology, versus the savings made from using it over time. You might also consider conducting a new practice or changing how agricultural land is used and managed. Reducing the carbon footprint could enhance business credentials and compliance with assurance schemes.

The Carbon Trust can offer information and advice on new technologies for agriculture and horticulture.

### Does PAS 2050 have specific application to the agricultural and horticultural sectors?

PAS 2050 sets out generic requirements for undertaking assessment of GHG emissions for all businesses. Agricultural activities are considered within its scope. Supplementary requirements and additional guidance is available in **PAS 2050-1: 2012 – Assessment of life cycle greenhouse gas emissions from horticultural products**. This was compiled by a group of experts from several countries including the UK (ADAS and the NFU). It details additional guidance for the horticultural sector such as land use change and allocation.

The purpose of the supplement is to aid consistent application of the PAS 2050 to the horticulture sector by providing:

- A horticultural focus for aspects of PAS 2050 where options are permitted

- Rules or assessment requirements directly relevant to main sources for emissions from horticulture
- Clarity on how to apply specific elements of PAS 2050 within the horticulture sector.

The system boundary for horticultural production includes:

- Seed or young plant production
- Storage of young plant material
- Crop growing
- Storage of crops
- Transport
- Waste management

The supplement has specific reference to: Growth media, water use, energy, and heating; cultivation procedures, including irrigation; storage and marketing; containers, packaging and labelling; waste management; combined heat and power (CHP) and methane slip.

It provides cradle- to- gate assessment for cultivation relating to fruits, vegetables, annuals and perennials and open and protected cropping. It includes:

- Emissions and removals of biogenic carbon
- CO<sub>2</sub> emissions from fossil carbon sources
- Methane emissions from manure and agricultural processes
- N<sub>2</sub>O emissions from soils and agricultural processes
- Land use change

The supplement **excludes** processes such as;

- Production and maintenance of goods used for climate control
- Production and maintenance of tractors, machines etc.
- Production and maintenance or buildings, roads and floor coverings

Allocation of emissions also forms part of the supplement, such as the use of organic fertilisers and how application might effect the C balance of crops and subsequent cropping. It also covers the application of peat products and other fossil-based products.

### Where can I get more information?

*PAS 2050: 2011 Specification for the assessment of the life cycle greenhouse gas emissions of goods and services* and; *PAS 2050-1:2012 Assessment of life cycle greenhouse gas emissions from horticultural products* are issued by:

The British Standards Institution, 389, Chiswick High Road, London, W4 4AL.

They can be downloaded for free at: <http://shop.bsigroup.com/>

Or contact the BSI Information Centre: Tel:+ 44(0)20 8996 7111, email [info@bsigroup.com](mailto:info@bsigroup.com)

The Carbon Trust offers a useful source of information for technologies in agriculture and horticulture: [www.carbontrust.co.uk](http://www.carbontrust.co.uk), Tel: +44 (0)800 085 2005