

PAS 2050: YOUR QUESTIONS ANSWERED

1. What is a product carbon footprint?

A product carbon footprint measures the greenhouse gas (GHG) emissions that occur at each stage of a product's lifecycle - including from the extraction of raw materials and manufacturing through to its use, recycling or disposal. It calculates a total footprint (i.e. amount of GHG emissions that arise from the lifecycle of the product) and identifies where the main sources of emissions occur along the supply chain.

2. When was it decided a method was needed to measure the carbon footprints of goods and services (i.e. products) and why?

In 2006 there was an increase in businesses wanting to:

- Understand the carbon emissions that result from their products' supply chains
- Measure the carbon emissions associated with their products – in the same way that they measured their corporate footprints
- Manage and reduce their emissions; improve resource efficiency and reduce risks
- Talk about their work internally, with their supply chains, and with customers.

Therefore, there was a growing demand for one, consistent, internationally recognized method to enable organizations to measure a product's GHG footprint.

Thus, the development of PAS 2050 began in 2007 in response to a broad community and industry desire for a consistent method for assessing the lifecycle GHG emissions of goods and services (jointly referred to as "products"), at the request of Defra and the Carbon Trust.

3. How was PAS 2050 developed?

The development process was based on consensus building and sourcing of technical knowledge/expertise from a wide group of international stakeholders. It was overseen by an independent Steering Group of experts, representing academia, NGO, Government, industry, etc.

The document was developed over 18 months with two rounds of consultation with external stakeholders. It was also supported by working groups of experts, market research and pilots with companies.

Over 1,000 stakeholders were consulted, with over 3,000 comments received and considered by the Steering Group and the project team. The engagement with the international community and the input from organizations in various countries was significant.

4. What prompted the review of PAS 2050?

Since published in 2008, the world's first standard for carbon footprinting of goods and services has been downloaded more than 35,000 times by organizations from around the world.

Since 2008 there has been growing interest in the theory and practice of quantification of GHG emissions from goods and services, facilitating greater understanding and encouraging continuing development of quantification methodologies, both at a national and an international level.

In the 2008 edition of PAS 2050, there were sections of the methodology that the drafting experts noted as being areas where understanding was acknowledged to be limited and where the topic potentially needed early review/revision. These were identified in the published PAS 2050 as: aircraft emissions, indirect land use change, carbon storage in soils, capital goods, product category rules, reference to the International Reference Life Cycle

Data (ILCD) system, recycling. These had to be addressed individually in a review process (see Question 6 below).

A public commitment to review the published PAS 2050 was made by BSI and Defra when the specification was launched in 2008. And it is also part of the BSI PAS process to review Publicly Available Specifications in not more than 2 years from the date of publication.

The revision was therefore undertaken to:

- Clarify ambiguities that have become apparent in the application of the standard
- Take account of advances in knowledge and understanding that have emerged since PAS 2050 was first published
- Reflect user experience as much as possible
- Enhance the level of take-up and application of product carbon footprinting, and in particular, the PAS 2050 methodology
- Align the PAS 2050 methodology and its use in conjunction with other internationally recognised footprint methods (WRI/WBCSD and ISO/TC 207, as it is with the methodologies developed by these organizations that PAS 2050 is most often compared).

5. What did the review process involve?

With UK Government backing (Defra, BIS, and DECC), the review and subsequent update of PAS 2050 was managed by a PAS Steering Group comprising carbon footprint experts from industry, trade associations and academia.

PAS 2050:2011 Steering Group

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Professor Roland Clift, Centre for Environmental Strategy, University of Surrey
Dr Laura Draucker, GHG Protocol
Karen Fisher, Environmental Resources Management (ERM)
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Dr Joanne Mundy, Building Research Establishment (BRE) Group
Stephen Reeson, Sustainability and Competitiveness Division, Food and Drink Federation
Dr Klaus Radunsky, co-convenor ISO TC207/SC7/WG2 Umweltbundesamt Wein
Dr Graham Sinden, Carbon Trust
Sandy Smith, SJS Consulting
John Swift, SCA Packaging
Dr Jeremy Wiltshire, ADAS UK Limited

At the beginning of the review process research into the use of the methodology since its publication was carried out and the views/experience of the PAS 2050 download/user community was sought to inform the update of the document.

[See the report presenting the findings of BSI's review of the use of PAS 2050.](#)

As with the original development process, the review of PAS 2050 relied on extensive consultation with stakeholders and was therefore made available for a four week public consultation period. The 661 comments received from 152 reviewing experts were used to inform the debates within the Steering Group and the next draft of the specification. None of the changes introduced as a result of the public consultation was fundamental (i.e. changed an approach) but many served to improve the accuracy and focus of the revision, particularly in relation to the inclusion of emissions from biogenic sources.

The next few iterations of the draft were then informed by the detailed technical discussion within the Steering Group, and the results from a fast-track consultation carried out with a select number of stakeholders toward the end of the revision process.

6. What are the key changes introduced to PAS 2050 as a result of the revision process?

The significant changes arising from this revision are:

1. The introduction of principles to develop and use sector- or product specific approaches known as 'supplementary requirements' (Clause 4.3 of PAS 2050). These are akin to, and may include, 'product category rules' or 'product rules' This change was introduced to align PAS 2050 with a general trend towards the introduction of product specific GHG assessment methods and recognise the importance of having more consistent approaches at a sector/product level (see Questions 9, 10 and 11 below).
2. The inclusion of CO₂ removals and emissions from biogenic sources, which were previously entirely excluded (on the premise that the CO₂ removals and emissions would balance each other out) (Clause 5). This change was made to bring the PAS into line with the approach being taken in the WRI/WBSCD GHG Protocol Product Standard and ISO 14067 (in development) on the basis that the inclusion of biogenic carbon can be important for certain products where there is long term carbon storage. Concerns that this change would impose considerable extra burden on suppliers of products intended for human ingestion (food and drink) and those for animal ingestion (feed) without significant improvement to the assessment outcome have been met by permitting the continued exclusion of CO₂ emissions from food and feed products.
3. The inclusion of GHG removals in assessments. Previously only emissions were taken into account and this was seen as being out of line with the approach being taken in the GHG Protocol Product Standard and ISO 14067 (in development), and would provide for a more scientifically accurate assessment.
4. Modification of the treatment of recyclable material (Annex D) to clarify that both the recycled content method (100 – 0) and the closed-loop approximation method (0 – 100) can be used to provide specific criteria for their selection or the selection of other recycling methods where application of the 100 – 0/ 0 – 100 methods was not appropriate. This was done in response to comment that the 2008 edition was not sufficiently clear in its treatment of recyclable material. The revision also aligned with the approach taken in the GHG Protocol Product Standard.
5. The previous requirement for applying a weighting factor for delayed emissions has been removed and is now optional with a requirement for separate reporting if a weighting factor is applied. This was changed in response to suggestions that the original normative requirement was an unnecessary complication of an already complex process that was frequently not observed by practitioners in their assessments.
6. Land use change – changes to the approach for determining emissions where there is limited traceability of products. Introduced because the extreme case scenario applied in the 2008 version was considered to be overly severe.

There has been no change to the treatment of aircraft emissions, land use change, carbon storage in soils or capital goods from within PAS 2050. The incorporation of Supplementary Requirements (SRs) does provide for the possibility of a change of treatment for land use change; carbon storage in soils and capital goods if meeting the principles of Clause 4.3 of PAS 2050:2011. Aircraft emissions remain unchanged (SRs do not apply here). There has been no move to more closely align with ILCD as the ILCD was still work in progress at the time of revising PAS 2050.

A summary of the specific changes to the PAS methodology, on a clause by clause basis, can be found on the PAS 2050 microsite at www.bsigroup.com/PAS2050.

7. In light of the review, what do I do with existing carbon footprint assessments already in the public domain?

Both the 2008 edition and the revision include a limit of two years on the currency of outcomes. An assessment undertaken to the 2008 PAS will remain valid throughout that two year period unless changes to the product makeup or process have been introduced.

8. How do I compare reductions in carbon footprints that were conducted both before and after the review?

Comparison can only reasonably be made on the basis of like-for-like quantification methods so it may be necessary to re-assess an earlier outcome if a true comparison is required. This will particularly apply when supplementary requirements have been introduced.

9. What is the purpose of supplementary requirements?

Supplementary requirements are intended to aid consistent application of the PAS to products within specific sectors/product groups by providing:

- a) a sector or product group focus for aspects of the PAS 2050 assessment where options are permitted;
- b) rules or calculation requirements that are directly relevant to the main sources of emissions for a specific sector or product group;
- c) clarity on how to apply specific elements of the PAS 2050 assessment within a specific sector or product group.

10. How are supplementary requirements developed? Is there a verification process?

There is no existing formal system or procedure for the development of supplementary requirements. It is envisaged that following the publication of the revised PAS 2050, trade bodies and other industry representative groups will be stimulated to come together to develop supplementary requirements appropriate for their product type. Indeed there is early evidence of interest in doing so. For such supplementary requirements to be acceptable for use in conjunction with PAS 2050 it will be necessary that they be developed in accordance with the principles established in Clause 4.3 and that they make provision only for those aspects of the PAS 2050 assessment identified as acceptable in the PAS.

Independent validation of such supplementary requirements is not a requirement of clause 4.3 but is encouraged. It is suggested that existing certification bodies undertaking assessment in connection with PAS 2050 or other GHG assessment methods could be approached in this respect.

11. Can I use existing Product Category Rules (PCRs) or guidance?

Provided the PCRs can be demonstrated to have met the principles contained in Clause 4.3 of PAS 2050 they may be applied in conjunction with PAS 2050.

12. What does PAS 2050 offer to organizations? Why should they use the standard?

In a nutshell, PAS 2050:

- Allows internal assessment of the existing lifecycle GHG emissions of goods and services – enables the identification of hotspots and therefore reduction/improvement opportunities
- Facilitates the evaluation of alternative product configurations, sourcing and manufacturing methods, raw material choices and supplier selections on the basis of

- the life cycle GHG emissions associated with goods and services – provides opportunities for cost savings, process optimizations and efficiencies
- Provides a benchmark for ongoing programmes aimed at reducing GHG emissions
- Supports reporting on corporate responsibility
- Increases the consistency of product carbon footprinting in general by providing one robust, credible, tested and internationally recognised method for GHG emission assessment.

Evidence as to the benefits associated with the implementation of PAS 2050 has been collected and analysed in the report presenting the findings of BSI's review of the use of PAS 2050.

[See the report presenting the findings of BSI's review of the use of PAS 2050](#)

13. How does PAS 2050 fit in/aid UK and international policies and legislation in the area of climate change?

The UK government promotes the use of PAS 2050 as a tool for business to better understand and reduce their emissions on a consistent basis internationally.

In a global marketplace, most of the products we consume and use are imported from other countries. This means that we are indirectly responsible for carbon emissions that arise elsewhere in the world. For example, using 2004 data it has been estimated that 55% of CO₂e emissions to provide UK households with goods and services occurred outside the UK¹. These sources of emissions are not accounted for in national GHG inventories.

For different types of goods and services the main sources of GHG emissions often occur in entirely different parts of a product supply chain. For example, while the main source of emissions for energy using might be in the 'in-use' phase, for food products it is often in the 'production' phase (i.e. agriculture). It is therefore extremely valuable for business to understand where in the supply chain the main sources of emissions occur in order to target reductions – wherever in the world they occur.

However, there is often much uncertainty and judgement to be made when carrying out carbon footprints that can provide inconsistent results. Where products are traded in an international marketplace, consistent underlying methodologies are important to allow comparability of assessments. Therefore, ensuring alignment with other international carbon footprint methodologies was extremely important driver for the UK government in the review of the PAS 2050.

14. What is BSI doing to assist with the implementation of the newly revised PAS 2050, to explain the changes introduced with the recent review and to increase the understanding/uptake of product carbon footprinting? (Is there anything that can help me learn what the update means and how to get my head around the changes?)

BSI is committed to providing current, technically relevant and up-to-date tools which enable organizations to better understand and manage the carbon footprint of their products. To ease the implementation of the revised PAS methodology, BSI will offer further support by providing additional guidance, awareness raising and educational events/programmes, as well as through direct engagement with individual industries and organizations. The following activities have been planned to address the need for additional information around the revision of PAS 2050 and its implementation:

¹ Barrett J., Owen A., Sakai M. (2011) UK Consumption Emissions by Sector and Origin, Report to the UK Department for Environment, Food and Rural Affairs by University of Leeds
<http://randd.defra.gov.uk/Document.aspx?Document=FINALEV0466report.pdf>

- To support the implementation of the revised PAS, BSI is updating the **PAS 2050 Guidance document** in line with the changes to PAS 2050. We will be aiming to make the Guidance more interactive and will be including additional examples around sharing of best practice, tools and frameworks for calculating product-level GHG emissions. The Guidance document has been found to be particularly useful for SMEs and the intention is to better reflect the product carbon footprinting needs of this market segment in the revised Guidance. The revised Guidance will be available for free download later in the year. Until then, the archived PAS 2050 Guidance can be downloaded from the PAS 2050 microsite for reference purposes (www.bsigroup.com/PAS2050).
- The revised PAS 2050 introduces a framework to permit the coordinated development and application of additional sector specific requirements that can be used in conjunction with PAS 2050, to deliver quantification outcomes that are both credible and widely accepted. BSI is currently working with Productschap Tuinbouw and Ministerie Landbouw, Natuur en Voedselkwaliteit in the Netherlands on a project to develop a protocol that will provide such supplementary requirements for the horticulture industry and is engaging with other industries to help them better address product carbon footprinting in their sector. For further detail around the role of supplementary requirements in helping specific industries gain better understanding of product carbon footprinting, contact Maria Varbeva-Daley (Maria.Varbeva-Daley@bsigroup.com) or Quincy Lissaur (Quincy.Lissaur@bsigroup.com).
- Explanatory material – supporting documents have been made available on the PAS 2050 microsite to detail the PAS 2050 revision process; the changes introduced in the PAS document, the impact of these changes and the rationale behind them; the relationship with international PCF work of relevance (such as the WRI/WBCSD and the ISO work).
- PAS 2050 dissemination and awareness raising events:
 - PAS 2050 webinars – a series of online events to assist PAS 2050's wide international audience come to grips with the changes introduced to the standard during its latest revision (see www.bsigroup.com/PAS2050)
 - BSI Carbon Conference - Conference: 17 November 2011, London
Post-conference workshop: 18 November 2011: Implementing PAS 2050 – for further information see <http://shop.bsigroup.com/en/Navigate-by/Conferences/Conferences/Now-Booking/The-Carbon-Conference/The-Carbon-Conference/>
 - PAS 2050 SME workshops - BSI is working on enabling SMEs to understand and take up product carbon footprinting by providing workshops to help businesses understand and make a better use of the PAS 2050 methodology. For details on past and upcoming events of relevance to your industry, please visit <http://shop.bsigroup.com/Navigate-by/Conferences/>
 - BSI at The Carbon Show 2011 – BSI will host a session at this year's Carbon Show with a focus on PAS 2050 and BSI's related engagement with individual sectors and industries. The session will explore the "low carbon" aspect of sustainable supply chain management by highlighting examples of best practice. It will outline the standardization approach to carbon management that BSI has adopted and will point out the benefits of relevant standards.

15. Related activities and other methodologies. How does PAS 2050 compare to WRI/WBCSD's Product Accounting and Reporting Standard and ISO 14067 (currently in development)?

Since the publication of PAS 2050 in 2008, both ISO and WRI/WBCSD have embarked on a programme to add quantification of emissions from products and services to their portfolio of specifications.

ISO is currently developing ISO 14067 Carbon footprints of products, covering quantification and communication requirements (publication date to be confirmed), and WRI/WBCSD have developed a new Product Accounting and Reporting Standard ("GHG Protocol Product Standard").

The most recent drafts of the GHG Protocol Product Standard and ISO 14067 were still works in progress at the beginning of the PAS 2050 revision process but were made available for comparison with PAS 2050 to the Steering Group. To facilitate this, arrangements have been made for experts participating in the development of both these documents to also participate in the revision of PAS 2050.

The key difference between the PAS 2050 approach and the ISO 14067 and GHG Protocol Product Standard is that:

- PAS 2050 focuses on providing a consistent quantification method only
- The purpose for the GHG Protocol Product Standard methodology is to underpin a public inventory report
- ISO 14067 is aimed at providing a standard for both the quantification and communication of carbon footprints.

Throughout the review, a key aim has been to achieve closer alignment of carbon footprinting methodologies internationally. As a result of the review, and close consultation with the GHG Protocol Product Standard, the key methodological rules underpinning these two standards are consistent. Key topics that have been brought into alignment through this process include:

- Provision of sectoral approaches (broader than PCRs)
- Inclusion of biogenic carbon for PAS 2050
- Recycling
- Land use change
- Removal of the requirement for applying a weighting factor to delayed emissions.

16. Will PAS 2050 remain when ISO 14067 is published?

The exact publication date for ISO 14067 is at present unknown. Every effort has been made to harmonise the revised PAS 2050 methodology, as much as is reasonably possible, with the (draft) ISO 14067 in order to avoid unnecessary duplication and introduce further consistency in international product carbon footprinting. Additionally, PAS 2050 has been one of the key documents to inform the development of ISO 14067. Upon publication of ISO 14067, BSI (which also channels the UK input into the development process for this international standard) will carry out a comparison between the two documents to establish the level of “overlap” and to determine the relevance/currency of PAS 2050 to the PCF market. The scope and the requirements of the two standards will be compared and implementation experience around PAS 2050 will be taken into account.

17. What does the future hold for PAS 2050?

Harmonization and alignment of international effort

Following its publication, interest in PAS 2050 has been phenomenal. The standard has been downloaded more than 35,000 times from BSI’s website, with downloads spread across approximately 80 jurisdictions. This is clear evidence that PAS 2050 provides a robust and effective framework to enable organizations to better understand and tackle the challenges of climate change along their supply chains.

The new revision reflects international experience in product carbon footprinting and aligns the methodology and its use with other footprint methods to promote best practice, harmonisation of standards and effort (see above).

Sector/product specific approaches

PAS 2050 has been available since October 2008 and has been widely used as a means of quantifying the carbon footprint of a wide range of goods and services. The PAS has been shown to provide a generally applicable quantification method but there is increasing evidence that carbon footprinting could be enhanced for some product categories through the provision of additional category specific rules to supplement the generic provisions of PAS 2050 in a uniform and consistent manner.

To facilitate this, the revised PAS 2050 introduces a framework to permit the coordinated development and use of such additional sector specific requirements that can be applied in conjunction with PAS 2050, to deliver quantification outcomes that are both credible and widely accepted. Supplementary requirements are defined as life cycle greenhouse gas emissions quantification requirements applicable to a particular sector or product group, to enhance the application of PAS 2050, and could include product category rules (PCR), product rules, product footprint rules or sector specific standards. Provision for the use of supplementary requirements has been included in PAS 2050 because it is recognized that the application of PAS 2050 in some sectors could be enhanced by their use.

BSI is currently working with Productschap Tuinbouw (PT) and Ministerie Landbouw, Natuur en Voedselkwaliteit (LNV) in the Netherlands on a project to develop a protocol that will provide such supplementary requirements for the horticulture industry.

18. Certification and accreditation activities

United Kingdom Accreditation Service (UKAS) has put in place an accreditation system for assessors wishing to certify organizations to PAS 2050. More information about the scope of the accreditation scheme and the organizations participating in it is available on UKAS's website.

19. Why are standards and specifications important in the area of reducing carbon emissions? How do they help organizations and their stakeholders?

Standards in general, PAS 2050 in particular, assist organizations and their customers by introducing consistency and commonality of approach.

PAS 2050 helps business to:

- Understand the “story” of their products – where they come from and their impact
- Move beyond managing direct operational greenhouse gas emissions (i.e. Emissions from their buildings and travel) to look for reduction opportunities in the whole supply chain of goods and services
- Identify key sources of emissions, or “hot spots”, in their supply chain and therefore help prioritize emission reduction initiatives
- Innovate around the development of lower carbon products and even phase out carbon intensive goods and services in favour of lower carbon alternatives.

Benefits for consumers:

- Businesses will be able to make goods and services with lower levels of emissions, without the consumer having to take any action themselves – enabling “choice editing”
- Some businesses might also offer specific guidance to consumers about how to use and dispose of their product, in order to help consumers make individual savings
- Wider awareness of the environmental impact of products.

20. Related activities of interest

DEFRA trials

Defra have worked closely with three high profile businesses to test PAS 2050:2008. The evaluation trials were conducted with Johnson & Johnson, Akzonobel and IBM, to gain feedback and lessons learnt on practical experiences of using the PAS 2050.

The summary report of the trials includes findings from the workshop on PAS 2050, held December 2009. The trials, and feedback at the workshop have formed an important part of the review of PAS 2050 in 2011.

[View the Summary report](#)

[View the Johnson & Johnson and AkzoNobel report](#)

[View the IBM report](#)

21. Further information

To download PAS 2050 for free and for additional information about the revised document, related initiatives and programmes, please visit www.bsigroup.com/PAS2050.