

Sustainability Watch



PAS 2050

2009

Consistent Process for Measuring Carbon Footprint

Watch List

- PAS (Publicly Available Specification) 2050 will undergo its first revision beginning in 2010.
- As international standards for protecting the environment are developed over the next several years, locally-developed specifications like PAS 2050 will be replaced.
- Consumers will continue to demand more information from businesses about the environmental impact of the products and services they offer.
- Labeling programs will become more popular as buyers look for quick, easy ways to compare products based on their environmental attributes.
- Controversy over labeling tactics will continue to grow as proponents and critics debate the relevancy and truthfulness of this information.
- New business opportunities for consultants, certification specialists, software developers and others will arise as more companies take steps to assess the environmental impact of their products and services.

Related Sustainability Watch Reports

- Cradle-to-Cradle Design
- Eco-labeling & Third Party Certification
- Kyoto Protocol
- Product Design

Key Takeaways

- PAS 2050, released in 2008, was developed by the British Standards Institution (BSI). PAS 2050 outlines a process for measuring a product or services lifetime GHG emissions. "2050" refers to the United Kingdom's target date for meeting emissions-reduction goals contained in the Kyoto Protocol.
- The process for determining a product's GHG emissions, (also referred to as its "carbon footprint"), involves four steps: Developing a process map that spans the product's life cycle, confirming the boundaries of the analysis, collecting data and completing the calculation.
- Companies use information obtained through this analysis to make changes with the goal of reducing emissions generated throughout the life cycle.
- Organizations that choose to communicate the information acquired through this analysis—internally or externally—undergo a verification process to ensure their claims are valid.
- Proponents of PAS 2050 acknowledge its limitations but believe it is a good first step toward an international life-cycle-based carbon footprint standard.
- Critics suggest that PAS 2050 excludes important sources of GHG emissions, overlooks critical environmental factors such as water usage, encourages consumption and enables companies to engage in "green washing" tactics (the practice of making misleading claims about a product's environmental impact).



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Executive Summary

To help meet the long-term emissions-reduction goals outlined in the Kyoto Protocol, the UK government asked BSI, a national standard-setting organization, to create a specification for measuring GHG emissions generated over the product life cycle. Known as PAS 2050, the specification was released in 2008 and is being used by companies around the world.

This methodology can be used on either goods or services and can be applied to both “Business to Business” and “Business to Consumer” distribution models. It allows an organization to look carefully at how a product is designed, built, distributed, used and disposed of or recycled—then measure the quantity of carbon emissions generated in each of these stages. With factual information about where the major emissions drivers lie, companies and their suppliers and distributors can reduce emissions more effectively. Facts obtained through a PAS 2050 analysis can also be used to cut costs, improve efficiency, support environmental reporting activities and strengthen supplier and distributor relationships.

In some cases, companies choose to communicate the results of the analysis to the marketplace as a means of achieving differentiation, demonstrating environmental responsibility or capturing a larger share of the green consumer’s business. A labeling program is available through Carbon Trust, a UK-based non profit. Companies must comply with a separate set of requirements in order to use these labels.

Organizations that have experience with PAS 2050 encourage new users to start with simple products to gain experience with the process. They also recommend that project objectives and scope be identified and communicated as early as possible. Leadership support and supplier engagement are considered critical to a successful outcome. Data templates, software, emissions databases and third-party consultants can also improve the speed, accuracy and relevancy of the analysis.

BSI will begin updating PAS 2050 in 2010. When an international standard is developed, the specification will be retired.



Transport Trucks in LA Getty 2008



Background

PAS 2050 is a Publicly Available Specification that outlines a process companies can use to measure the GHG emissions a product or service generates over its life cycle. The specification was developed by the British Standards Institution (BSI) over an 18-month period during 2007 and 2008. Two organizations sponsored the work:

- **Carbon Trust**, a non profit formed by the government in the United Kingdom (UK) to help businesses and organizations reduce carbon dioxide (CO₂) emissions.
- **Defra**, the UK government's Department for Environment, Food and Rural Affairs.

The specification was commissioned as part of an overall strategy to achieve the emissions-reduction goals contained in the Kyoto Protocol. Specifically, the UK is seeking to cut GHG emissions by 80% (from 1990 levels) by 2050. Because the UK is a net importer of emissions (products bought and used there generate more pollutants than products manufactured there), the Kyoto goals cannot be reached unless emissions are reduced at every stage of the product life cycle. This specification gives companies a consistent way to evaluate life cycle stages and identify when and where emissions are being generated, so that targeted improvement plans can be implemented.

PAS 2050 is a specification, not a standard. Specifications can be developed faster and more economically than standards because participants in the development process are not required to reach consensus on all issues.

Highlights of PAS 2050

The specification is outlined in detail in a 40-plus page document called "PAS 2050 - 2008: Specification for the assessment of the life cycle greenhouse gas emissions of goods and services." Following is

a high-level review of key points contained in the document.

- **One assessment per product.** This process allows an organization to measure GHG emissions at the individual product level only. Products that make up a common family are evaluated separately, as are identical products manufactured in different facilities or used by different types of consumers.
- **Goods or services.** The methodology can be used to assess the carbon footprint of any product, including a service offering.
- **GHG only.** PAS 2050 focuses solely on a product's GHG emissions. It does not assess water usage, impact on biodiversity, social equity issues or other factors that affect sustainability.
- **Built on existing standards.** The specification incorporates life cycle assessment methodologies outlined in International Organization for Standardization (ISO) 14040 and 14044.
- **Data integrity and recordkeeping.** Companies are expected to use complete, accurate, relevant data for this analysis. Data must be maintained for five years or the life cycle of the product, whichever is greater.
- **Two life cycle definitions.** The analysis can be completed in two ways, depending on the organization's business model. Companies that sell directly to consumers assess their products with the "Business to Consumer" or "cradle to grave" life cycle which encompasses all activities from raw materials to disposal or recycling. Companies that make parts or components for use in other manufacturers' products use the "Business to Business" or "cradle to gate" life cycle. It measures GHG emissions generated prior to the point at which the part or component arrives at the prime product manufacturer's location.



- **Global warming coefficients.** GHG emissions are measured by mass and converted to CO₂ equivalent (CO₂ e) emissions using the latest 100-year global warming coefficients developed by the Intergovernmental Panel on Climate Change (IPCC).
- **Credits and debits.** The methodology incorporates a system of credits and debits to enhance calculation. For example, credits are issued when recycled materials are used or to account for the presence of stored carbon in certain materials such as wood. A debit is recorded when land use has been affected (e.g., a natural habitat has been converted to factory site in order to manufacture the product).
- **No carbon offsets.** There is no adjustment made for the purchase of carbon offsets. Companies are encouraged to reduce actual emissions to the greatest extent possible, then use carbon offsets to make additional gains.
- **Two-year cycle.** The results of a PAS 2050 assessment are valid for two years.
- **Communication optional.** There is no requirement to communicate the results of a carbon footprint analysis either internally or externally. However, if an organization makes claims about its carbon footprint based on this assessment, the calculation must be verified by an independent third party.
- **Separate labeling program.** A carbon footprint labeling program, administered by a subsidiary of Carbon Trust, is available for companies that want to communicate GHG emissions information to consumers. A rigorous verification process must be completed before a label will be issued, and companies must provide evidence that emissions are actually being reduced in order to retain the label.

Benefits of Using PAS 2050

Companies that use PAS 2050 to measure GHG emissions may realize the following benefits.

- **Ensures consistency.** The specification provides a detailed roadmap to follow, improving consistency and accuracy.
- **Provides benchmark for improvement activities.** Information acquired through the analysis helps organizations identify problems, set concrete objectives and measure progress.
- **Aids decision making.** Using facts and data from the assessment can improve the quality of business decisions related to emissions reduction.
- **Encourages wide variety of solutions.** The life cycle approach uncovers improvement opportunities in design, packaging, materials, procurement, operations, supplier selection and other aspects of the business.
- **Accelerates emissions reduction.** Having concrete information about life cycle emissions helps generate a sense of urgency to improve.
- **Identifies potential for cost reduction.** The assessment can pinpoint cost reduction opportunities associated with excess energy usage, inefficiency and waste.
- **Gives deeper insight into supply chain.** A life cycle analysis reveals emissions issues that are beyond a manufacturer's control and can only be addressed by the supplier organization.
- **Supports sustainability reporting activities.** Data from the analysis can often be used in environmental or sustainability reports.
- **Demonstrates differentiation.** Calculating and communicating carbon footprint information can set a product or company apart from its competitors.



- **Improves ability to compete for green consumer's business.** Credible carbon footprint data can help a company attract more customers and capture more business.
- **Enhances reputation.** Companies that invest in carbon footprint analysis may be perceived as more committed to environmental and social responsibility than those that do not.

Calculating Carbon Footprint

The complete process for calculating carbon footprint at the product level is contained in PAS 2050. It includes four major steps, and also recommends a start-up phase and follow-up activities to manage uncertainty. While the actual process is very detailed, it can be summarized as follows:

The start-up phase sets the stage for a cost-effective analysis that delivers valuable information. It includes the following activities.

- **Choose team.** Members may include senior leaders, as well as representatives from production, marketing, logistics, procurement, finance and environmental affairs. Suppliers and third-party consultants may also be involved.
- **Set objectives.** Objectives guide every aspect of the project from team size and composition to budget, timing and data-gathering procedures. If the goal is obtaining a rough estimate of GHG emissions for use by a few key people, shortcuts can be taken and less robust data can be used. However, if the information will be shared broadly with internal or external audiences, the whole process must be completed with a higher degree of precision and rigor.
- **Select products.** Product selection is also driven by project objectives. Some factors to consider when evaluating products include potential for emissions reduction and impact on cost, quality and competitiveness.
- **Specify functional unit.** The calculation must be completed and expressed in a functional unit that reflects the way the product is actually consumed. For example, a soft drink manufacturer might choose to measure grams (of carbon) per 350-milliliter can, while a hotel chain could measure grams per overnight stay.
- **Engage suppliers.** When inviting suppliers to participate, it is important to communicate how they will benefit from the experience. Sharing goals, specifying time and resource commitments, and establishing clear roles and responsibilities will also help build supplier support for the assessment.

The assessment process includes these basic steps:

- **Create process map** encompassing all phases of the product's life cycle. The life cycle for products sold to end users includes five stages: Raw materials, manufacturing, distribution, consumer use and disposal/recycling. The life cycle for products sold to other businesses has three stages: raw materials, manufacture and distribution to business customer.
- **Confirm boundaries of the analysis.** After a high-level process map has been developed, the scope or boundaries of the analysis must be determined. This requires identifying which life cycle stages, inputs and outputs will—and will not—be included in the assessment. All material emissions are expected to be included, with "material" defined as any source that contributes at least 1% of the product's total anticipated life cycle emissions.
- **Collect data.** Two types of data are used in the calculation, activity data and emissions factors. Activity data refers to the amount of material and energy used in the life cycle, while emissions factors convert that data into a quantity of



GHG emissions known as CO₂ equivalent (CO₂e) emissions. Both types of data can be classified as either primary or secondary. Primary data pertains directly to the product and comes from measurements made by the company or one of its suppliers. Secondary data is not specific to the product. It represents an average or generally accepted measurement and is typically obtained from industry reports or trade associations. Generally speaking, primary data is preferred as it yields a more precise measurement.

- **Calculate footprint.** The actual calculation involves multiple steps and incorporates a system of adjustments that account for factors such as stored carbon, land use changes, recycling and unexpected supply chain disruptions. Commercial software and databases are available to make the calculation process faster, easier and more accurate.

An optional uncertainty analysis can also be completed. While not prescribed as an essential part of the process, uncertainty analysis can increase confidence in the assessment.

Using Carbon Footprint Information

Companies choose to use information obtained through this analysis in several ways.

- Data can be shared with a few individuals who are responsible for developing and executing emissions reduction strategies.
- Information can be communicated broadly across an organization to guide company-wide improvement activities.
- Suppliers can be informed about their contributions to life cycle emissions so they can initiate change.
- Information can be delivered to the marketplace with the goal of educating customers, demon-

strating environmental responsibility or achieving competitive advantage.

Business Experience with PAS 2050

As PAS 2050 was developed, more than 20 companies representing a variety of industries tested the methodology on at least 75 products and services. Coca Cola, Cadbury, Kimberly-Clark and Coors participated, along with smaller organizations such as Halifax, a financial services institution; Boots, a cosmetics manufacturer; and Colors, a South African fruit supplier. Their experiences are described in "Product carbon footprinting: the new business opportunity," a document produced by Carbon Trust. Following are some of the key lessons learned by these organizations:

- **Cost** of implementation varies widely, depending on the type of product, the complexity of the supply chain and the use of third-party expertise. Smaller companies seeking to control costs by doing the assessment themselves (without a consultant) should consider investing in an independent verification.
- **Key enablers** of the process are leadership support and supplier engagement. Both are necessary for a successful outcome.
- **Early identification of scope and objectives** speeds the process, reduces costs and improves the value of information acquired.
- **Starting with simpler products** (fewer inputs, fewer supply chain stages) helps improve the success rate of early projects and builds confidence for the future.
- **Cost and time decrease** with additional footprinting, particularly within a product category.
- **Data collection templates** save time, improve accuracy and help ensure that the right information is provided.



- **Choose products** that permit GHG data to be reused and leveraged in future analyses.
- **An investment in software and emissions databases** can pay big returns.
- **Sharing successes and challenges** with other users helps improve the quality and efficiency of future analyses.

Criticisms of PAS 2050

PAS 2050 has critics in business, government, academia and non governmental organizations. Some of the primary complaints include:

- **No accounting for capital goods.** The emissions generated when the machine tools and processes used to produce a product were first manufactured are not included in the calculation. As a result, some believe the carbon footprint is understated.
- **Does not include shopper or employee transportation.** The calculation has no provision for emissions produced when employees who make the product travel to work or consumers go to retail outlets. Again, the concern is an understated footprint.
- **Too expensive and time consuming.** Because a separate analysis must be completed for every product, every two years, the process is not affordable for many companies.
- **Only valid if many companies do it.** Unless most companies complete the analysis and publicize the results, consumers do not have enough information to make valid comparisons.
- **Ignores social and environmental impact.** The specification focuses only on GHG emissions and is not a measure of environmental or social impact. For example, a product could have a low carbon footprint, but be produced in a factory that pollutes the water supply or employs child labor. A more complete assessment would

give consumers better information for decision making.

- **Can be used for “green washing.”** Carbon footprint calculations can be used to mislead consumers about a company’s environmental commitment.
- **Does nothing to discourage consumption.** Low-carbon-footprint labels may help consumers rationalize their purchase decisions, thereby increasing consumption and GHG emissions.

Despite these criticisms, users of PAS 2050 believe it is a useful tool for businesses and organizations.

Next Steps

PAS 2050 will be revised every two years, with its first revision commencing in 2010. In time, the specification is expected to be replaced by a global standard developed by an international standard-setting body such as ISO.

Regulatory Environment

No regulatory body oversees the use of PAS 2050. However, BSI is accountable for maintaining and updating the specification.

GHG emissions have not been regulated to date, but that situation is changing. The UK’s Department for Environment, Food and Rural Affairs adopted the Climate Change Act of 2008, calling it “a legally binding long-term framework for cutting carbon emissions.” In the United States, US Environmental Protection Agency (EPA) is taking steps to begin regulating GHG emissions under the Clean Air Act.

Related Entities

British Standards Institution
 Carbon Trust
 Department for Environment, Food and Rural Affairs
 International Organization for Standardization
 US Environmental Protection Agency



Acronyms

BSI: British Standards Institution
 CO₂: Carbon Dioxide
 CO₂ e: Carbon Dioxide Equivalent
 Defra: Department for Environment, Food and Rural Affairs
 GHG: Greenhouse Gas
 IPCC: Intergovernmental Panel on Climate Change
 ISO: International Organization for Standardization
 PAS: Publicly Available Specification
 UK: United Kingdom

References

Alden, C. (2009). Shopping down the carbon. *Green Futures*, (71), 15. Retrieved October 9, 2009, from EBSCO Online Database Environment Complete.

<http://search.ebscohost.com/login.aspx?direct=true&db=eih&AN=36503519&site=ehost-live>

British standard on carbon footprints set to have big impact on growers. (2008, November 7). *Horticulture Week*, 31. Retrieved October 9, 2009, from EBSCO Online Database Business Source Complete. <http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=35428291&site=ehost-live>

British Standards Institution. (2008). *Executive overview*. Retrieved October 7, 2009, from <http://www.bsigroup.com/en/Standards-and-Publications/How-we-can-help-you/Professional-Standards-Service/PAS-2050/Executive-Overview/>

British Standards Institution. (2008). *Guide to PAS 2050: How to assess the carbon footprint of goods and services*. Retrieved October 7, 2009, from <http://shop.bsigroup.com/en/ProductDetail/?pid=000000000030190366>

British Standards Institution. (2008, Winter). *Minister for Environment launches carbon footprint PAS 2050*. Retrieved October 7, 2009, from <http://www.bsigroup.com/en/Standards-and-Publications/Committee-Members/Committee-member-news/Winter-2008/Minister-for-Environment-launches-carbon-footprint-PAS-2050/>

British Standards Institution. (2008). *Specification for the assessment of the life cycle greenhouse gas emissions of goods and services*. Retrieved October 7, 2009, <http://www.bsigroup.com/en/Standards-and-Publications/How-we-can-help->

[you/Professional-Standards-Service/PAS-2050/](http://www.bsigroup.com/en/Standards-and-Publications/How-we-can-help-you/Professional-Standards-Service/PAS-2050/)

Brooks, J. (2008, September). Industry voices fears over PAS 2050 carbon footprint standard. *Packaging News*, 5. Retrieved October 9, 2009, from EBSCO Online Database Business Source Complete. <http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=34454597&site=ehost-live>

Carbon Trust. (2009) *PAS 2050, the product carbon footprinting standard*. Retrieved October 7, 2009, from <http://www.carbontrust.co.uk/carbon/briefing/pre-measurement.htm>

Carbonica. (2008, November). *Concerns about PAS 2050*. Retrieved October 7, 2009, from <http://blog.carbonica.org/post/2008/11/Concerns-about-PAS-2050.aspx>

Cervi, B. (2008, November). *Can you calculate the carbon cost of your shopping?* Retrieved October 7, 2009, from Institute of Engineering and Tech

nology Knowledge Network. <http://kn.theiet.org/magazine/issues/0820/calculate-carbon-cost.cfm>

Charlesworth, K. (2008). Counting the cost of carbon. *PrintWeek*, 28-29. Retrieved October 9, 2009, from EBSCO Online Database Business Source Complete. <http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=34195484&site=ehost-live>

Coca-Cola measures its carbon footprint (2009). *ENDS (Environmental Data Services)*, (410), 9. Retrieved October 9, 2009, from EBSCO Online Database Business Source Complete. <http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=37602410&site=ehost-live>

Firms plan carbon-slashing initiatives. (2009). *Food Manufacture*, 84(7), 12. Retrieved October 9, 2009, from EBSCO Online Data Base Business Source Complete. <http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=43928151&site=ehost-live>

Footprints assessed. (2009). *Sustain Magazine*, 10(1), 74. Retrieved October 9, 2009, from EBSCO Online Database Environment Complete. <http://search.ebscohost.com/login.aspx?direct=true&db=eih&AN=37834231&site=ehost-live>

Kimberley, M. (2008, July 3). BSI to introduce carbon standard. *Horticulture Week*, 9. Retrieved October 9, 2009, from EBSCO Online Database Business Source Complete. <http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=33303876&site=ehost-live>



More brands to trial carbon test. (2008, March). *Packaging News*, 5. Retrieved October 9, 2009, from EBSCO Online Database Business Source Complete. <http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=31402889&site=ehost-live>

Product footprinting drives supply chain focus. (2008). *ENDS (Environmental Data Services)*, (398), 26. Retrieved October 9, 2009, from EBSCO Online Database Business Source Complete. <http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=32798007&site=ehost-live>

Spielmann, M. (2008). *PAS 2050 - The ultimate guideline for product carbon footprints?* Retrieved October 7, 2009, from PE International. <http://www.pe-international.com/index.php?id=6252>

UK launches world's first footprinting standard. (2008). *ENDS (Environmental Data Services)*, (406), 26-28. Retrieved October 9, 2009, from EBSCO Online Database Business Source Complete. <http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=35522323&site=ehost-live>

Wilcock, I. (2008, March 27). Carbon footprint. *PrintWeek*, 46. Retrieved October 9, 2009, from EBSCO Online Database Business Source Complete. <http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=31640302&site=ehost-live>



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