

A SOURCE 44 TECHNICAL WHITE PAPER

Emerging Guidelines for Product-Level Carbon Footprints

**A Comparison of the Proposed GHG Product Accounting and Reporting
Standard to PAS 2050**

Michelle Turner, MS, PhD and
Jennifer Kraus, MPH, PhD



Introduction

Product-level carbon footprints – life cycle estimates of products’ greenhouse gas (GHG) emissions from natural resource extraction to end-of-life recycling or disposal – are one tool to guide supply chain-wide sustainability analysis and identify and manage GHG opportunities and risks.

To date, Publicly Available Specification (PAS) 2050 has been the primary guidance available for conducting product-level carbon footprints. However, two international standards are now on the immediate horizon. The World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD) are in final development stages of the GHG Protocol Initiative Product Accounting and Reporting Standard (“the Product Standard,” available September 2011), and International Organization for Standardization (ISO) 14067, “Carbon Footprints of Products” is expected to be released in 2012-2013.

In anticipation of the September 2011 release, this White Paper provides a comparison of the “the Product Standard” (draft version dated November 2010) to the existing PAS 2050. The intent is to highlight key differences between the two methodologies, with a focus on “cradle-to-gate” emission inventories. The goal is to provide practical guidance to organizations contemplating how the new Product Standard may impact their current carbon footprint calculation practices.

General Guideline Characteristics

Both PAS 2050 and the Product Standard are based on the principles for life cycle assessment provided in ISO 14040 and 14044, with modifications to address GHG emissions from goods and services. PAS 2050 provisions were considered when creating the Product Standard, and both guidelines use an “attributorial approach;” as a result the guidelines have over-arching similarity.

Principles

PAS 2050 and the Product Standard specify five accounting principles for GHG accounting and reporting: Relevance, Completeness, Consistency, Accuracy and Transparency. In general, the Product Standard is more prescriptive. The key differences between the two guidelines, noted in Table 1, are within the areas of Completeness, Consistency and Accuracy.

Principle	PAS 2050 vs. Product Standard
Completeness	Per PAS 2050, an inventory is considered complete if all material emissions are included (processes or sources contributing >1% to total emissions are considered material). The Product Standard allows insignificant emissions to be excluded, with the reporting organization determining the exclusion threshold based on the business goals for the inventory.
Consistency	Under PAS 2050, consistency is required to “enable meaningful comparisons in GHG-related information”. The Product Standard defines consistency more narrowly as the ability to compare inventory results for a single product over time. The issue of product comparisons is discussed further below.
Accuracy	PAS 2050 states bias and uncertainties should be reduced as far as practicable. The Product Standard is more prescriptive, requiring inventories with no systematic bias. However, it also states practitioners should “achieve sufficient accuracy to enable users to make decisions with reasonable assurance as to the reliability of the reported information”. In practice, it seems the Product Standard requires a level of accuracy sufficient to meet the intended business goals for the inventory.

Product Comparisons

Another key difference between the two guidelines is the use of inventory results for product comparisons. The Product Standard explicitly states the guidelines are intended to support performance tracking of a single product over time. For product labeling, performance claims by third parties, consumer and business decision-making based on comparison of two products, and other types of product comparisons, additional specifications must be met. The Product Standard includes examples of such additional specifications, which will likely come from sector guidance or product rules (although the Standard does not limit these to ISO 14025 product category rules (PCRs) specifically). In addition, the Product Standard does not support comparative assertions. On the other hand, PAS 2050 is intended to support comparison of GHG emissions between products and to provide a common basis for communication of this information, but does not include specific requirements for such communication.

Product-Level GHG Emission Inventory Process

The following sections highlight additional key differences between the two standards with respect to the main GHG emission inventory steps diagrammed in Figure 1.

Set Goals/Objectives

The Product Standard recommends organizations first identify the business goals for the inventory to help guide subsequent methodological and data collection decisions. Such goals may include identifying GHG reduction opportunities and risks, performance tracking, product differentiation, and supply chain engagement. Inventory goals must be included in public reporting. PAS 2050

similarly recommends establishing goals as an important first step in the inventory process, but does not include reporting requirements, as discussed further below.

Set Scope

Once the inventory goals are established, the scope is determined by: (1) identifying the product(s) to study and (2) defining the unit of analysis for each product.

The selection of products to study should align with the organization's business goals for the inventory. For example, available Scope 3 emission estimates may help identify those products with the greatest GHG impact. Alternatively, organizations may need to rely on physical or economic data, ranking products based on mass or volume produced, energy use intensity, or spend.

Once the product(s) to inventory are selected, both guidelines require a "functional unit" be established as the basis for emission calculations. The Product Standard provides guidance for establishing the functional unit for one example product – a light bulb – as summarized in Figure 2. The functional unit is defined by taking into account magnitude, duration, and expected level of quality for the product. Duration is most important for determining use and end-of-life emissions.

For organizations that produce an intermediate product and who do not know the function of the final product(s) in which their intermediate product is used, the Product Standard requires the reference flow be used as the unit of analysis for GHG calculations. Although PAS 2050 does not similarly define and recommend use of a reference flow for intermediate products, for products commonly available on a variable unit basis, it states calculation of GHG emissions must be proportional to the unit size (e.g., per kilogram or per liter of goods sold).

Overall, both guidelines provide flexibility in functional unit definition depending on whether the product is final or intermediate and what the goals are for the inventory. Per the Product Standard, the following issues should also be kept in mind when defining the inventory scope:

- The functional unit must be same in future inventories for fair comparisons over time;
- The reference flow is the basis for data collection as it defines the magnitude of material and/or energy inputs and outputs;
- One may want to define the functional unit to avoid allocation; and
- The functional unit should be clear and understandable to users.

Use of a functional unit defined by a product rule or sector guidance would facilitate product comparisons.

Generate Process Map

Once the functional unit and reference flow are determined, both guidelines recommend constructing a process map. Such maps provide a useful tool for organizing processes, data collection, and inventory results. The Product Standard states all “attributable processes” should be included in the process map. The major life cycle stages to be included are: material acquisition and preprocessing, production, product distribution and storage, use, and end of life. The Standard provides recommendations and examples of processes included in each stage. The first stage is required to start with material extraction from nature. PAS 2050 does not use the term attributable processes directly, but states the assessment must include “GHG emissions arising from processes, inputs and outputs in the life cycle of a product, including but not limited to: energy use, combustion processes, chemical reactions, refrigerant loss and other fugitive gases, operations, service provision and delivery, land use change, livestock and other agricultural processes and waste.”

The Product Standard notes relevant life cycle stages and processes will depend on the type of inventory performed (cradle-to-grave versus cradle-to-gate, as discussed further below) as well as where the entity performing the inventory “sits” within the life-cycle (e.g., upstream supplier assessing emissions for an intermediate product versus retailer assessing emissions for a product it sells directly to consumers). Again, development and use of product rules will help ensure comparability of life cycle stages and processes included and thus inventory results for product comparisons.

Per the Product Standard, organizations must include a process map in public inventory reports which depicts: defined life cycle stages, generalized attributable processes in each stage, the flow of studied product through its life cycle, and any processes, material, or energy flows excluded from the inventory.

Set System Boundaries

The next step in the inventory process is to determine which stages and processes within the map will be included in the inventory, i.e., a system boundary for the analysis must be set. PAS 2050 and Product Standard guidance for establishing an inventory system boundary differ.

Both guidelines allow for inventories that do not include the use and end-of-life stages, termed “business-to-business (B2B)” or “cradle-to-gate” in PAS 2050 and the Product Standard, respectively. However, how these boundaries are defined currently differs between the two guidelines. Specifically, the Product Standard does not include transport of the finished (intermediate) product to the next stage in the supply chain, whereas PAS 2050 does. The PAS 2050 Guide states: “the B2B life cycle captures raw materials through production up to the point where the product arrives at a new organization, including distribution and transport to the customer’s site.” Note that the revisions to PAS 2050 due out in summer 2011 may clarify these differences.

Another major difference between the Product Standard and PAS 2050, is that the latter requires appropriate product category rules (PCRs) based on ISO 14025 be used to set the inventory boundary if they exist and do not conflict with PAS 2050 provisions. Although the Product Standard states product rules and sector guidance can provide additional useful guidance when performing product inventories, it does not specifically require their use in boundary setting.

The two guidelines also differ with respect to how to determine system boundary exclusions. PAS 2050 recommends first calculating a “high-level” emission estimate based on readily available data to serve as the “anticipated life cycle emissions.” The system boundary must then be drawn so that all material emissions are included. A source’s emissions are material if they contribute more than 1% to anticipated life cycle emissions. Sources contributing $\leq 1\%$ may be excluded, however the inventory must cover at least 95% of the total anticipated life cycle emissions. Also, if a single source accounts for more than 50% of the total anticipated life cycle emissions, the 95% threshold applies to the remaining emission sources.

The Product Standard does not have a similar materiality threshold, but allows attributable processes to be excluded if: (1) no primary or secondary data are available, (2) no extrapolated or proxy data (considered types of secondary data) are available and (3) a “worst-case” estimate of the emissions from the process are “insignificant.” The Standard is currently somewhat vague regarding estimation of worst-case emissions for processes for which primary and secondary data cannot be found. Worst-case emissions should be estimated using data with “upper limit assumptions” to determine whether the process is insignificant based on either mass, volume or energy and environmental relevance criteria. Unlike PAS 2050, the organization can set its own level of significance for exclusions based on the business goals for the inventory (although a rule of thumb of 1% similar to PAS 2050 is suggested). If the estimated “worst-case” emissions indicate the process is significant, the company should continue searching for better data, or include the worst-case estimate in the inventory. The selected significance threshold and any resulting exclusions should be disclosed and justified in public reporting.

Table 2 (at the end of this paper) provides a summary of additional differences between PAS 2050 and the Product Standard when determining inventory system boundaries.

Data Collection

Once the system boundary and attributable processes are identified, the next step in the inventory process is data collection. In both guidelines, two types of data are delineated: primary and secondary. The Product Standard provides detailed definitions and examples of primary data, which include direct emissions data and process activity data. Secondary data include financial activity data specific to the process, as well as process data not specific to processes in the product’s life cycle. Secondary data can be obtained from existing lifecycle databases.

The Product Standard requires primary data be collected for processes under operational or financial control of the reporting organization (as defined in the GHG Protocol Corporate Standard). PAS 2050, on the other hand, requires collection of primary activity data for those

processes owned, operated or controlled by the organization implementing the specification. If that organization does not contribute 10% or more of the anticipated life cycle emissions, then primary data must be collected for processes and materials controlled by the first (closest) upstream process that does. However, the primary data requirement does not apply if it would necessitate physical measurement of GHG emissions (e.g., CH₄ emissions from livestock). Also, the primary activity data requirement does not apply to downstream emission sources.

Data Quality Assessment and Indicators

The Product Standard requires the use of data quality indicators to assess activity data, emission factors, and direct emissions data throughout the data collection process. Per the Product Standard, data quality indicators address how well the data fit the given process in the product inventory, including how representative the data are (in time, technology and geography) and the quality of data measurement (completeness of data collection and precision of the data) (Table 3). For significant processes (as defined by the reporting organization), data sources, data quality, and efforts taken to improve data quality must be included in public reporting. Significant processes may be those with the greatest emissions, energy use, or waste, or may be those with strategic importance to the organization.

PAS 2050 does not require recording and reporting of data quality indicators. However, it similarly stipulates that preference must be given to data that are time-specific, technologically-specific, geographically-specific, complete, precise and accurate. Consideration must also be given to consistency and reproducibility.

Qualitative Data Quality Assessment

Per the Product Standard, “all data quality assessments are based on data quality indicators, but how the indicators are used can vary.” Although the Standard provides a qualitative example of how indicators could be used to score data, other methods are allowed. Regardless of the method used, organizations should document the method and results to “support the assurance process, internal inventory quality controls, and for tracking data quality improvements over time.” PAS 2050 states determination of best quality data could be supported by a data scoring framework, but does not explicitly require such an assessment.

Table 3. Product Standard Data Quality Indicators

Indicator	PAS 2050 Definition	Product Standard Definition	Differences between guidelines
Technological representativeness	Use data that are technology-specific to the product being assessed	Degree to which the data reflect the actual technology (ies) used in the given process	Select data technology-specific to given processes within product life cycle; no differences
Temporal representativeness	Age of data and the minimum length of time over which data are collected	Degree to which the data reflect the actual time (e.g., year) or age of the given process	Select data that are time-specific to given process; PAS 2050 includes the length of time over which data are collected in its definition

Geographical representativeness	Geographical area from which data are collected (e.g. district, country, region)	Degree to which the data set reflects actual geographic location of the processes within the system boundary, e.g., country or site	Select data geographically-specific to process; no differences
Completeness	The percentage of data that are measured, and the degree to which the data represent the population of interest (is the sample size large enough, is the periodicity of measurement sufficient, etc.)	Degree to which data are statistically representative of the process sites; includes percentage of locations for which data are available and used out of the total number that relate to the given process; Also addresses seasonal and other normal fluctuations in data (e.g., use annual averages to smooth out data variability due to temporal factors)	Select data complete to the given process; no differences
Precision	Measure of the variability of the data values used to derive the data for the given process (e.g. low variance = high precision)	Measure of the variability of the data values for each data expressed (e.g. variance)	Select data that are most precise; no differences
Accuracy	Data with high uncertainty should be avoided	For accuracy of the information (e.g. data, models and assumptions), data that are most accurate shall preferred	Accuracy not included as data quality indicator in Product Standard

Data Management Plan

Unlike PAS 2050, the Product Standard provides specific recommendations for developing a Data Management Plan that can be used to guide quality assurance/quality control processes throughout inventory development. Elements and examples for such a plan are laid out in detail in the Product Standard, but the use of such a plan is a recommendation and not a requirement.

Supplier Engagement

Although neither of the guidelines includes specific requirements, the Product Standard provides more detailed recommendations for supplier engagement than PAS 2050. Depending on the complexity of the product and the position of the company along the product's life cycle, the number of suppliers to engage for primary data collection may vary significantly. Regardless, organizations will likely want to prioritize their engagement activities based on a percent contribution of a given process to overall emissions. If such screening estimates are not available, Tier 1 suppliers could be ranked based on physical or economic factors (e.g., energy use, production volumes, annual spend). The number of suppliers to engage is at the organization's discretion; a general rule of thumb per the Product Standard is to request data from the top 80% of known suppliers based on a preliminary evaluation of emissions contribution. The Product Standard recommends procurement staff responsible for the chosen commodity types assess

selected suppliers for appropriateness and applicability.

Allocation

Both guidelines give first preference to avoiding allocation of emissions. Per PAS 2050, practitioners should avoid allocation by dividing into sub-processes which only have one input or output, or next by using system expansion. If allocation cannot be avoided, PAS 2050 requires proportioning emissions between products based on economic value. However, it includes other superseding guidance for the following specific processes: waste emissions, emissions from combined heat and power units, transport, use of recycled material and recycling, and emissions from reuse and remanufacturing in Clause 8.

The Product Standard also states process subdivision should be the first step to avoid allocation. Other methods that can be used to avoid allocation are to redefine the functional unit or system expansion. If allocation cannot be avoided, the Product Standard recommends allocation by: (1) using underlying physical relationships, or (2) using another method (e.g., economic). Although a hierarchy of preferred methods is provided, the Standard states it “does not prescribe the use of any single allocation method due to the wide variety of circumstances organizations are likely to encounter when calculating product emissions.”

Differences between the guidelines for allocation of emissions from waste, recycling, and reuse and remanufacturing are not covered in detail here since this paper focuses on cradle-to-gate inventory methods.

Calculating Emissions

There are three key differences between the guidelines pertaining to calculation of emissions: (1) PAS 2050 requires total emissions be scaled up to account for any immaterial excluded emissions, while the Product Standard allows processes or inputs with missing data to be excluded, if a worst-case emissions estimate indicates they are insignificant; (2) PAS 2050 requires use of the latest Intergovernmental Panel on Climate Change (IPCC) Global Warming Potentials (GWPs) to convert all GHGs inventoried to CO₂e units, while the Product Standard does not explicitly require use of IPCC GWPs; and (3) while PAS 2050 allows weighting of delayed emissions over time, the Product Standard does not allow weighting of emissions when estimating the main inventory results. However, if organizations want to also report the impact of delayed emissions separately, they may do so.

Inventoried GHGs

The Product Standard requires the six Kyoto GHGs (CO₂, CH₄, N₂O, SF₆, perfluorocarbons (PFCs), and hydrofluorocarbons (HFCs)) be included in the inventory, but recommends other GHGs significant or relevant to the product being inventoried be included as well. In addition to the six Kyoto gases, PAS 2050 requires inclusion of substances controlled by the Montreal Protocol and listed in the latest IPCC guidance. PAS 2050 has a more inclusive list, so in cases

where additional substances beyond those listed in the Product Standard are included, this should be noted in reporting.

Uncertainty

According to the Guide to PAS 2050, an uncertainty assessment of GHG inventories is not required, but may be necessary to meet data quality specifications (e.g., selecting most precise data). The Guide recommends using stochastic modeling – Monte Carlo analysis – to estimate the impact of uncertainty in model inputs on model results (Appendix IV). Through such modeling, practitioners can generate probability distributions (means, ranges) for estimated footprint values.

The Product Standard on the other hand requires at least a qualitative discussion of uncertainty in inventory reporting. The Standard recommends organizations “...should make a thorough yet practical effort to communicate level of confidence and key sources of uncertainty...” in their inventory results. Three uncertainty types are delineated: (1) parameter uncertainty which includes uncertainty in activity data, emission factors, and estimated or measured emissions data; (2) scenario uncertainty which includes uncertainty in methodologies and situations (i.e., how much variation there may be in estimates based on methodological choices); and (3) model uncertainty which stems from limitations in selected modeling approaches to accurately reflect the real world. Quantitative methods for addressing uncertainty are provided in Product Standard Appendix E.

Assurance/Verification

PAS 2050 provides for three types of conformity assessment for product inventories: (1) independent third party certification; (2) other party verification (non-accredited third parties); and (3) self-verification. Appropriate language for stating conformance under each of these three assessment methods is provided in Clause 10.4. Claims of conformance with PAS 2050 must be made on the “principal documentation or on the packaging provided for the product for which the claim is being made.” For self-verification, organizations must be able to demonstrate calculations were made in accordance with the PAS and make supporting documentation available to any interested party. The appropriate method for self-verification and for presentation of the results must be through the application of ISO 14021. PAS 2050 “highly encourages” independent third party certification when communicating inventory results publicly.

Under the Product Standard, a product GHG inventory must be assured by a first or third party. Assurance, as defined in Chapter 13 of the Standard, provides a broad review of product inventories and is aligned with financial accounting processes and terminology (versus verification which is defined more narrowly as the assessment of the accuracy and completeness of reported GHG information against pre-established GHG accounting and reporting principles).

The Product Standard defines data and model assurance, the former being required if possible. The assurance opinion must be expressed in the form of either reasonable or limited assurance. Assurance providers, whether internal or external to the organization, must be sufficiently independent of any involvement in the product GHG inventory calculations or development of any

declaration, and have no conflicts of interests resulting from their position in the organization. When publicly reporting a product GHG inventory, the assurance opinion must also be presented, including identification of the type of assurance performed and whether it was by a first or third party.

Reporting

PAS 2050 does not specify any requirements for communicating a product-level carbon footprint. However, it does require that data supporting the GHG emission calculations, including but not limited to, product and process boundaries, materials, emission factors, and any other pertinent data be documented and recorded in a format suitable for analysis and verification for the greater of either five years or the life expectancy of the product.

The Product Standard lists specific elements which must be included in public reporting of product-level inventories in Chapter 14. According to the Standard, a public GHG inventory report must follow the key accounting principles (Relevance, Accuracy, Completeness, Consistency, and Transparency) and include: general information, scope, boundaries, allocation, recycling, data information, inventory results, methodological choices, inventory changes over time, assurance, and use of results.

Conclusions

The Product Standard, scheduled to be published in September 2011, will no doubt be an important addition to existing guidance for product-level carbon footprint calculations. Although this new standard is generally harmonized with requirements of PAS 2050, there are some differences summarized here which will require organizations to make choices as to which guidelines to follow. Such differences will also impact comparability of carbon footprints for similar products. Transparency in reporting, including clear identification of guidelines followed, unit of analysis, boundaries, assumptions, and limitations, will be essential for increasing utility of product-level emission inventories for both reporting organizations and the public.

Table 2. Summary of Additional Key Differences Between PAS 2050 and the Product Standard for Determining System Boundaries

Inventory area	PAS 2050 Requirements	Product Standard Requirements	Potential
Non-attributable processes	Requires inclusion of emissions from operation of premises (factories, warehouses, central supply centers, storage, offices, retail outlets, etc.), while emissions from capital goods, human energy inputs, animals providing	Recommends inclusion of non-attributable processes if relevant, but does not require it. Relevance is determined by the company based on business goals, reduction potentials, and relative impact in relation to the	PAS 2050 is more specific than the Product Standard regarding which “non-attributable” processes should be included or excluded from the inventory. Discrepancies in emissions estimates could occur depending on which

	transport services, employee commuting, and transport of consumers to/from point of retail purchase must be excluded.	rest of the inventory. Any non-attributable processes included in the boundary should be reported.	guidelines are used.
Time-boundary for assessment	Emissions must be calculated over a 100 year period. Emissions arising from all life cycle phases of the product, except the use and final disposal phases, must be treated as a single release at the beginning of the assessment period. Use and final disposal stage emissions not occurring in the first year can be weighted over future years.	The time boundary for the total life cycle of the product is not specified, but must be reported. The time boundary for an inventory is defined as: “the amount time from when a product and its components are extracted from nature until they are returned to nature.” The use stage time boundary is based on the service life of the product. The end-of-life time boundary is based on the average waste treatment profile of the studied product in the assumed geographic location.	PAS 2050 requires a 100-year assessment period, whereas the Product Standard allows the time boundary to vary depending on the product being inventoried. Although PAS 2050 allows weighting of use and final disposal emissions over time, the Product Standard does not. Discrepancies in emissions estimates could occur depending on which guidelines are used, especially for cradle-to-grave inventories.
CO ₂ removals	PAS 2050 provides detailed requirements to account for CO ₂ removals during the life cycle of eligible products. Similar to emissions, removals are weighted over time (per Annex C). The most typical case is carbon of biogenic origin stored in a product (e.g., wood fibers in a table). A key requirement is that PAS 2050 allows for a carbon storage benefit only where the material storing the carbon is additional to the storage that would have occurred anyway (e.g., managed versus virgin forests).	In general, the Product Standard guidance on carbon storage is less specific than PAS 2050. Per Section 7.2.1, CO ₂ removals due to use of biogenic materials in products should only reflect the amount of carbon embedded in the material. All other removals and emissions due to land use change or other stock changes associated with biogenic materials use must be accounted for as land use change impacts. In cradle-to-gate inventories, the amount of embedded carbon in a product as it leaves the inventory boundary should be quantified and reported.	PAS 2050 places restrictions on which CO ₂ removals can be included in the inventory. Guideline differences regarding weighting of emissions over time will also need to be addressed. Discrepancies in emissions estimates could occur depending on which guidelines are used, especially for cradle-to-grave inventories.
Emissions from biogenic carbon sources	PAS 2050 provides specific guidance for addressing emissions from biogenic carbon sources in	Emissions from biogenic carbon sources must be included. The Standard does not allow weighting	PAS 2050 deals with CO ₂ emissions from products containing biogenic carbon via the calculation of

	<p>Clauses 5.3 and 5.4. They are: (1) CO₂ emissions from biogenic carbon sources apart from those due to land use changes must be excluded; (2) non-CO₂ emissions from biogenic carbon sources must be included; (3) CO₂ emissions from the degradation of products containing carbon of biogenic origin must be excluded; and (4) non-CO₂ emissions from degradation of products containing carbon of biogenic origin must be included. Clause 7.8 provides guidance on estimating non-CO₂ emissions for livestock and soils.</p>	<p>of CO₂ removals and emissions over time.</p>	<p>weighted average carbon stored over the 100-year assessment period, whereas the Product Standard requires quantification of both emissions and removals with no weighting of emissions over time. Discrepancies in emissions estimates could occur depending on which guidelines are used, especially for cradle-to-grave inventories.</p>
Land Use Impacts	<p>PAS 2050 defines a direct land use change as “the conversion of non-agricultural land to agricultural land as a consequence of producing an agricultural product or input to a product on that land.” GHG emissions from direct land use changes occurring on or after 1/1/1990 must be estimated using the country- and land use-specific emission factors provided in Annex E. The total estimated land use change emissions are then amortized over 20 years. Emissions and removals due to changes in soil carbon are excluded (e.g., changes in tilling techniques, crop types, other management practices).</p>	<p>The Product Standard defines a direct land use change less narrowly, including situations when “the demand for a specific land use results in a change of carbon stocks (total amount of carbon stored on a plot of land) on that land;” thus, changes are not limited to those due to agricultural production. The Product Standard provides detailed guidance for estimating direct land use change impacts in Appendix C. The key differences from PAS 2050 are: (1) the assessment period is 20 years or the length of a single harvest period, whichever is longer; (2) primary data are required if the reporting company has financial or operational control over the land; (3) detailed guidance is provided for allocation of emissions between wood and other</p>	<p>Although it provides more detailed guidance on direct land use impact calculations, the Product Standard allows other methods to be used, as long as the reference is reported. Organizations can consider following the more detailed Product Standard guidance when they have direct control over the land converted, the harvest cycle of the input is long (e.g., wood from managed forest is used), or if the product includes non-agricultural impacts which require large amounts of land.</p>

		products when a forest is removed; and (4) Section 18.2 provides detailed guidance and examples of secondary data use when a company has limited information on the specific land from which the product is extracted or harvested.	
Emissions from energy use	GHG emissions associated with the provision and use of energy must be included for energy supply systems. This includes: emissions at the point of consumption of the energy; emissions arising from the provision of energy, including generation of electricity and heat; emissions from transport fuels; upstream emissions; downstream emissions; and the growing and processing of biomass for use as a fuel. For electricity and heat from a stand-alone source, an emission factor relevant to that source must be used. For electricity and heat from a large energy transmission system, an average electricity supply emission factor appropriate for the location and time period must be used. Renewable energy emission factors can only be used if not already included in national averages (i.e., avoid double counting).	No specific requirements or guidance, although use of emission factors for electricity grid systems is discussed in Chapter 9. In general, all attributable processes, i.e., processes that are directly connected to the studied product and its ability to perform its function by material and energy flows, must be included.	Discrepancies in emissions estimates could occur depending on which guidelines are used since the Product Standard is less specific.

References

Publicly Available Specification (PAS) 2050, “Specification for the assessment of the life cycle greenhouse gas emissions of goods and services,” 29 October 2008. British Standards Institution, the Carbon Trust and the Department for Environment, Food and Rural Affairs (Defra), London, United Kingdom.

Guide to PAS 2050, “How to assess the carbon footprint of goods and services,” 2008. British Standards Institution, the Carbon Trust and the Department for Environment, Food and Rural Affairs (Defra), London, United Kingdom.

PAS 2050 Research Report, 2011, British Standards Institution, London, United Kingdom.

The Carbon Trust, “Code of Good Practice for Product Greenhouse Gas Emissions and Reduction Claims: Guidance to support the robust communication of product carbon footprints,” October 2008, United Kingdom.

The Greenhouse Gas Protocol Initiative, “Product Accounting & Reporting Standard”, Draft for Stakeholder Review, November 2010. World Resources Institute and World Business Council for Sustainable Development.

Disclaimer

Strictly no photocopying or redistribution allowed without prior written permission of Source 44. When quoting, please cite ‘Source 44’. The information contained in this publication is derived from carefully selected public sources we believe are reasonable. We do not guarantee its accuracy or completeness and nothing in this document shall be construed to be a representation of such a guarantee. Any opinions expressed reflect the current judgment of the author of the relevant article or features, and do not necessarily reflect the opinion of Source 44. The opinions presented are subject to change without notice. Source 44 accepts no responsibility for any liability arising from use of this document or its contents. Nothing in this note constitutes or should be taken to constitute investment advice.

Contact Source 44

Source 44, LLC
514 Via De La Valle, Suite 203
Solana Beach, CA 92075
Phone: 877. 916. MFDS (6337)
Email: servicedelivery@source-44.com