

PAS 2050 Review 2011: Summary of changes to PAS 2050 and rationale

This document provides a high level summary of the most significant changes to the PAS 2050 from the 2011 revision. It then provides further detail of each individual change, clause by clause, in the table below. Minor changes that are not likely to affect assessments (i.e. changes in clause numbering/minor changes in wording/editing/structure) are not included here.

Objectives for revision of PAS 2050: 2008.

1. Clarify any areas of ambiguity in the published PAS;
2. Take account of any advances in knowledge or understanding since the original publication date;
3. Enhance the level of take-up and application, by reflecting user experience/feedback;
4. Align the PAS 2050 methodology and its use in conjunction with other internationally recognised footprint methods being developed.

The significant changes arising from this revision are:

1. The recommendation to use sector specific rules known as “supplementary requirements” where these have been developed in accordance with the principles for supplementary requirements, set out in PAS 2050 (Clause 4.3 and others). This change was introduced to recognise the benefits of greater specificity at a sector or product level to aid consistent application of the PAS within sectors and enable use and take up. It also aligns with a general trend towards the introduction of product specific GHG assessment methods (sometimes referred to as product category requirements (PCR) or “product rules”). The intention is for supplementary requirements 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.
2. The inclusion of GHG emissions and removals from biogenic sources, which were previously entirely excluded (on the premise that the CO₂ removals and emissions would balance each other out). This change was made to bring the PAS into line with the approach being taken in the 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 WRI GHG product protocol 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 and 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 – Application broadened beyond agriculture (e.g. to include a broader range of land use changes like industrial) and changes to the approach for determining emissions where there is limited traceability of products (i.e. from applying a worst case scenario to the average). The second change was introduced because the extreme case scenario applied in the 2008 version was considered to be overly severe.

The following table relates the clauses of PAS 2050: 2011 to those of the 2008 edition, identifies the changes that they introduce and the reason for their introduction.

PAS 2050: 2008	PAS 2050: 2011	Topic	Summary of original text	Summary of changes	Rationale for changes
Clause 1: Scope					
1	1	Scope	Outlines the scope of PAS 2050 emphasizing the lifecycle approach and the key elements of assessments undertaken to its requirements.	Provides much the same information as the 2008 edition but draws attention to the inclusion in the revised PAS of principles underpinning the development of sector specific rules known as “supplementary requirements” (e.g. akin to “product category rules” or “product rules”). The new scope removes the reference to PAS 2050 allowing for communication or comparison of information. The scope emphasises that there is no requirement in the PAS to communicate or disclose information.	The changes reflect the inclusion of principles for development and use of supplementary requirements for particular product groups or categories and removes any impression that the PAS is intended to be used for communication or comparison purposes. <i>A more detailed rationale for the focus on Supplementary requirements is provided in this table</i>
Clause 2: Normative references					
2	2	Normative references	Identifies other standards that are indispensable to the application of PAS 2050	No change	Unchanged
Clause 3: Terms and definitions					
3	3	Terms and definitions	Provided meanings for the particular use of terms in PAS 2050	<p>Terms removed/changed in the revised version :</p> <ul style="list-style-type: none"> business-to-business (replaced with ‘cradle-to-gate’) business-to-consumer (now ‘cradle-to-grave’) carbon sequestration competent person environmentally extended input-output (EEIO) analysis product category rules (replaced by ‘supplementary requirements’) <p>Terms added in revised version are</p> <ul style="list-style-type: none"> biogenic carbon food and feed fossil carbon (replaces fossil) land-use-change GHG removals 	<p>Terms removed either because they are no longer used in the PAS or because they have been replaced by others considered more appropriate.</p> <p>Terms were added to provide additional clarity where required but mainly as a result of the changes to include the emissions from biogenic sources.</p>

Clause 4 Principles and implementation					
4.3	Deleted	Product differentiation		Requirement for assessments to be applicable only to the product for which the assessment has been conducted is now incorporated in 4.1. Provision for assessment of similar products removed.	Removal of provision for similar products because the criteria for identifying similar products not sufficiently robust.
	4.3	Supplementary requirements		New clause provides principles intended to govern the development and application of supplementary requirements appropriate for use with PAS 2050.	Principles for the development and use of supplementary requirements (SR) have been introduced to recognise that product specific requirements may help to improve the accuracy and relevance of the results for particular sectors/products. There have also been sectors where some aspects of PAS 2050 are considered to be inadequate for their sector. The introduction of using SR is seen as a means of potentially expanding the use of PAS 2050 without loss of rigor.
4.4	4.4	Supporting data/ record keeping	Previous text provided requirements for maintaining 'supporting data'	Focus of requirement changed from supporting data to record keeping, and supported by a new Annex B. Requirement for keeping records reduced from 5 to 3 years.	Change introduced as part of the separation of PAS 2050 from all aspects of communication. Record retention period changed to more closely relate to the 2 year period for which a PAS 2050 assessment remains valid.
Clause 5. Emissions and removals					

5.1/ 5.3	5.1	Scope of GHG removals	Identified the range of GHG emissions to be included	The revised clause addresses the same subjects but the requirements are expanded to include emissions and removals from fossil and biogenic sources at all stages of the life cycle (transferred from 5.3 and changed). An exception is made for products intended for human or animal ingestion (food and feed) which may be excluded.	The inclusion of CO2 removals from the atmosphere and CO2 emissions from biogenic sources was introduced on the basis that this approach is technically more robust. The inclusion of biogenic carbon can be important for certain products where there is long term carbon storage. This change also aligns PAS 2050 with the approach being taken in the GHG Protocol Product Standard and ISO 14067. Emissions from biogenic sources were previously entirely excluded on the premise that the CO2 removals and emissions would balance each other out. The possibility of continuing to exclude emissions from products intended for human and animal ingestion (food and feed) was introduced in response to concerns that the inclusion of emissions from biogenic sources would impose considerable extra burden on suppliers of those products without significant improvement to the assessment outcome
5.2	5.2	100 year time period for assessment	Established the time period for the assessment of GHG emissions as 100 years following formation of the product and set out requirement for the treatment of emissions arising during that period from all life cycle phases with the exception of the use phase.	This clause retains the requirement for a 100 year assessment period as a default for all life cycle phases but provides for the use of supplementary requirements (SR).	100 year assessment period retained as default position but the possibility to develop and use SRs will enable change to the period in respect of products for which 100 years is judged not to be appropriate (i.e. where there is a significant source of emissions beyond 100 years).

5.2	6.4.9 & 6.4.10	Delayed emissions	For the use phase, there was requirement that delayed emissions i.e. occurring over more than one year be dealt with by the application of a factor representing the weighted average time the emissions are present in the atmosphere (method provided in annex B)	<p>The requirement to apply a weighting factor for delayed emissions has been removed (all emissions and removals must be accounted for as if occurring at the start of the 100 year assessment period).</p> <p>Organizations intending to undertake the assessment of such delayed emissions may still do so and provision for this is made in 6.4.10 dealing with final disposal and Annex E</p>	The requirement to assess the impact over time of emissions occurring over more than 1 year was removed on the basis that it added considerable complexity to the PAS 2050 method without significant improvement to the outcome.
5.4	5.5	Carbon Storage	Addressed the issue of carbon storage and included the requirement that the impact of carbon storage be assessed using a method involving the weighted average of biogenic carbon in a product over time.	<p>The requirement to take account of the impact of stored carbon beyond 100 years is retained but there are changes arising from the change to the treatment of biogenic carbon overall. Requirements relating to:</p> <p>the eligibility of products containing carbon of biogenic origin and the treatment of stored biogenic carbon have been removed.</p> <p>The requirement to assess the impact over time of stored carbon by applying a weighting factor has been removed.</p>	<p>Change results from the requirement to take account of removals as well as emissions at each stage of the life cycle and the inclusion of emissions from biogenic sources in the overall assessment, removing the need for special provision for stored biogenic carbon.</p> <p>Assessment of the impact over time of stored carbon removed in line with the action taken for emissions (5.2).</p>

5.5	5.6	Land use change	Provide for the inclusion and treatment of land use change including the approach to be taken when knowledge of product source and background is limited.	<p>The inclusion of direct land use change has been broadened from only applying to product originating from agricultural activities to include any product originating from land use. (e.g. conversion for industrial use)</p> <p>The period for inclusion is now not more than twenty years (or a single harvest period) since the land use was changed whichever is the longer (i.e. not 1990).</p> <p>The rules with regard to limited traceability and limited knowledge of the timing of land use change have also been modified to change from 'extreme case' to average.</p> <p>The revised PAS makes provision for the use of SR to determine the method used (otherwise referring to Annex C or IPCC as per previous PAS).</p>	<p>Restriction to purely agricultural products inappropriate broadened to be more technically accurate.</p> <p>Changes to the approach for determining emissions where there is limited traceability of products were introduced because the extreme case scenario applied in the 2008 version was considered to be overly severe.</p>
5.6	5.7	Soil Carbon	Excluded the effect of soil carbon change resulting from changes in soil management techniques, from the assessment.	The default position for the treatment of soil carbon change remains that of exclusion unless provided for in SR.	<p>The decision to continue with the exclusion of the impact of soil carbon change was taken on the basis that expert opinion has still not agreed on an appropriate method.</p> <p>The decision to permit the intervention of SR was taken on the basis that work is still in progress on the determination of a possible methodology and that particular sectors could take advantage of the work done, at some future time.</p>
5.8	5.9	Unit of analysis	Established parameters for the use of a functional unit in the calculation and expression of calculation results	The default requirements governing the use of a functional unit remain unchanged although the possibility of SR setting a preferred unit of analysis has been introduced.	See rationale provided for the introduction of SR at 4.

Clause 6 – System Boundary					
6.1	6.1	System boundary	Established the requirements for determination of a product system boundary for each product under assessment and required the use of existing Product Category Rules (PCR)	Clause changed to reference supplementary requirements developed in accordance with 4.3 rather than PCRs developed in accordance with BS ISO 14025. This change doesn't necessarily remove the possibility of using PCRs.	This change is a logical development from the decision to incorporate provision for supplementary requirements. See rationale to 4.
6.2	6.2	Cradle-to-gate assessments	6.2.1 Provided for the preparation and use of partial (business-to-business) assessments including requirements for their communication.	Changed to use the term cradle-to-gate for partial assessments rather than business-to-business. Clarified the meaning of cradle to gate assessments. .	The objective to separate PAS 2050 from all aspects of communication leads to the removal of 'business to business' or business to consumer'. The use of the terms cradle-to-gate or cradle-to-grave are considered to be more relevant to the purposes of PAS 2050.
			6.2.2 Set out a requirement for the communication of partial GHG emission assessment results.	Changed requirements to 'recording' of information rather than 'communication'.	Removed communication requirements
6.3	6.3	Material contribution and threshold	Set out the rules relating to the materiality of emissions sources to the overall assessment	Requirements changed to remove the requirement relating to a situation where a single source of GHG emissions accounts for more than 50% of the anticipated lifecycle emissions from a product. As a result the requirement to treat emissions from the use phase differently has been removed. Where some emissions have been excluded on the basis of materiality, the requirement to 'scale up' emissions to represent 100% of the life cycle has been removed.	Materiality requirements simplified to reduce complexity and bring PAS 2050 into alignment with the approach taken in the GHG Protocol Product Standard.

6.4	6.4	Elements of the product system	Established the rules for system boundary definition, identifying key elements. Changes to specific provisions are highlighted below.	All key elements for inclusion in system boundary are retained although clause numbering has altered by a single place.	Clause numbering changed to accommodate the need to number the opening clause (not done in 2008 version).
			6.4.1: Raw materials	Now 6.4.2 – The title of raw materials is changed to Production materials The content of notes is changed to examples in the main text.	More indicative of the intention of the clause
			6.4.3: Capital Goods (excluded)	Now 6.4.4 Added reference to SRs to allow for inclusion of capital goods if considered important within a sector	Recognises capital goods may be important for some sectors so supplementary requirements could specify for their inclusion.
			6.4.6: Transport:	Now 6.4.7 Includes added reference to SRs	Recognises supplementary requirements could help to provide clarity in some areas
			6.4.7: Storage [of products]	The title of 6.4.8 (previous 6.4.7) is changed to storage of products, it is otherwise unchanged.	Title of 6.4.8 changed to clarify that this clause relates to storage of products rather than carbon storage.
			6.4.8: Use phase	6.2.9. now references 'supplementary requirements' rather than PCRs. Applying a weighting factor for delayed emissions is no longer a requirement.	Changes to 6.4.9 and 6.4.10 on delayed emissions are a direct result of the changes to 5.2 (see rationale at 5.2)
			6.4.9: Final disposal	6.4.10. Reference 'supplementary requirements' rather than PCRs	As above
Clause 7 – Data					
7.3	7.3	Primary activity data	Sets out requirements for collecting primary activity data.	Requirement that data collection apply to the first upstream supplier with emissions contributing 10% or more changed to apply to upstream suppliers that cumulatively contribute 10% or more.	Rule has been found to be difficult to implement in supply-chains where there are many suppliers each with a very small contribution to the overall upstream emissions (e.g. circuit-board manufacture). In this case there may be no "first upstream supplier" that contributes 10% or more to the upstream GHG emissions of the product or input.

7.4	7.4	Secondary data	Specified requirements for collection secondary data.	Changed requirements for using secondary data where primary data is not 'required' to is not 'obtained'.	Confirms intention that use of primary data is encouraged as much as possible.
			7.4.1 Use of PAS 2050 compliant data	Minor change to title and content.	Removes reference to partial assessment for clarity.
7.6	7.6	Variability of emissions and removals overtime	Addresses products where emissions will vary over its lifespan.	For product made available on a continuing basis, the requirement that assessment cover at least one year is changed to permit shorter periods and time periods specific to particular products.	Changed to accommodate new products and seasonal products
7.8	7.8	Non-CO ₂ emissions data for livestock and soils	Set requirements for the estimation of the non-CO ₂ emissions data for livestock and soils using one of two methods selected on the basis of highest assessment.	Modified to provide a tier 1 approach for emissions that do not make a material difference.	Introduced to reduce the burden of accounting for low value emissions.
7.9	7.9	Emission data for fuel, electricity and heat	7.9.1 Established the requirements for assessing the emissions from fuel, electricity and heat including that for onsite and offsite generation, renewable energy generation and the use biomass and biofuels.	Requirement to use calculation method described in PAS 2050 changed to a method consistent with this PAS.	Changed to clarify intention. PAS 2050 doesn't describe such a method.
7.11	Deleted	Disclosure	Set requirements for disclosure in relation to system boundary, use phase, carbon storage and secondary data when communicating outcomes.	Clause removed. (See Annex B Recording of supporting information).	Removed in line with the intention to separate PAS 2050 from communication and to focus on recording relevant information

Clause 8 Allocation of emissions					
8.1	8.1	Allocation of emissions	Established the preferred approach to allocation as avoidance followed by system expansion with allocation on the basis of economic value of co-products as the default position.	Introduces the possibility of using SR but retains the use of economic value as the default method for allocation	Default value retained in the interest of maintaining a uniform approach. However, recognizing the possible restriction caused in some product sectors by requirement to use economic value, the introduction of SR should permit the introduction of alternative methods where appropriate.
8.2	8.2	Waste	Set out requirements for the allocation of CO ₂ and non-CO ₂ emissions from biogenic and from fossil sources with rules for the allocation of emissions from methane combustion also provided.	Separate requirements reflecting the difference in treatment between biogenic and fossil, carbon sources removed to reflect the inclusion of emissions from biogenic carbon sources in the revised PAS.	See rationale to 5.1.
8.3	8.5	Energy	Provided a method for the inclusion and allocation of CHP emissions.	2008 edition required 'assessment' in accordance with 8.1.1 but should have referred to 'allocation'.	Correction.
8.4	8.6	Transport	Addressed the allocation of emissions from transport	Clarification of allocation in respect of 'return journey'.	Clarification only.
8.5	8.3	Recycled material and recycling	Required the use of the method provided in Annex D in relation to recycled material.	Changes to the method in Annex D (see below).	See below, changes to Annex D.
8.6	8.4		Established rules for the inclusion and allocation of emissions from reuse.	Title change to remove reference to remanufacture. Method for assessing emissions per instance of use or reuse provided in greater detail and as a formula.	Refurbishment as part of the reuse process considered more appropriate. Change in presentation of the methodology for clarification
Clause 9: Calculation					
9	9	Calculation of the GHG emissions of products	Set out the method for calculation of the emissions from a functional unit on the basis of PAS 2050	Changed to reflect the content of the revised PAS 2050 i.e. incorporate emissions and removals, removal of requirement for applying a weighting factor for delayed emissions, removes requirement for excluded emissions to be 'scaled up'.	To be consistent with update.

Clause 10: Claims of conformity					
10	10	Claims of conformity	Established requirements for claiming conformity with the provisions of PAS 2050	Introductory clause changed removing the requirement to include claims in documentation or packaging associated with the product. Provides additional information with regard to the accuracy and nature of claims.	Changed to further emphasise that PAS 2050 does not require communication in any form and to make reference to other sources/ documents if communication is to be carried out.
Annexes					
B	E	Calculation of the weighted average impact of use phase and disposal phase emissions	Provided the method for the calculation of emissions over time, arising from the use phase or final disposal of a product to take account of the weighted average time that emissions are present in the atmosphere during the assessment period.	Merged with Annex C on the weighted average impact of carbon storage	Resulted from the change in approach to delayed emissions (see rationale at 5.2)
	New B	Recording of supporting information		Summarises the requirements for record keeping in PAS 2050	Added to clarify and draw attention to the importance of accurate recording to meet the requirements of the PAS 2050 methodology
C	C	Calculation of the weighted average impact of carbon storage in products	Provided the method for the calculation of the impact of carbon storage over the life cycle of a product taking account of the weighted average time of storage during the assessment period.	Merged with Annex B.	Resulted from the change in approach to delayed emissions (see rationale at 5.2)
D	D	Calculation of emissions arising from recyclable material inputs	Provided the method for the calculation of emissions from recyclable material inputs	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 and 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.	Changed in response to comment that the 2008 edition was not sufficiently clear in its treatment of recyclable material. The revision also brings PAS 2050 into closer alignment with the approach taken in the GHG Protocol Product Standard and ISO 14067.

E	C	Default land use change values for selected countries.	Provided a table of GHG emission values for selected countries.	Changes to correct and broaden cross references to IPCC Guidelines for National Greenhouse Gas Inventories	Changed to reflect the broadening of land use change (see rationale to 5.6) to be applicable to other than just agriculture products.
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