PUBLICLY AVAILABLE SPECIFICATION

PAS 2050:2011

Specification for the assessment of the life cycle greenhouse gas emissions of goods and services

defra
Department for Environment Food and Rural Affairs

DEPARTMENT OF ENERGY & CLIMATE CHANGE

BIS
Department for Business Innovation & Skills

BSI

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Contents

Foreword

The revision of this Publicly Available Specification (PAS) has been undertaken by BSI to update the specification for quantifying the life cycle greenhouse gas (GHG) emissions of goods and services in line with the latest technical advances and current experience.

The development of this PAS was co-sponsored by:

- Defra (Department for Environment, Food and Rural Affairs, UK);
- DECC (Department of Energy and Climate Change, UK);
- BIS (Department for Business, Innovation and Skills, UK).

Acknowledgement is given to the following organizations and individuals that assisted with the development of this specification:

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Technical advisor to Defra: Dr. Dorothy Maxwell, *Global View Sustainability Services Ltd.*

Comments from other parties were also sought by BSI. The expert contributions from all the organizations and individuals consulted in the development this PAS are gratefully acknowledged.

Supersession

This Publicly Available Specification supersedes PAS 2050:2008, which is withdrawn.

Use of this document

It has been assumed in the preparation of this PAS that the execution of its provisions will be entrusted to appropriately qualified and experienced people, for whose use it has been produced.

This PAS has been prepared and published by BSI, which retains its ownership and copyright. BSI reserves the right to withdraw or amend this PAS on receipt of authoritative advice that it is appropriate to do so. This PAS will be reviewed at intervals not exceeding two years, and any amendments arising from the review will be published as an amended Publicly Available Specification and publicized in *Update Standards*.

This PAS is not to be regarded as a British Standard, European Standard or International Standard. In the event that this PAS is put forward to form the basis of a full British Standard, European Standard or International Standard, it will be withdrawn.

Presentational conventions

The provisions of this PAS are presented in roman (i.e. upright) type. Its requirements are expressed in sentences in which the principal auxiliary verb is "shall". Its recommendations are expressed in sentences in which the principal auxiliary verb is "should".

Commentary, explanation and general informative material (e.g. Notes) is presented in italic type, and does not constitute a normative element.

Contractual and legal considerations

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with this PAS does not in itself confer immunity from legal obligations.

0 Introduction

0.1 General information

Climate change continues to be one of the greatest challenges facing nations, governments, business and citizens and will influence the way we live and work in future decades (IPCC 2007 [1]). Past and current actions, including the release of carbon dioxide (CO_2) and other greenhouse gases through human activities such as the burning of fossil fuels, emissions from chemical processes and other sources of anthropogenic greenhouse gases, will have an effect on future global climate.

While greenhouse gas (GHG) emissions are often viewed at global, national, corporate or organizational levels, emissions within these groupings can arise from supply chains within business, between businesses and between nations. The GHG emissions associated with goods and services reflect the impact of processes, materials and decisions occurring throughout the life cycle of those goods and services.

PAS 2050 was developed in response to broad community and industry desire for a consistent method for assessing the life cycle GHG emissions of goods and services. Life cycle GHG emissions are the emissions that are released as part of the processes of creating, modifying, transporting, storing, using, providing, recycling or disposing of such goods and services. PAS 2050 offers organizations a method to deliver improved understanding of the GHG emissions arising from their supply chains, but the primary objective of this PAS is to provide a common basis for GHG emission quantification that will inform and enable meaningful GHG emission reduction programmes.

During the first two years of its use, this PAS has been shown to be generically applicable to a wide range of goods and services and therefore does not itself make provision for the special treatment of particular product sectors. However, it is recognized that the availability of supplementary requirements could aid consistent application of the PAS to products within specific product sectors 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.

To facilitate this, this new edition of PAS 2050 includes a set of principles (see **4.3**) governing the development of supplementary requirements for the application of PAS 2050 to particular product types. These principles are intended to ensure that such supplementary requirements are not in conflict with the requirements of this PAS.

Although there is no requirement for, or standardization of, communication techniques in this specification, this PAS supports the assessment of life cycle GHG emissions of goods and services in a manner that can be later disclosed. For this reason, great emphasis is given to proper recording of processes and outcomes. Where an organization implementing this PAS chooses to disclose all or part of the results of an assessment of GHG emissions, all relevant supporting information should also be made available.

Where communication is directed to the consumer, the user should refer to additional specifications or further guidance on environmental claims (e.g. ISO 14021 [1] or UK Department of Environment Food and Rural Affairs Green Claims Guidance [7] [2]).

Using PAS 2050 to quantify the life cycle GHG emissions from goods and services aids informed decision-making when considering reducing emissions for products and services.

This PAS is focused on a single environmental issue (i.e. GHG emissions and their contribution to climate change), but this is only one of a range of possible environmental impacts from specific goods or services. The relative importance of those impacts can vary significantly from product to product, and it is important to be aware that decisions taken on the basis of a "single issue" assessment could be detrimental to other environmental impacts potentially arising from the provision and use of the same product.

[1] http://www.iso.org/iso/catalogue_detail?csnumber=23146
[2] http://www.defra.gov.uk/publications/2011/06/03/pb13453-green-claims-guidance/

0.2 Background, benefits and context of PAS 2050

PAS 2050 builds on existing life cycle assessment methods established through BS EN ISO 14040 and BS EN ISO 14044 by giving requirements specifically for the assessment of GHG emissions within the life cycle of goods and services. These requirements further clarify the implementation of these standards in relation to the assessment of GHG emissions of goods and services, and establish particular principles and techniques, including:

a) cradle-to-gate and cradle-to-grave GHG emissions assessment data as part of the life cycle GHG emissions assessment of goods and services;

b) scope of greenhouse gases to be included (see **5.1**);

c) criteria for global warming potential (GWP) data (see **5.3**);

d) treatment of emissions and removals from land use change and biogenic and fossil carbon sources;

e) treatment of the impact of carbon storage in products and offsetting;

f) requirements for the treatment of GHG emissions arising from specific processes;

g) data requirements and accounting for emissions from renewable energy generation.

This PAS benefits organizations, businesses and other stakeholders by providing a clear and consistent method for the assessment of the life cycle GHG emissions associated with goods and services. Specifically, this PAS provides the following benefits:

a) for organizations that supply goods and services, this PAS:
   - allows internal assessment of the existing life cycle GHG emissions of goods and services;
   - facilitates the evaluation of alternative product configurations, sourcing and manufacturing methods, raw material choices and supplier selection on the basis of the life cycle GHG emissions associated with goods and is to be used as a basis for comparison of services;
   - provides a benchmark for programmes aimed at reducing GHG emissions;
   - allows for the quantification, management and potential comparison of GHG emissions from goods or services using a common, recognized and standardized approach to life cycle GHG emissions assessment; and
   - supports reporting (e.g. on corporate responsibility).

b) for consumers of goods and services, this PAS provides a common basis for understanding the assessment of life cycle GHG emissions when making purchasing decisions and using goods and services.

1 Scope

This Publicly Available Specification (PAS) specifies requirements for the assessment of the life cycle GHG emissions of goods and services (collectively referred to as "products") based on key life cycle assessment techniques and principles. This PAS is applicable to organizations assessing the GHG emissions of products across their life cycle, and to organizations assessing the cradle-to-gate GHG emissions of products.

Requirements are specified for identifying the system boundary, the sources of GHG emissions associated with products that fall inside the system boundary, the data requirements for carrying out the analysis, and the calculation of the results.

This PAS addresses the single impact category of global warming. It does not assess other potential social, economic and environmental impacts or issues arising from the provision of products or issues associated with the life cycle of products, such as non-GHG emissions, acidification, eutrophication, toxicity, biodiversity or labour standards. The life cycle GHG emissions of products, as calculated using this PAS, do not provide an indicator of the overall environmental impact of these products, such as may result from other types of life cycle assessment.

PAS 2050 is generically applicable to a wide range of goods and services. However, this revision includes principles for the preparation and use of supplementary requirements to provide a focused approach for specific industry sectors or product categories in a manner that will facilitate consistent application of PAS 2050 within the particular sector or product category.

This PAS does not specify requirements for the disclosure or communication of the results of a quantification of the life cycle GHG emissions of goods and services.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS EN ISO 14021, *Environmental labels and declarations – Self-declared environmental claims (Type II environmental labelling)*

BS EN ISO 14044:2006, *Environmental management – Life cycle assessment – Requirements and guidelines*

IPCC 2006, *Guidelines for National Greenhouse Gas Inventories*. National Greenhouse Gas Inventories Programme, Intergovernmental Panel on Climate Change

Note *Subsequent amendments to IPCC 2006 also apply.*

IPCC 2007, *Climate Change 2007: The Physical Science Basis.* Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Solomon S, Qin D, Manning M, Chen Z, Marquis M, Avery KB, Tignor M, Miller HL (editors)]. Cambridge, UK: Cambridge University Press, 996 pp.

Note *Subsequent amendments to IPCC 2007 also apply.*

3 Terms and definitions

For the purposes of this PAS, the following terms and definitions apply.

3.1 allocation

partitioning the inputs to or emissions from a shared process or a product system between the product system under study and one or more other product systems

3.2 anticipated life cycle greenhouse gas emissions

initial estimate of greenhouse gas (**3.19**) emissions for a product (**3.35**) that is calculated using secondary data (**3.41**) or a combination of primary activitity data (**3.34**) and secondary data, for all processes used in the life cycle of the product

3.3 biogenic

derived from biomass, but not from fossilized or fossil sources

3.4 biogenic carbon

carbon that is contained in biomass

Note *For the purpose of calculations in accordance with this PAS, CO_2 from air converted to non-biomass carbonates is calculated as biogenic carbon.*

3.5 biomass

material of biological origin, excluding material embedded in geological formations or transformed to fossil

[Adapted from CEN/TR 14980:2004, 4.3]

3.6 capital goods

goods, such as machinery, equipment and buildings, used in the life cycle of products

3.7 carbon dioxide equivalent (CO_2e)

unit for comparing the radiative forcing of a greenhouse gas to carbon dioxide

[BS ISO 14064-1:2006, 2.19]

Note 1 *The term carbon dioxide (CO_2) used throughout this PAS should not be confused with carbon dioxide equivalent (CO_2e).*

Note 2 *The CO_2e is calculated by multiplying the mass of a given GHG by its global warming potential (see **3.23** for a definition of global warming potential).*

Note 3 *Greenhouse gases, other than CO_2, are converted to their CO_2e on the basis of their per unit radiative forcing using 100-year global warming potentials defined by the Intergovernmental Panel on Climate Change (IPCC).*

3.8 carbon storage

retention of carbon from biogenic or fossil sources or of atmospheric origin in a form other than as an atmospheric

3.9 combined heat and power (CHP)

simultaneous generation in one process of usable thermal, electrical and/or mechanical energy

3.10 consumable

ancillary input that is necessary for a process to occur but that does not form a tangible part of the product or co-products arising from the process

Note 1 *Consumables differ from capital goods in that they have an expected life of one year or less, or a need to replenish on a one year or less basis (e.g. lubricating oil, tools and other rapidly wearing inputs to a process).*

Note 2 *Fuel and energy inputs to the life cycle of a product are not considered to be consumables.*

3.11 consumer

user of goods or services

3.12 co-product

any of two or more products from the same unit process or product system

[BS EN ISO 14044:2006, 3.10]

Note *Where two or more products can be produced from a unit process, they are considered co-products only where one cannot be produced without the other being produced.*

3.13 cradle-to-gate

life cycle stages from the extraction or acquisition of raw materials to the point at which the product leaves the organization undertaking the assessment

3.14 cradle-to-grave

life cycle stages from the extraction or acquisition of raw materials to recycling and disposal of waste

3.15 data quality

characteristics of data that relate to their ability to satisfy stated requirements

[BS EN ISO14044:2006, 3.19]

3.16 downstream emissions

GHG emissions associated with processes that occur in the life cycle of a product subsequent to the processes owned or operated by the organization implementing this PAS

3.17 economic value

market value of a product, co-product or waste (see **3.49** for a definition of waste) at the point of production

3.18 emission factor

amount of greenhouse gases emitted, expressed as CO_2e (**3.7**) and relative to a unit of activity

Note *For example, kgCO_2e per unit input. Emission factor data would be obtained from secondary data sources.*

3.19 (GHG) emissions

release to air and discharges to water and land that result in GHGs entering the atmosphere

3.20 food and feed

substances in solid or liquid form intended to be consumed by humans or animals

3.21 fossil carbon

carbon that is contained in fossilized material

Note *Examples of fossilized material are coal, oil and natural gas. For the purposes of this PAS, peat is also to be treated as fossilized material with regard to its combustion.*

3.22 functional unit

quantified performance of a product system for use as a reference unit

[BS EN ISO 14044:2006, 3.20]

Note *For the purposes of GHG emissions assessment, the functional unit can be a single item of product or a generally accepted sales quantity (e.g. 1 rose or 1 dozen roses).*

3.23 global warming potential (GWP)

factor describing the radiative forcing impact of one mass-based unit of a given greenhouse gas relative to an equivalent unit of CO_2 over a given period of time

[BS ISO 14064-1:2006, 2.18]

Note *CO_2 is assigned a GWP of 1, while the GWP of other gases is expressed relative to the GWP of CO_2. Annex A contains global warming potentials for a 100-year time period produced by the Intergovernmental Panel on Climate Change (IPCC).*

3.24 greenhouse gases (GHGs)

gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiation at specific wavelengths within the spectrum of infrared radiation emitted by the Earth's surface, the atmosphere and clouds

Note *The GHGs included in this PAS are specified in Annex A.*

3.25 input

product, material or energy flow that enters a unit process

[BS EN ISO 14040:2006, 3.21]

3.26 intermediate product

output from a unit process that is an input to other unit processes involving further transformation within the system

3.27 land use change

change in the purpose for which land is used by humans (e.g. between crop land, grass land, forest land, wetland, industrial land)

Note 1 *Change in the use of land at the location of production of the product being assessed is referred to as direct land use change.*

Note 2 *Change in the use of land elsewhere is referred to as indirect land use change.*

3.28 life cycle

consecutive and interlinked stages of a product system, from raw material acquisition or generation of natural resources to end of life, inclusive of any recycling or recovery activity

[Adapted from BS EN ISO 14040:2006, 3.1]

3.29 life cycle assessment (LCA)

compilation and evaluation of inputs, outputs and potential environmental impacts of a product system throughout its life cycle

[BS EN ISO 14040:2006, 3.2]

3.30 life cycle GHG emissions

sum of greenhouse gas emissions resulting from all stages of the life cycle of a product and within the specified system boundaries of the product

Note *This includes all emissions and removals associated with the processes within the boundary of the life cycle of the product, including obtaining, creating, modifying, transporting, storing, operating, using and end-of-life disposal of the product. To avoid undue repetition, reference to removals is not always included in the text, but it is intended that assessment should include removals wherever they occur.*

3.31 material contribution

contribution from any one source of GHG emissions of more than 1% of the anticipated total GHG emissions associated with the product being assessed

***Note** A materiality threshold of 1% has been established to ensure that very minor sources of life cycle GHG emissions do not require the same treatment as more significant sources.*

3.32 offsetting

mechanism for claiming a reduction in GHG emissions associated with a process or product through the removal of, or preventing the release of, GHG emissions in a process unrelated to the life cycle of the product being assessed

***Note** An example is the purchase of Certified Emission Reductions generated by Clean Development Mechanism projects under the Kyoto Protocol [3].*

3.33 output

product, production material or energy that leaves a unit process

[Adapted from BS EN ISO 14044:2006, 3.25]

***Note** Production materials may include raw materials, intermediate products, co-products, products and emissions.*

3.34 primary activity data

quantitative measurement of activity from a product's life cycle that, when multiplied by the appropriate emission factor, determines the GHG emissions arising from a process

***Note 1** Examples of primary activity data include the amount of energy used, material produced, service provided or area of land affected.*

***Note 2** Primary activity data sources are typically preferable to secondary data sources as the data will reflect the specific nature/efficiency of the process and the GHG emissions associated with the process.*

***Note 3** Primary activity data do not include emission factors.*

3.35 product

good or service

***Note** Services have tangible and intangible elements. The provision of a service can involve, for example, the following:*

a) an activity performed on a consumer-supplied tangible product (e.g. automobile to be repaired);

b) an activity performed on a consumer-supplied intangible product (e.g. the income statement needed to prepare a tax return);

c) the delivery of an intangible product (e.g. the delivery of information in the context of knowledge transmission);

d) the creation of ambience for the consumer (e.g. in hotels and restaurants);

e) software, which consists of information and is generally intangible and can be in the form of approaches, transactions or procedures.

[Adapted from BS ISO 14040:2006, 3.9]

3.36 product category

group of products that can fulfil equivalent functions

[BS ISO 14025:2006, 3.12]

3.37 product system

collection of unit processes with elementary and product flows, performing one or more defined functions, that models the life cycle of a product

[BS EN ISO 14040:2006, 3.28]

3.38 production material

primary or secondary material that is used to produce a product

***Note** Secondary material includes recycled material.*

[BS EN ISO 14040:2006, 3.15]

3.39 (GHG) removals

absorption and isolation of greenhouse gases from the atmosphere

***Note** Removals typically occur when CO_2 is absorbed by biogenic materials during photosynthesis. Removals may also occur when a product absorbs CO_2 during use.*

3.40 renewable energy

energy from non-fossil energy sources: wind, solar, geothermal, wave, tidal, hydropower, biomass, landfill gas, sewage treatment plant gas and biogases

[Adapted from Directive 2001/77/EC, Article 2 [4]]

3.41 secondary data

data obtained from sources other than direct measurement of the emissions from processes included in the life cycle of the product

Note *Secondary data are used when primary activity data are not available or it is impractical to obtain primary activity data.*

3.42 supplementary requirement

life cycle greenhouse gas emissions quantification requirements applicable to a particular product type or product sector, to enhance the application of PAS 2050

3.43 system boundary

set of criteria specifying which unit processes are part of a product system

[BS EN ISO 14040:2006, 3.32]

3.44 unit process

smallest portion of a life cycle for which data are analysed when performing a life cycle assessment

3.45 upstream emissions

GHG emissions associated with processes that occur in the life cycle of a product prior to the processes owned, operated or controlled by the organization implementing this PAS

3.46 use phase

that part of the life cycle of a product that occurs between the transfer of the product to the consumer and the point of transfer to recycling and waste disposal

Note *For services, the use phase includes the provision of the service.*

3.47 use profile

criteria against which the GHG emissions arising from the use phase are determined

3.48 useful energy

energy that meets a demand by displacing another source of energy

Note *For example, where heat production from a CHP unit is utilized to meet a demand for heat that was previously met by another form of energy, or meets a new demand for heat that would have required additional energy input, then the heat from the CHP is providing useful energy. Had the heat from the CHP not met a demand, but instead been dissipated (e.g. vented to the atmosphere), the heat would not be considered useful energy (in which case no emissions from the CHP would be assigned to the heat production).*

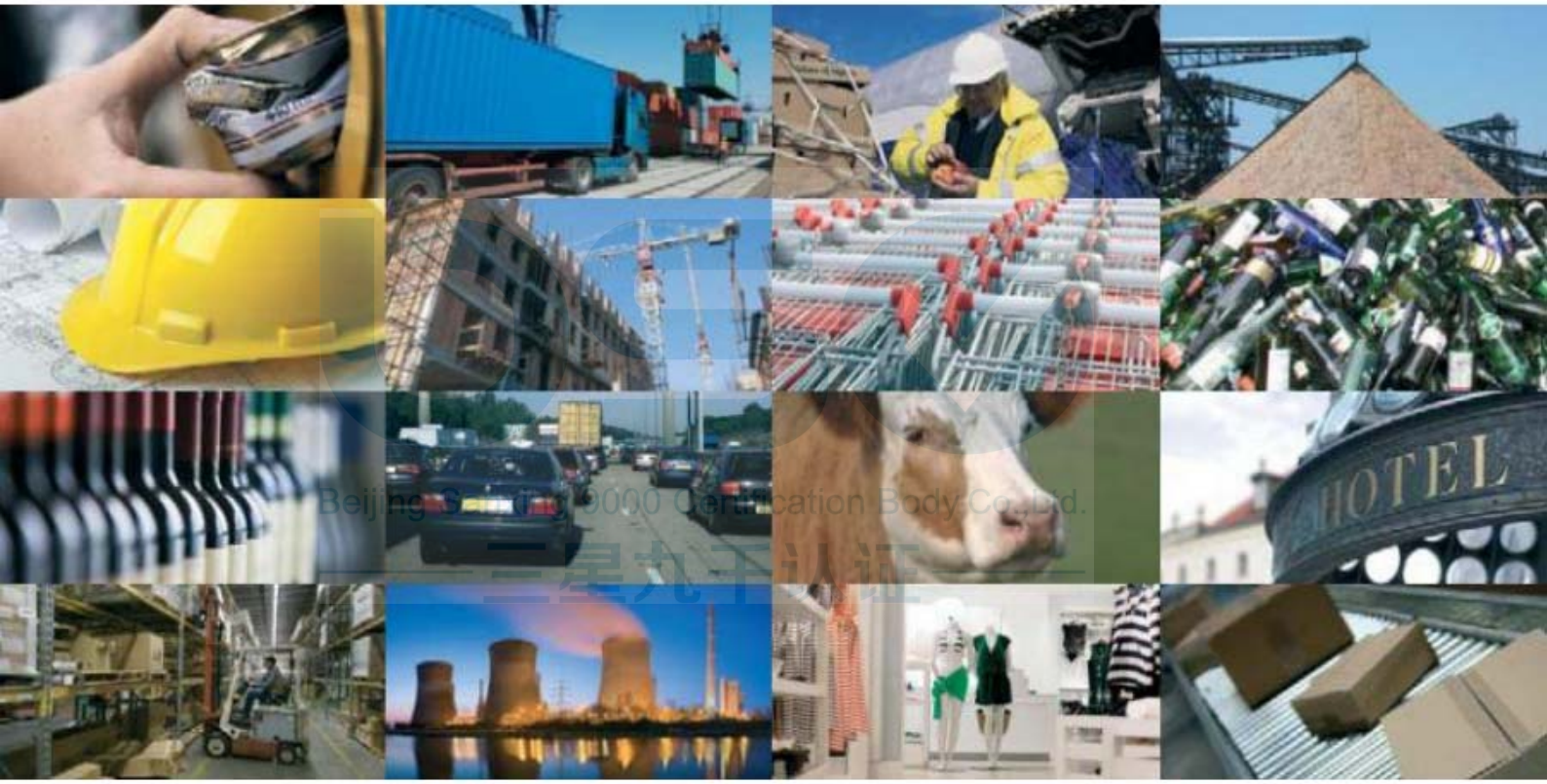
3.49 waste

materials, co-products, products or emissions that the holder discards or intends, or is required to, discard

公开的规范

PAS2050：2011

商品和服务的生命周期温室气体排放评价规范



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以下BSI参考资料与本标准的工作有关：

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出版历史

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日期	受影响的文本

内容

前言

BSI已经对本公开供应规范(PAS)进行了修订，以根据最新的技术进步和当前的经验，更新了量化商品和服务的生命周期温室气体(GHG)排放的规范。

该PAS的开发工作由以下机构共同赞助：
Defra（英国环境、食品和农村事务部）；
DECC（英国能源和气候变化部）；
BIS（英国商业、创新和技能部）。

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环境管理研究所和
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SCA包装，约翰·斯威夫特；
SJS咨询公司，桑迪·史密斯；
食品和饮料联合会的可持续发展和竞争力部，斯蒂芬·里森；
联合利华安全与环境保证中心，亨利·金；
WRAP（废物和资源行动方案），Keith詹姆斯；
Defra的技术顾问：博士。多萝西·麦克斯韦尔，
全球景观可持续发展服务有限公司。

BSI还征求了其他各方的意见。感谢在本PAS开发过程中咨询的所有组织和个人的专家贡献。

超级会话

本公开提供的规范将取代已撤回的PAS2050：2008。

本文档的使用

在编制本PAS时，已假定其规定的执行将委托给适当的合格和有经验的人，并供其使用。

本PAS不被视为英国标准、欧洲标准或国际标准。如果本PAS被提出作为一个完整的英国标准、欧洲标准或国际标准的基础，它将被撤回。

介绍性约定

本PAS的规定在罗马提出
（i．e.直立）类型。它的要求以主辅动词为“应动词”的句子来表示。它的建议用主要辅动词是“应该”的句子来表达。

评论、解释及一般资料资料(e。g.注释)以斜体字表示，并不构成规范元素。

合同和法律考虑

本出版物并不声称包括合同的所有必要条款。用户要对其正确的应用程序负责。

遵守本PAS本身并不赋予人们对法律义务的豁免权。

0介绍

0.1一般信息

气候变化仍然是国家、政府、企业和公民面临的最大挑战之一，并将影响未来几十年我们的生活和工作方式(IPCC2007[1])。过去和现在的行动，包括释放二氧化碳(CO_2)和其他通过人类活动产生的温室气体，如燃烧化石燃料、化学过程的排放和其他人为温室气体来源，将对未来的全球气候产生影响。

虽然温室气体(GHG)的排放通常被视为全球、国家、企业或组织层面，但这些群体内的排放可能来自企业内部、企业之间和国家之间的供应链。与商品和服务相关的温室气体排放反映了在这些商品和服务的整个生命周期中发生的过程、材料和决策的影响。

PAS2050是为了响应广泛的社区和行业对评估商品和服务的生命周期温室气体排放的一致方法的愿望而开发的。生命周期温室气体排放是指在创造、修改、运输、储存、使用、提供、回收或处置此类商品和服务的过程中释放的排放。

PAS2050为各组织提供了一种方法，以更好地了解其供应链产生的温室气体排放，但PAS的主要目标是为温室气体排放量化提供共同基础，为有意义的温室气体减排计划提供信息并使之成为可能。

在其使用的头两年中，该PAS已被证明一般适用于广泛的商品和服务，因此其本身并不提供对特定产品部门的特殊处理。但是，人们认识到，提供补充要求可通过提供以下服务，帮助将PAS持续应用于特定产品部门内的产品：

a)是允许进行PAS2050评估的各个方面的部门或产品小组重点；

与特定部门或产品组的主要排放源直接相关的b)规则或计算要求；

c)明确了如何应用PAS的特定元素2050年在一个特定的部门或产品组内进行的评估。

为了促进这一点，这个新版本的PAS2050包括一套原则（见4.3），用于开发将PAS2050应用于特定产品类型的补充要求。这些原则旨在确保这些补充要求与本PAS的要求不相冲突。

虽然本规范中没有对通信技术的要求或标准化，但本PAS支持以以后可以披露的方式对商品和服务的生命周期温室气体排放的评估。因此，我们非常强调要正确地记录过程和结果。如果实施本PAS的组织选择披露温室气体排放评估的全部或部分结果，则也应提供所有相关的支持信息。

如果通信是针对消费者的，用户应参考关于环境索赔的附加规格或进一步的指导(e。g. ISO14021[1]或英国环境部食品和农村事务部绿色索赔指导[7][2]).

使用PAS2050来量化商品和服务的温室气体排放的生命周期，有助于在考虑减少产品和服务的排放时的知情决策。

这个PAS关注于一个单一的环境问题(i。e.温室气体排放及其对气候变化的贡献)，但这只是来自特定商品或服务的一系列可能的环境影响之一。
这些影响的相对重要性可能因产品而异，而且，重要的是要知道，基于“单一问题”评估作出的决定可能对提供和使用同一产品可能产生的其他环境影响有害。

1) http://www.iso.组织/iso/catalogue_detail吗？csnumber=23146

2) http://www.defra。gov.uk/publications/2011/06/03/pb13453green-claims-guidance/

0.2背景、利益和背景的PAS2050

PAS2050建立在通过BSENISO14040和BSENISO14044建立的现有生命周期评估方法的基础上，专门提出了关于评估商品和服务生命周期内的温室气体排放的要求。这些要求进一步澄清了与评估商品和服务的温室气体排放有关的这些标准的执行情况，并确定了具体的原则和技术，包括：

a)从摇篮到门和从摇篮到坟墓的温室气体排放评估数据，作为商品和服务生命周期温室气体排放评估的一部分；

b)温室气体范围（见5.1）；

全球变暖潜力(GWP)数据的c)标准（见5.3）；

d)处理土地利用变化和生物碳源和化石碳源的排放和去除；

对产品中碳储存和抵消的影响的e)处理；

关于处理由特定工艺产生的温室气体排放的f)要求；

g)的数据要求和对可再生能源发电产生的排放量的核算。

该PAS提供了一种清晰和一致的方法来评估与商品和服务相关的生命周期温室气体排放，从而使组织、企业和其他利益相关者受益。具体来说，该PAS提供了以下好处：

a)对于提供商品和服务的组织，此PAS：

允许对商品和服务的现有生命周期温室气体排放进行内部评估；

根据与产品相关的生命周期温室气体排放，便于评估替代产品配置、采购和制造方法、原材料选择和供应商选择，并作为服务比较的基础；

为旨在减少温室气体排放的方案提供一个基准；

允许使用一种通用的、公认的和标准化的生命周期温室气体排放评估方法，对商品或服务中的温室气体排放进行量化、管理和潜在的比较；和

SUB支持报告(e。g.公司责任）。

b)为商品和服务的消费者，该PAS为理解在作出购买决定和使用商品和服务时对生命周期温室气体排放的评估提供了一个共同的基础。

1范围

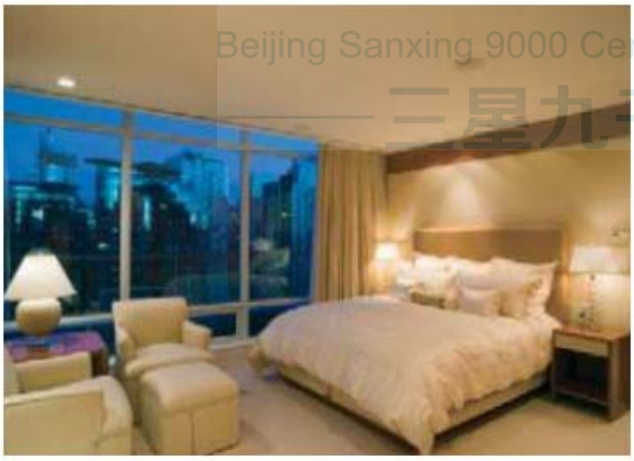
本公开供应规范(PAS)规定了基于关键生命周期评估技术和原则对商品和服务（统称为“产品”）的生命周期温室气体排放进行评估的要求。该PAS适用于评估产品整个生命周期内温室气体排放的组织，以及评估产品从摇篮到门的温室气体排放的组织。

规定了确定系统边界、与系统边界内产品相关的温室气体排放来源、进行分析的数据要求以及结果计算的要求。

这个PAS解决了全球变暖的单一影响类别。它不评估因提供产品而产生的其他潜在的社会、经济和环境影响或问题，或与产品生命周期相关的问题，如非温室气体排放、酸化、富营养化、毒性、生物多样性或劳动标准。使用本PAS计算的产品的生命周期温室气体排放量，并不能提供这些产品的总体环境影响的指标，如其他类型的生命周期评估可能产生的指标。

PAS2050一般适用于广泛的商品和服务。然而，该修订包括准备和使用补充要求的原则，以为特定行业或产品类别提供一个集中的方法，从而有助于PAS2050在特定行业或产品类别内的一致应用。

本PAS没有规定披露或传达商品和服务生命周期温室气体排放的量化结果的要求。



2规范性引用文件

以下所引用的文件对于本文件的应用是必不可少的。对于有日期的参考文献，只适用被引用的版本。对于未注明日期的参考文件，适用参考文件的最新版本（包括任何修订）。

BSENISO14021，环境标签和声明-自声明的环境声明（II类环境标签）

BSENISO14044：2006，环境管理-生命周期评估-要求和指南

IPCC2006年，《国家温室气体清单指南》。国家温室气体储存方案，政府间气候变化专门委员会
注：IPCC2006年的后续修订也适用。

IPCC2007，气候变化2007：物理科学基础。第一工作组对政府间气候变化专门委员会第四次评估报告的贡献[所罗门S、秦D、曼宁M、陈Z、侯爵M、艾弗里KB、TignorM、米勒HL（编辑）]。英国剑桥出版社：剑桥大学出版社，第996页。
注：IPCC2007年的后续修订也适用。

3术语和定义

对于本PAS的目的，适用以下术语和定义。

3.1分配

在正在研究的产品系统和一个或多个其他产品系统之间划分共享过程或产品系统的输入或排放

3.2预期生命周期内的温室气体排放量

使用二次数据（3.41）或初级活动数据（3.34）和二次数据组合计算的产品（3.35）的温室气体（3.39）排放的初始估计

3.3生物原性

来自生物量，但不是来自化石或化石来源

3.4生物碳

生物质中所含的碳

注意：为了根据本PAS进行计算，从空气转化为非生物质碳酸盐被计算为生物碳。

3.5生物质

生物来源的材料，不包括地质构造或转化为化石的材料

[改编自CEN/TR14980：2004,4.3]

3.6资本性商品

在产品的生命周期中使用的货物，如机械、设备和建筑物

3.7二氧化碳当量(CO_2e)

用于比较a的辐射强迫的单位
温室气体变成二氧化碳

[bsISO14064-1：2006,2.19]

注1：术语二氧化碳(CO_2)不应与二氧化碳当量(CO)相混淆2e).

注2CO_2E的计算方法是将一个给定的温室气体的质量乘以它的全球变暖潜力（关于全球变暖潜力的定义，见3）。

.23

注3：除一氧化碳以外的温室气体，都被转化为它们的CO_2e根据政府间气候变化专门委员会(IPCC)定义的100年全球变暖潜力造成的单位辐射强迫。

3.8碳储存

保留来自生物或化石来源或大气来源的碳

3.9热电组合式(CHP)

在一个过程中同时产生可用的热能、电能和/或机械能

3.10消耗品

过程发生所必需的辅助输入，但不构成过程中产品或副产品的有形部分

注1耗材与资本品的不同之处在于，其预期寿命为一年或更少，或需要补充一年或更少(e。g.润滑油、工具和其他快速磨损的输入过程)。

注2：产品生命周期中的燃料和能量输入不被视为消耗品。

.113个消费者

商品或服务的使用者

3.12副产品

来自同一单元工艺或产品系统的两种或两种以上产品

[bsenISO14044：2006,3.10]

注意：当一个单元工艺可以生产两种或两种以上的产品时，只有当其中一种不能不生产时，它们才被视为副产品。

3.13从摇篮到门

生命周期阶段，从提取或获取原材料到产品离开组织进行评估的点

3.14从摇篮到坟墓

生命周期阶段，从原材料的提取或获取，再到废物的回收和处理

.153数据质量

与它们的处理能力相关的数据的特征
满足规定的要求

[BS EN ISO14044:2006, 3.19]

3.16下游排放

与实施本PAS的组织所拥有或运营的过程之后的产品生命周期中发生的过程相关的温室气体排放

.173经济价值

产品、副产品或废物的市场价值（废物的定义见3.49）

3.18排放系数

温室气体的排放量，用CO表示$_2$e（3.7）和相对于一个活动单位

注意例如，kgCO_2e单位输入。排放因子数据将从次要数据源中获得。

3.19（温室气体）排放

释放到空气中，并排放到水和陆地上，导致温室气体进入大气中

3.20食品和饲料

拟供人或动物食用的固体或液体形式的物质

3.21化石碳

化石材料中含有的碳

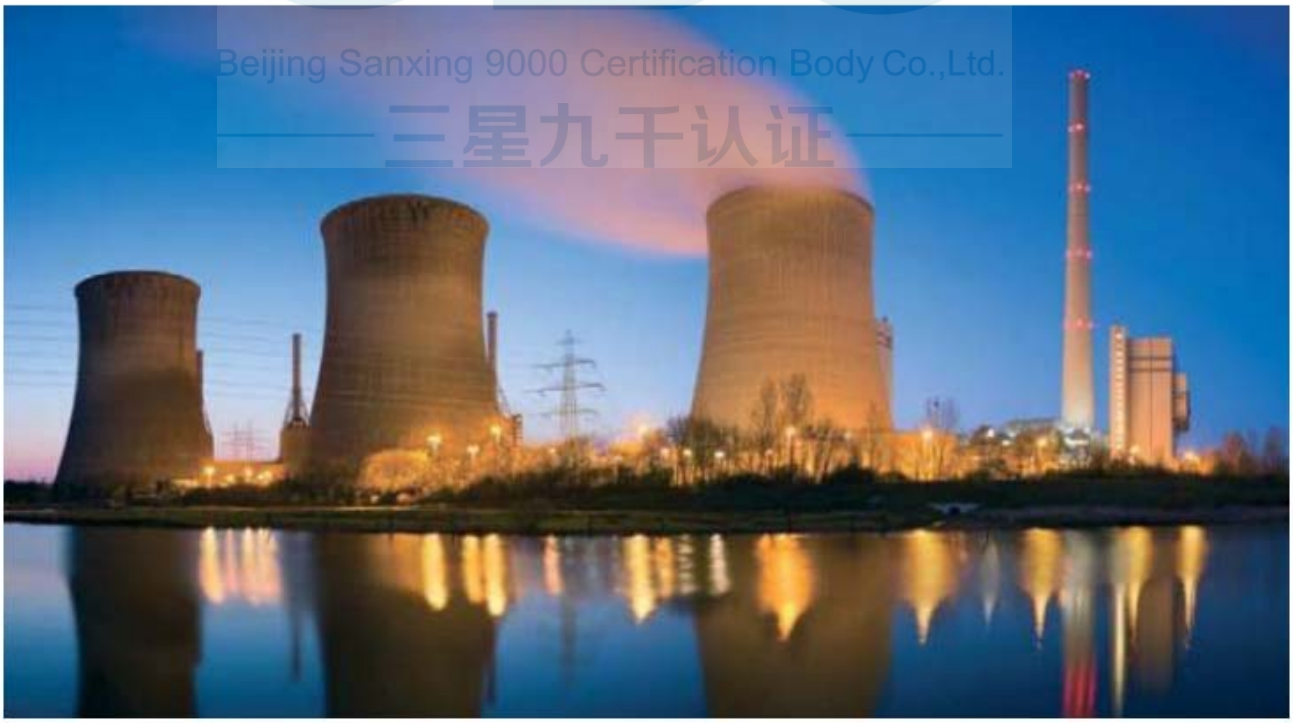
注：化石材料的例子有煤、石油和天然气。对于PAS，泥炭也将被处理为化石材料。

3.22功能单元

作为参考单元使用的产品系统的量化性能

[bsenISO14044：2006,3.20]

注：对于温室气体排放评估的目的，功能单位可以是一个单项的产品或一个普遍接受的销售数量(e。g.1朵玫瑰或112朵玫瑰)。



3.23全球变暖潜力(GWP)

描述给定温室气体的一个质量单位相对于等效单位CO的辐射强迫影响的因子$_2$在给定的时间内

[bsISO14064-1：2006,2.18]

***注意CO$_2$**的GWP为1，而其他气体的GWP相对于CO的GWP表示$_2$.*
附件A载有由政府间气候变化专门委员会(IPCC)产生的100年期间的全球变暖潜力。

3.24温室气体（温室气体）

大气中的气态成分，包括自然的和人为的，在地球表面、大气和云发出的红外辐射光谱中吸收和发射特定波长的辐射

注意：本PAS中包含的温室气体是在附件A。

3.25输入

进入一个单元工艺的产品、材料或能量流

[bsenISO14040：2006,3.21]

3.26中间产品

单元进程的输出是对系统内部进一步转换的其他单元进程的输入

3.27土地利用变化

对人类使用土地的目的的改变(e。g.在农田、草地、林地、湿地、工业用地之间)

注1被评估产品生产地点土地使用的变更称为直接土地使用变更。

注2其他地方土地使用的变化称为间接土地使用变化。

3.28生命周期

一个产品系统的连续或相互关联的阶段，从原材料的获取或自然资源的生成到生命的结束，包括任何回收或回收活动

[改编自BSENISO14040：2006,3.1]

3.29生命周期评估(LCA)

编制和评估一个产品系统在其整个生命周期内的输入、输出和潜在的环境影响

[bsenISO14040：2006,3.2]

3.30生命周期的温室气体排放

由产品生命周期的所有阶段和在产品指定的系统边界内产生的温室气体排放的总和

注意：这包括在产品生命周期范围内与过程相关的所有排放和清除，包括产品的获取、创建、修改、运输、存储、操作、使用和寿命结束处置。为了避免不适当的重复，文中并不总是提到删除，但评估应包括删除发生的地方。

3.31重大贡献

任何一个温室气体排放来源的贡献都超过了与被评估产品相关的预期温室气体排放总量的1%

注意：已经确定了1%的物质阈值，以确保生命周期中非常小的温室气体排放源不需要与更重要的来源相同的处理。

3.32补偿

通过在与被评估产品的生命周期无关的过程中消除或防止释放温室气体排放，声称减少与一个过程或产品相关的温室气体排放的机制

注：根据《京都议定书》[3]购买清洁发展机制项目产生的认证减排。

3.33输出

离开一个单位工艺的产品、生产材料或能源

[改编自BSENISO14044：2006,3.25]

注意：生产材料可能包括原材料、中间产品、副产品、产品和排放物。

3.34主要活动数据

对产品生命周期中活性的定量测量，再乘以适当的排放因子，就可以确定一个过程中产生的温室气体排放

注1主要活动数据的例子包括使用的能源量、生产的材料、提供的服务或受影响的土地面积。

注2主要活动数据源通常优于次要数据源，因为这些数据将反映过程的具体性质/效率以及与过程相关的温室气体排放。

注3主要活动数据不包括排放因子。

.353产品

良好或服务

票据服务有有形的和无形的元素。例如，提供的服务可能包括以下内容：

a)在消费者提供的有形产品上进行的活动。g.需要修理的汽车）；

b)是对消费者提供的无形产品进行的活动。g.准备纳税申报单所需的损益表)；

c)是一种无形产品的交付。g.在知识传播的背景下提供信息)；

d)是为消费者创造的氛围(e。g.在酒店和餐馆)；

e)软件，它由信息组成，通常是无形的，可以以方法、交易或程序的形式存在。

[改编自BSISO14040：2006,3.9]

3.36产品类别

能够实现同等功能的产品组[BSISO14025：2006,3.12]

3.37产品体系

收集具有基本流和产品流的单元流程，执行一个或多个已定义的功能，从而为产品的生命周期建模

[bsenISO14040：2006,3.28]

3.38生产材料

用于生产产品的初级或二级材料

注意：次要材料包括可回收材料。

[bsenISO14040：2006,3.15]

.393(GHG)移除

从大气中吸收和隔离温室气体

注意：清除通常发生在CO_2在光合作用过程中被生物源物质吸收。当产品吸收CO时，也可能发生清除$_2$在使用。

3.40可再生能源

来自非化石能源的能源：风能、太阳能、地热、波浪、潮汐、水电、生物质、垃圾填埋气体、污水处理厂气体和生物气体

[改编自指令2001/77/EC，第2条[4]]

3.41次级数据

从产品生命周期中包含的工艺排放以外的来源获得的数据

注意S?)onpeJ (pe斗e eJ?ns?p wV?n dJ!meJ (e)斗!v!斗(pe斗e eJ?no斗 eve!leql?oJ !斗 !s !mdJe)斗!)el 斗o oq斗e!n dJ!meJ (e)斗!v!斗(pe斗e.

3.42补充要求

适用于特定产品类型或产品部门的生命周期温室气体排放量化要求，以加强PAS2050的应用

3.43系统边界

指定哪个单元流程是产品系统的一部分的标准集

[bsenISO14040：2006,3.32]

3.44单位工艺

在执行生命周期评估时，所分析数据的生命周期的最小部分

3.45上游排放

与所发生的过程相关的温室气体排放
在产品的生命周期中
由本组织拥有、经营或控制的
实现这个PAS

3.46使用阶段

从产品向消费者转移到转移到再回收和废物处理之间发生的产品生命周期的一部分

注意“oJs? 颈静脉s, 斗V?ns?dVes?!n)1np?s 斗V?dJov!s!on o} 斗V?s?颈静脉.

3.47使用概况

确定在使用阶段产生的温室气体排放的标准

3.48有用能量

通过取代另一种能源来满足一种需求的能源
能源

注意“oJ? xemdl? ，wV吗? J? V?e斗 dJopn)斗!on }Jom e DHd nn!斗 !s n斗!1!z?p 斗o m??斗 e p?menp }oJ V?e斗斗Ve斗 wes dJ?v!ons1 (m?斗 q (eno斗V?J }oJm o} ?n?J6(, oJ m??斗s e n?w p?menp }oJ V?e斗 斗Ve斗 wonlp Vev?J? bn! J?p epp!斗!onel ?n?J6(!ndn斗, 斗V?n 斗V?V?e斗 }Jom 斗V?DHd !s dJov!p!n6 ns?}n1 ?n?J6(.Hep 斗V?V?e斗 }Jom 斗V?DHd no斗 m?斗 e p?menp, qn斗 !ns斗?ep q??n p!ss!de斗?p)?.6.v?n斗?p 斗o 斗V?e斗mosdV?J?(, 斗V?V?e斗 wonlp no斗 q?)ons!p?J?p ns?}n1 ?n?J6( )!n wV!)V)es?不是吗? m! ss! Jom斗V?DHd wonlp q?ess!6n?p 斗o 斗V?V?e斗 dJopn)斗!on (.

3.49个废物

持有人丢弃或打算丢弃或被要求丢弃的材料、副产品、产品或排放物

4原则及实施

4.1一般要求

应使用LCA技术对产品的温室气体排放量进行评估（见注）。除非另有说明，对产品的生命周期温室气体排放量的评估应采用归因方法，i。e.通过描述由于交付特定数量的产品功能单元所产生的输入及其相关排放。

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4.2原则

声称评估符合本PAS的组织应确保对产品的生命周期温室气体排放的评估是完整的，并仅适用于所进行评估的产品。他们应能够证明在进行评估时已经遵守了以下原则：

a)相关性：已经选择了适用于评估特定产品产生的温室气体排放的温室气体排放和去除数据和方法。

b)完整性：在系统内产生的所有产品生命周期的温室气体排放和清除，以及对评估该产品产生的温室气体排放提供实质性贡献的特定产品的时间边界，都已包括在内。

c)一致性：假设、方法和数据在整个量化过程中以相同的方式应用，并支持可重复的、可比的结果。

d)的准确性：偏差和不确定性已经尽可能地减少了。

e)透明度：根据本PAS进行的生命周期温室气体排放评估结果将向第三方披露，即温室气体

提供与排放有关的信息，足以支持信息披露，并允许该第三方有信心地作出相关决定。

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4.3补充要求

本修订版PAS2050的规定，因为它们的使用可以加强PAS2050在某些产品部门或类别中的应用。在有补充要求并符合补充要求的地方

根据本条款的原则a)至i)，这些要求应用于支持将PAS2050应用于为其开发的产品部门或类别。

支持PAS2050所使用的补充要求应如下：

a)补充：本PAS中具体规定的补充和不冲突的要求和相关指导；

b)得到广泛认可：在国际、国家、行业或部门范围内：

c)的包容性和基于共识：通过一个对利益相关者开放的透明过程进行开发；

d)的范围适当：具有直接适用于特定利益相关者基础的范围和要求；

e)协调：在考虑了相关的现有产品部门或类别规则、指导或要求后，通过采用、引用或建立这些规则来开发。有正当理由不被采纳的，应当在补充要求中明确说明其理由。

f)综合性：通过包含PAS2050允许的具体要求来解决相关产品生命周期的所有阶段；

g)证明：通过纳入确定和解释PAS2050中提供的评估方法的补充内容的理由，并确认本条款的a)至h)中规定的原则如何得到满足；

h)公开可用：无使用限制和在公共领域；

i)维护：确保随时间推移的有效性。

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如需要获取全文

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