
**Greenhouse gases — Carbon footprint
of products — Requirements and
guidelines for quantification**

*Gaz à effet de serre — Empreinte carbone des produits — Exigences
et lignes directrices pour la quantification*



Beijing Sanxing 9000 Certification Body Co., Ltd.

—— 三星九千认证 ——



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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 207, *Environmental management*, Subcommittee SC 7, *Greenhouse gas management and related activities*.

This first edition cancels and replaces ISO/TS 14067:2013, which has been technically revised. It constitutes a reduction in scope as follows:

- principles, requirements and guidance on communication of the carbon footprint of a product (CFP) and the partial CFP are now covered in ISO 14026;
- principles, requirements and guidance on verification are now covered in ISO 14064-3;
- principles, requirements and guidance on PCR are now covered in ISO/TS 14027;
- requirements for the treatment of biogenic carbon and electricity have been revised and clarified;
- the definitions have been aligned within the ISO 14064 series for ease of interpretation.

This document is the generic standard for the quantification of the carbon footprint of products.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

Climate change arising from anthropogenic activity has been identified as one of the greatest challenges facing the world and will continue to affect business and citizens over future decades.

Climate change has implications for both human and natural systems and could lead to significant impacts on resource availability, economic activity and human wellbeing. In response, international, regional, national and local initiatives are being developed and implemented by public and private sectors to mitigate greenhouse gas (GHG) concentrations in the Earth's atmosphere as well as to facilitate adaptation to climate change.

There is a need for an effective and progressive response to the urgent threat of climate change on the basis of the best available scientific knowledge. ISO produces documents that support the transformation of scientific knowledge into tools that will help address climate change.

GHG initiatives on mitigation rely on the quantification, monitoring, reporting and verification of GHG emissions and/or removals.

The ISO 14060 family provides clarity and consistency for quantifying, monitoring, reporting and validating or verifying GHG emissions and removals to support sustainable development through a low-carbon economy. It also benefits organizations, project proponents and stakeholders worldwide by providing clarity and consistency on quantifying, monitoring, reporting, and validating or verifying GHG emissions and removals. Specifically, the use of the ISO 14060 family:

- enhances the environmental integrity of GHG quantification;
- enhances the credibility, consistency, and transparency of GHG quantification, monitoring, reporting, validation and verification;
- facilitates the development and implementation of GHG management strategies and plans;
- facilitates the development and implementation of mitigation actions through emission reductions or removal enhancements;
- facilitates the ability to track performance and progress in the reduction of GHG emissions and/or increase in GHG removals.

Applications of the ISO 14060 family include:

- corporate decisions, such as identifying GHG emission reduction opportunities and increasing profitability by reducing energy consumption;
- carbon risk management, such as the identification and management of risks and opportunities;
- voluntary initiatives, such as participation in voluntary GHG registries or sustainability reporting initiatives;
- GHG markets, such as the buying and selling of GHG allowances or credits;
- regulatory/government GHG programmes, such as credit for early action, agreements or national and local reporting initiatives.

ISO 14064-1 details principles and requirements for designing, developing, managing and reporting organization-level GHG inventories.

It includes requirements for determining GHG emission and removal boundaries, quantifying an organization's GHG emissions and removals, and identifying specific company actions or activities aimed at improving GHG management.

It also includes requirements and guidance on inventory quality management, reporting, internal auditing and the organization's responsibilities in verification activities.

ISO 14064-2 details principles and requirements for determining baselines and for the monitoring, quantifying and reporting of project emissions. It focuses on GHG projects or project-based activities specifically designed to reduce GHG emissions and/or enhance GHG removals. It provides the basis for GHG projects to be validated and verified.

ISO 14064-3 details requirements for verifying GHG statements related to GHG inventories, GHG projects, and carbon footprints of products. It describes the process for validation or verification, including validation or verification planning, assessment procedures, and the evaluation of organizational, project and product GHG statements.

ISO 14065 defines requirements for bodies that validate and verify GHG statements. Its requirements cover impartiality, competence, communication, validation and verification processes, appeals, complaints, and the management system of validation and verification bodies. It can be used as a basis for accreditation and other forms of recognition in relation to the impartiality, competence, and consistency of validation and verification bodies.

ISO 14066 specifies competence requirements for validation teams and verification teams. It includes principles and specifies competence requirements based on the tasks that validation teams or verification teams must be able to perform.

This document defines the principles, requirements and guidelines for the quantification of the carbon footprint of products. The aim of this document is to quantify GHG emissions associated with the life cycle stages of a product, beginning with resource extraction and raw material sourcing and extending through the production, use and end-of-life stages of the product.

ISO/TR 14069 assists users in the application of ISO 14064-1, providing guidelines and examples for improving transparency in the quantification of emissions and their reporting. It does not provide additional guidance to ISO 14064-1.

[Figure 1](#) illustrates the relationship among the ISO 14060 family of GHG standards.

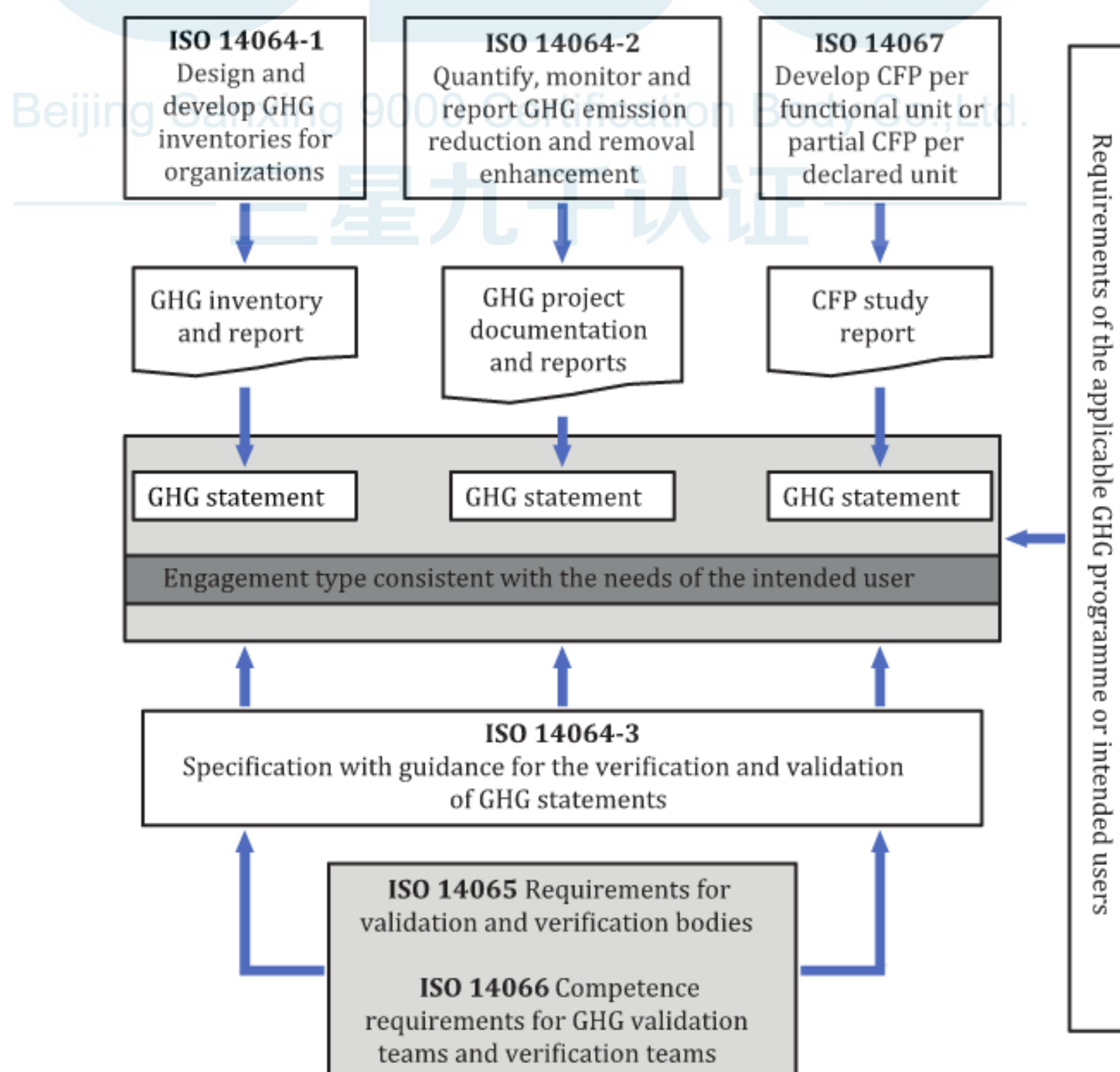


Figure 1 — Relationship among the ISO 14060 family of GHG standards

NOTE In this document, GHG statements are the CFP or the partial CFP.

GHGs can be emitted and removed throughout the life cycle of a product which includes acquisition of raw material, design, production, transportation/delivery, use and the end-of-life treatment. Quantification of the carbon footprint of a product (CFP) will assist in the understanding and action to increase GHG removals and reduce GHG emissions throughout the life cycle of a product. This document details principles, requirements and guidelines for the quantification of CFPs, i.e. goods and services, based on GHG emissions and removals over their life cycle. Requirements and guidelines for the quantification of a partial CFP are also provided. Communication related to the CFP or the partial CFP is covered in ISO 14026. The development of product category rules (PCR) is covered in ISO/TS 14027.

This document is based on principles, requirements and guidelines identified in existing International Standards on life cycle assessment (LCA), ISO 14040 and ISO 14044, and aims to set specific requirements for the quantification of a CFP and a partial CFP.

This document is expected to benefit organizations, governments, industry, service providers, communities and other interested parties by providing clarity and consistency in quantifying CFPs. Specifically, using LCA in accordance with this document, with climate change as the single impact category, can offer benefits through:

- avoiding burden-shifting from one stage of a product life cycle to another or between product life cycles;
- providing requirements for the quantification of the CFP;
- facilitating CFP performance tracking in reducing GHG emissions;
- providing a better understanding of the CFP such that potential opportunities for increases in GHG removals and reductions of GHG emissions might be identified;
- helping to promote a sustainable low carbon economy;
- enhancing the credibility, consistency and transparency of the quantification and reporting of the CFP;
- facilitating the evaluation of alternative product design and sourcing options, production and manufacturing methods, raw material choices, transportation, recycling and other end-of-life processes;
- facilitating the development and implementation of GHG management strategies and plans across product life cycles, as well as the detection of additional efficiencies in the supply chain;
- preparing reliable CFP information.

NOTE In respect to the terminology of ISO 14026 regarding footprint communication, climate change is considered as an example of an “area of concern”.

[Figure 2](#) illustrates the connection between this document and standards outside the GHG management family of standards.

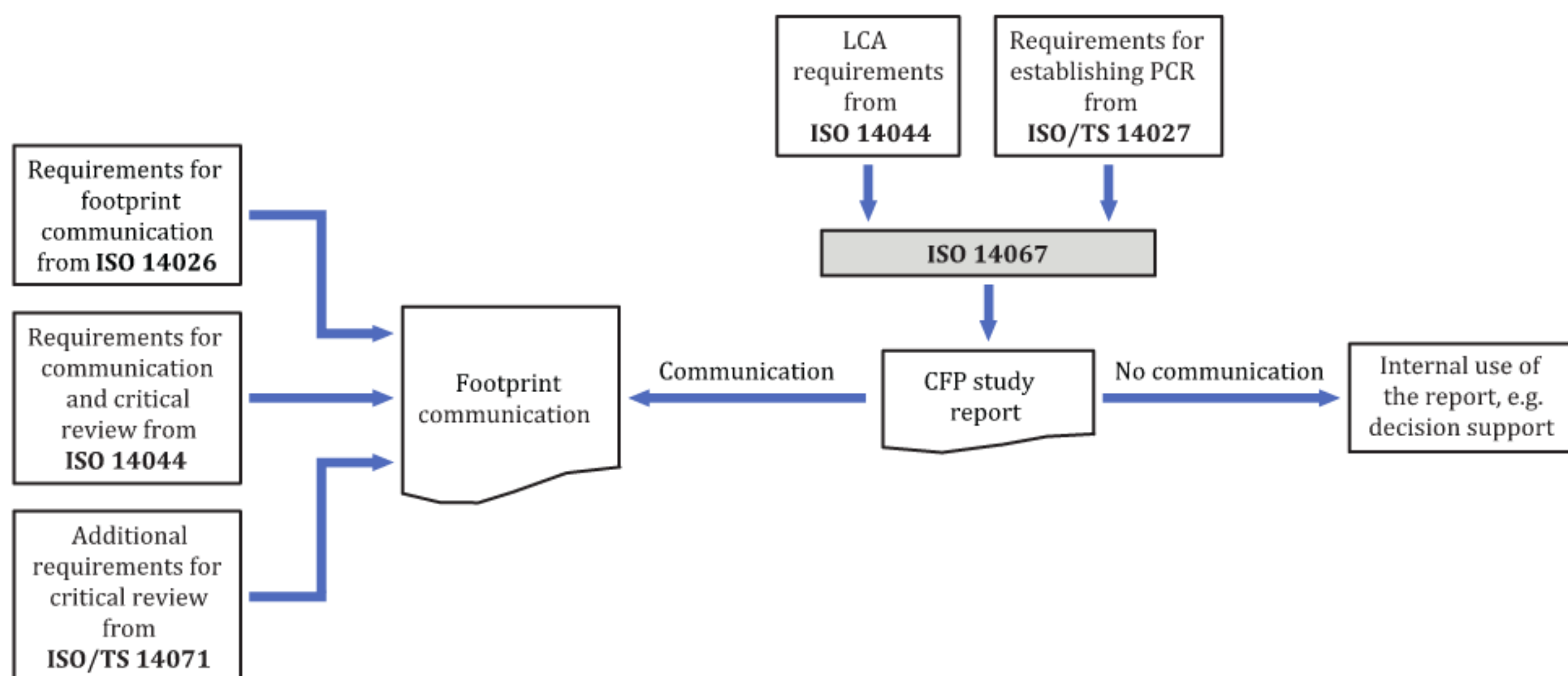


Figure 2 — Relationship between this document and standards beyond the GHG management family of standards

CFPs prepared in accordance with this document contribute to the objectives of GHG-related policies and/or regimes.

Limitations of CFPs based on this document are described in [Annex A](#).

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Greenhouse gases — Carbon footprint of products — Requirements and guidelines for quantification

1 Scope

This document specifies principles, requirements and guidelines for the quantification and reporting of the carbon footprint of a product (CFP), in a manner consistent with International Standards on life cycle assessment (LCA) (ISO 14040 and ISO 14044).

Requirements and guidelines for the quantification of a partial CFP are also specified.

This document is applicable to CFP studies, the results of which provide the basis for different applications (see [Clause 4](#)).

This document addresses only a single impact category: climate change. Carbon offsetting and communication of CFP or partial CFP information are outside the scope of this document.

This document does not assess any social or economic aspects or impacts, or any other environmental aspects and related impacts potentially arising from the life cycle of a product.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

ISO/TS 14027:2017, *Environmental labels and declarations — Development of product category rules*

ISO 14044:2006, *Environmental management — Life cycle assessment — Requirements and guidelines*

ISO/TS 14071, *Environmental management — Life cycle assessment — Critical review processes and reviewer competencies: Additional requirements and guidelines to ISO 14044:2006*

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

3.1.1 Quantification of the carbon footprint of a product

3.1.1.1

carbon footprint of a product

CFP

sum of *GHG emissions* (3.1.2.5) and *GHG removals* (3.1.2.6) in a *product system* (3.1.3.2), expressed as *CO₂ equivalents* (3.1.2.2) and based on a *life cycle assessment* (3.1.4.3) using the *single impact category* (3.1.4.8) of climate change

Note 1 to entry: A CFP can be disaggregated into a set of figures identifying specific GHG emissions and removals (see Table 1). A CFP can also be disaggregated into the stages of the *life cycle* (3.1.4.2).

Note 2 to entry: The results of the quantification of the CFP are documented in the *CFP study report* (3.1.1.5) expressed in mass of CO₂e per *functional unit* (3.1.3.7).

3.1.1.2

partial carbon footprint of a product

partial CFP

sum of *GHG emissions* (3.1.2.5) and *GHG removals* (3.1.2.6) of one or more selected *process(es)* (3.1.3.5) in a *product system* (3.1.3.2), expressed as *CO₂ equivalents* (3.1.2.2) and based on the selected stages or processes within the *life cycle* (3.1.4.2)

Note 1 to entry: A partial CFP is based on or compiled from data related to (a) specific process(es) or footprint information modules, which is (are) part of a product system and can form the basis for quantification of a CFP. More detailed information on information modules is given in ISO 14025:2006, 5.4.

Note 2 to entry: "Footprint information modules" is defined in ISO 14026:2017, 3.1.4.

Note 3 to entry: The results of the quantification of the partial CFP are documented in the *CFP study report* (3.1.3.5) expressed in mass of CO₂e per *declared unit* (3.1.3.8).

3.1.1.3

carbon footprint of a product systematic approach

CFP systematic approach

set of procedures to facilitate the *quantification of the CFP* (3.1.1.6) for two or more *products* (3.1.3.1) of the same *organization* (3.1.5.1)

3.1.1.4

carbon footprint of a product study

CFP study

all activities that are necessary to quantify and report a *CFP* (3.1.1.1) or a *partial CFP* (3.1.1.2)

3.1.1.5

carbon footprint of a product study report

CFP study report

report that documents the *CFP study* (3.1.1.4), presents the *CFP* (3.1.1.1) or *partial CFP* (3.1.1.2), and shows the decisions taken within the study

Note 1 to entry: The CFP study report demonstrates that the provisions of this document are met.

3.1.1.6

quantification of the carbon footprint of a product

quantification of the CFP

activities that result in the determination of a *CFP* (3.1.1.1) or a *partial CFP* (3.1.1.2)

Note 1 to entry: Quantification of the CFP or the partial CFP is part of the *CFP study* (3.1.1.4).

3.1.1.7**carbon offsetting**

mechanism for compensating for all or a part of the *CFP* (3.1.1.1) or the *partial CFP* (3.1.1.2) through the prevention of the release of, reduction in, or removal of an amount of *GHG emissions* (3.1.2.5) in a *process* (3.1.3.5) outside the *product system* (3.1.3.2) under study

EXAMPLE Investment outside the relevant product system, e.g. in renewable energy technologies, energy efficiency measures, afforestation/reforestation.

Note 1 to entry: Carbon offsetting is not allowed in the *quantification of a CFP* (3.1.1.6) or a partial CFP, and communication of carbon offsetting is outside of the scope of this document (see 6.3.4.1).

Note 2 to entry: Footprint communication and relevant claims regarding carbon offsetting and carbon neutrality are covered in ISO 14026 and ISO 14021.

Note 3 to entry: Adapted from the definition of “offsetting” in ISO 14021:2016, 3.1.12.

3.1.1.8**product category**

group of *products* (3.1.3.1) that can fulfil equivalent functions

[SOURCE: ISO 14025:2006, 3.12]

3.1.1.9**product category rules****PCR**

set of specific rules, requirements and guidelines for developing Type III environmental declarations and footprint communications for one or more *product categories* (3.1.1.8)

Note 1 to entry: PCR include quantification rules conforming to ISO 14044.

Note 2 to entry: ISO/TS 14027 describes the development of PCR applicable to this document.

Note 3 to entry: “Footprint communication” is defined in ISO 14026:2017, 3.1.1.

[SOURCE: ISO/TS 14027:2017, 3.1, modified — Notes 1, 2 and 3 to entry have replaced the original Note 1 to entry.]

3.1.1.10**carbon footprint of a product – product category rules****CFP-PCR**

set of specific rules, requirements and guidelines for *CFP* (3.1.1.1) or *partial CFP* (3.1.1.2) quantification and communication for one or more *product categories* (3.1.1.8)

Note 1 to entry: CFP-PCR include quantification rules conforming to ISO 14044.

Note 2 to entry: ISO/TS 14027 describes the development of *PCR* (3.1.1.9) applicable to this document.

3.1.1.11**carbon footprint of a product performance tracking****CFP performance tracking**

comparing the *CFP* (3.1.1.1) or the *partial CFP* (3.1.1.2) of one specific *product* (3.1.3.1) of the same *organization* (3.1.5.1) over time

Note 1 to entry: It includes calculating the change to the CFP for one specific product, or between superseding products with the same *functional unit* (3.1.3.7) or *declared unit* (3.1.3.8) over time.

3.1.2 Greenhouse gases

3.1.2.1

greenhouse gas

GHG

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

Note 1 to entry: For a list of GHGs, see the latest IPCC Assessment Report[16].

Note 2 to entry: Water vapour and ozone, which are anthropogenic as well as natural GHGs, are not included in the *CFP* (3.1.1.1) and *partial CFP* (3.1.1.2).

Note 3 to entry: The focus of this document is limited to long-lived GHGs and it therefore excludes climate effects due to changes in surface reflectivity (albedo) and short-lived radiative forcing agents (e.g. black carbon and aerosols).

[SOURCE: ISO 14064-1:2006, 2.1, modified — Notes 1, 2 and 3 to entry have replaced the original Note 1 to entry, which listed examples of GHGs.]

3.1.2.2

carbon dioxide equivalent

CO₂ equivalent

CO₂e

unit for comparing the radiative forcing of a *GHG* (3.1.2.1) to that of carbon dioxide

Note 1 to entry: Mass of a GHG is converted into CO₂ equivalents by multiplying the mass of the GHG by the corresponding *GWP* (3.1.2.4) or *GTP* (3.1.2.3) of that gas.

Note 2 to entry: In the case of GTP, CO₂ equivalent is the unit for comparing the change in global mean surface temperature caused by a GHG to the temperature change caused by CO₂.

[SOURCE: ISO 14064-1:2006, 2.19, modified — An additional preferred term has been included, Note 1 to entry has been reworded to provide clarification, and Note 2 has been replaced with a new Note 2 to entry.]

3.1.2.3

global temperature change potential

GTP

index measuring the change in global mean surface temperature at a chosen point in time in response to a *GHG* (3.1.2.1) emission pulse, relative to the change in temperature attributed to carbon dioxide (CO₂)

Note 1 to entry: "Index" as used this document is a "characterization factor" as defined in ISO 14040:2006, 3.37.

Note 2 to entry: The GTP is based on temperature change for a selected year.

Note 3 to entry: Derived from the Working Group 1 IPCC Fifth Assessment Report (AR5), Climate Change 2013: The Physical Science Basis.

[SOURCE: IPCC (2013)[16].]

3.1.2.4

global warming potential

GWP

index, based on radiative properties of *GHGs* (3.1.2.1), measuring the radiative forcing following a pulse emission of a unit mass of a given GHG in the present-day atmosphere integrated over a chosen time horizon, relative to that of carbon dioxide (CO₂)

Note 1 to entry: "Index" as used in this document is a "characterization factor" as defined in ISO 14040:2006, 3.37.

Note 2 to entry: A "pulse emission" is an emission at one point in time.

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温室气体—产品碳足迹—量化要求和指南



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前言

国际标准化组织（ISO）是由各国标准化机构（ISO 成员机构）组成的一个世界联合会。编制国际标准的工作通常由 ISO 技术委员会进行。已针对每个主题设立了一个技术委员会，凡对某一主题感兴趣的任何成员机构均有权派代表参加委员会。与 ISO 保持联系的政府间和非政府间国际组织也参加这方面的工作。ISO 就有关电工标准化的所有事宜与国际电工委员会（IEC）保持着密切的合作关系。

ISO/IEC 指令第 1 部分描述了用于编制本文件和用于进一步维护的程序。特别是，应注意不同类型的 ISO 文件所需的不同批准标准。本文件根据 ISO/IEC 指令第 2 部分的编辑规则起草（见 www.iso.org/directives）。

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本文件由技术委员会 ISO/TC 207、环境管理、小组委员会 SC 7、温室气体管理和相关活动编制。

本第一版取消并取代了 ISO/TS 14067:2013，该标准经过了技术修订。它构成范围的缩减，如下所示：

- 有关产品碳足迹（CFP）和部分 CFP 通信的原则、要求和指南，见 ISO 14026；
- 有关验证的原则、要求和指南见 ISO 14064-3；
- 有关 PCR 的原则、要求和指南见 ISO/TS 14027；
- 对生物炭和电处理的要求进行了修订和澄清；
- 为了便于解释，已在 ISO 14064 系列中对定义进行了调整。

本文件是产品碳足迹量化的通用标准。有关本文件的任何反馈或问题都应提交给用户的国家标准机构。这些机构的完整列表可以在 www.iso.org/members.html 上找到。

引言

人类活动引起的气候变化已被确定为世界面临的重大挑战之一，并将在未来几十年继续影响商业和公民。

气候变化对人类和自然系统都有影响，并可能对资源可用性、经济活动和人类福祉产生重大影响。作为回应，公共和私营部门正在制定和实施国际、区域、国家和地方倡议，以减轻地球大气中温室气体（GHG）的浓度，并促进适应气候变化。

有必要在现有最佳科学知识的基础上，对气候变化的紧急威胁作出有效和渐进的应对。国际标准化组织编制的文件支持将科学知识转化为有助于应对气候变化的工具。

温室气体减排倡议依赖于温室气体排放和/或清除的量化、监测、报告和验证。

ISO 14060 系列为量化、监控、报告和验证或核实温室气体排放和清除提供清晰和一致性的叙述方式，以通过低碳经济支持可持续发展。它还通过在量化、监测、报告和验证或验证方面提供清晰和一致性的叙述方式，为全世界的组织、项目支持者和利益相关者带来好处。具体来说，使用 ISO 14060 系列：

- 提高温室气体量化的环境完整性；
- 提高温室气体量化、监测、报告、验证和验证的可信度、一致性和透明度；
- 促进温室气体管理战略和计划的制定和实施；
- 通过减少排放或提高排放，促进缓解措施的制定和实施；
- 有助于跟踪温室气体排放量减少和/或温室气体清除量增加方面的绩效和进展。

ISO 14060 系列的应用包括：

- 企业决策，例如确定温室气体减排机会，通过减少能源消耗提高盈利能力；
- 碳风险管理，如风险和机遇的识别和管理；
- 自愿倡议，例如参与自愿温室气体登记或可持续性报告倡议；
- 温室气体市场，如购买和出售温室气体津贴或信贷；
- 监管/政府温室气体计划，如早期行动信贷、协议或国家和地方报告倡议。

ISO 14064-1 详细说明了设计、开发、管理和报告组织级 GHG 清单的原则和要求。它包括确定温室气体排放和清除边界，量化组织的温室气体排放和清除，以及确定旨在改进温室气体管理的具体公司行动或活动的要求。它还包括对清单质量管理、报告、内部审计以及组织在验证活动中的职责的要求和指导。

ISO 14064-2 详细说明了确定基准值以及项目排放监测、量化和报告的原则和要求。它侧重于温室气体项目或专门为减少温室气体排放和/或加强温室气体清除而设计的基于项目的活动。为温室气体项目的验证提供了依据。

ISO 14064-3 详细要求验证与温室气体清单、温室气体项目和产品碳足迹有关的温室气体声明。它描述了确认或验证的过程，包括确认或验证计划、评估程

序以及组织、项目和产品 GHG 声明的评估。

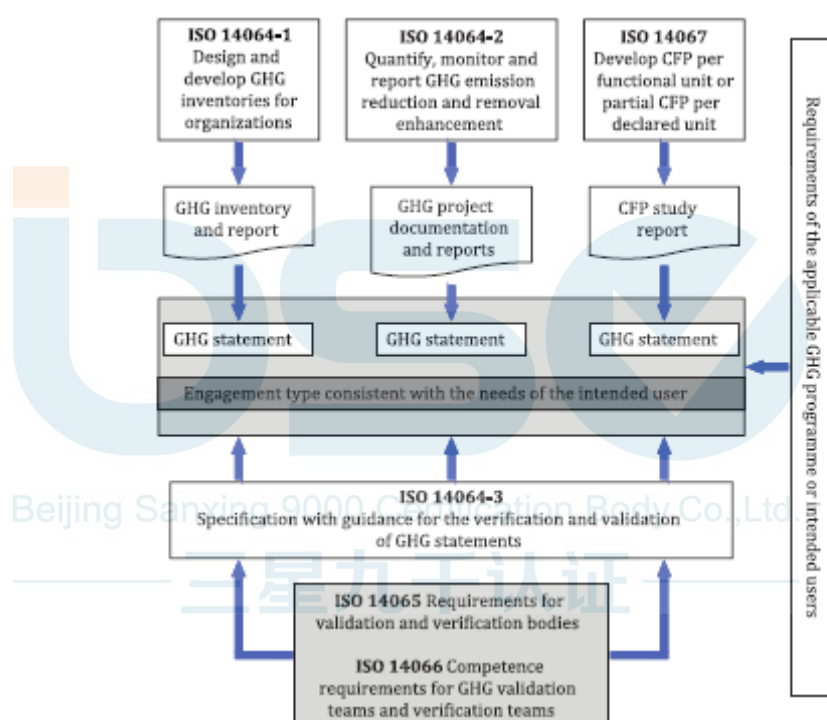
ISO 14065 规定了验证和验证 GHG 声明的机构的要求。其要求包括公正性、能力、沟通、验证和验证过程、申诉、投诉以及验证和验证机构的管理体系。它可以用作与确认和核查机构的公正性、能力和一致性有关的认可和其他形式的认可的基础。

ISO 14066 规定了验证团队和验证团队的能力要求。它包括原则，并根据验证团队或验证团队必须能够执行的任务来规定能力要求。

本文件规定了产品碳足迹量化的原则、要求和指南。本文件旨在量化与产品生命周期阶段相关的温室气体排放量，从资源开采和原材料采购开始，一直延伸到产品的生产、使用和寿命结束阶段。

ISO/TR 14069 帮助用户应用 ISO 14064-1，为提高排放量化及其报告的透明度提供指导和示例。它不提供 ISO 14064-1 的附加指南。

图 1 说明了 ISO 14060 系列温室气体标准之间的关系。



温室气体可以在产品的整个生命周期内排放和去除，包括原材料的获取、设计、生产、运输/交付、使用和寿命终止处理。量化产品的碳足迹（CFP）将有助于理解和采取行动，在产品的整个生命周期中增加温室气体的去除量并减少温室气体的排放量。本文件详细说明了商品和服务等基于其生命周期内的温室气体排放和清除的 CFP 量化的原则、要求和指南。还提供了部分 CFP 量化的要求和指南。与 CFP 或部分 CFP 相关的通信见 ISO 14026。ISO/TS 14027 涵盖了产品类别规则（PCR）的开发。

本文件基于现行国际生命周期评估标准（LCA）、ISO 14040 和 ISO 14044 中确定的原则、要求和指南，旨在为 CFP 和部分 CFP 的量化制定具体要求。

本文件旨在通过提供量化 CFP 的清晰性和一致性，使组织、政府、行业、服务提供商、社区和其他相关方受益。具体来说，根据本文件使用 LCA，将气候变化作为单一影响类别，可以通过以下方式提供好处：

——避免负担从产品生命周期的一个阶段转移到另一个阶段或在产品生命

周期之间转移；

- 提供 CFP 量化要求；

- 促进 CFP 在减少温室气体排放方面的绩效跟踪；

- 更好地了解产品碳足迹，以便确定增加温室气体清除和减少温室气体排放的潜在机会；

- 帮助促进可持续的低碳经济；

- 提高 CFP 量化和报告的可信度、一致性和透明度；

- 促进对替代产品设计和采购方案、生产和制造方法、原材料选择、运输、回收和其他寿命终止过程的评估；

- 促进在产品生命周期内制定和实施温室气体管理战略和计划，并发现供应链中的额外效率；

- 准备可靠的 CFP 信息。

注：关于 ISO 14026 关于足迹通信的术语，气候变化被视为“关注领域”的一个例子。

图 2 说明了本文件与 GHG 管理系列标准以外的标准之间的关系。

根据本文件编制的 CFP 有助于实现 GHG 相关政策和/或制度的目标。

附录 A 描述了基于本文件的 CFP 局限。



温室气体—产品碳足迹—量化要求和指南

1. 范围

本文件规定了量化和通报产品碳足迹（CFP）的原则、要求和指南，其方式与国际生命周期评估标准（LCA）（ISO 14040 和 ISO 14044）一致。

此外还规定了有关产品的部分碳足迹（部分 CFP）量化的要求和指南。

本文件适用于 CFP 研究，其结果可为不同应用提供依据（见第 4 条）。

本国际标准仅阐明一个影响类别，即气候变化。

有关抵消方面的信息不属于本国际标准的范畴。

本文件不评估任何社会或经济方面，或其他任何产品生命周期可能产生的相关影响。

2. 参考标准

为应用本文件，下列参考文件是必备的。凡是注日期的引用文件，仅引用的版本适用。凡是不注日期的引用文件，其最新版本（包括任何修改）适用。

ISO/TS 14027:2017, Environmental labels and declarations — Development of product category rules（环境标签和声明—产品类别规则的制定）

ISO 14044:2006, Environmental management — Life cycle assessment — Requirements and guidelines（环境管理. 生命周期评价. 要求和指南）

ISO/TS 14071, Environmental management — Life cycle assessment — Critical review processes and reviewer competencies: Additional requirements and guidelines to ISO 14044:2006（环境管理. 生命周期评估. 关键评审过程和评审员能力：ISO 14044:2006 的附加要求和指南）

3. 术语，定义和缩略语

3.1 术语和定义

在本文件中，以下术语和定义适用。

国际标准化组织和国际电工委员会在以下地址维护标准化用术语数据库：

—ISO 在线浏览平台：可从 <https://www.iso.org/obp> 获取

—IEC Electropedia：可从 <http://www.electropedia.org> 获取。

3.1.1 产品碳足迹量化相关的术语

3.1.1.1

产品碳足迹

CFP

产品系统 (3.1.3.2) 中的温室气体排放量 (3.1.2.5) 和温室气体去除量 (3.1.2.6) 之和 (3.1.3.2)，以二氧化碳当量 (3.1.2.2) 为单位表示，基于使用气候变化单一影响类别 (3.1.4.8) 的生命周期评价 (3.1.4.3)。

注 1：可将 CFP 分解为一组数字，确定具体的温室气体排放量和去除量（见表 1）。CFP 也可以分解为生命周期的各个阶段 (3.1.4.2)。

注 2：CFP 量化结果记录在 CFP 研究报告 (3.1.1.5) 中，以每个功能单元 (3.1.3.7) 的二氧化碳当量表示。

3.1.1.2

产品部分碳足迹

部分 CFP

产品系统 (3.1.3.2) 中一个或多个选定过程 (3.1.3.5) 的温室气体排放量 (3.1.2.5) 和温室气体去除量 (3.1.2.6) 之和，表示为二氧化碳当量 (3.1.2.2)，并基于生命周期 (3.1.4.2) 中选定的阶段或过程。

注 1：产品部分碳足迹是基于或汇编自各具体流程或各信息模块，而这些流程和信息是某一产品系统的一部分并可构成产品碳足迹量化的依据。关于各信息模块的细节，见 ISO 14025: 2006，第 5.4 条。

注 2：“足迹信息模块”在 ISO 14026:2017，3.1.4 中定义。

注 3：部分 CFP 的量化结果记录在 CFP 研究报告 (3.1.3.5) 中，以二氧化碳当量表示。

3.1.1.3

产品碳足迹系统化方法

促进同一组织 (3.1.5.1) 的两个或多个产品 (3.1.3.1) CFP (3.1.1.6) 量化的程序集。

3.1.1.4

产品碳足迹研究

包括产品碳足迹 (3.1.1.1) 或部分产品碳足迹 (3.1.1.2) 量化和报告在内的研究。

3.1.1.5

产品碳足迹研究报告

报告记录了 CFP 研究 (3.1.1.4)，提出了 CFP (3.1.1.1) 或部分 CFP (3.1.1.2)，并显示了研究中所做的决定。

注 1：CFP 研究报告证明符合本文件的规定。

3.1.1.6

产品碳足迹的量化

导致确定 CFP (3.1.1.1) 或部分 CFP (3.1.1.2) 的活动

注 1：CFP 或部分 CFP 的量化是 CFP 研究的一部分 (3.1.1.4)。

3.1.1.7

碳补偿

通过防止产品系统 (3.1.3.2) 外过程 (3.1.3.5) 中温室气体排放量 (3.1.2.5) 的释放、减少或消除，对 CFP (3.1.1.1.1) 或部分 CFP (3.1.1.2) 的全部或部分进行补偿的机制。

研究示例：相关产品系统外投资，例如可再生能源，能源技术，节能措施，造林/再造林。

注 1: 在产品碳足迹或部分 CFP 的量化阶段不允许抵消 (3.1.1.6), 碳抵消的相关内容不在本文件范围内 (见 6.3.4.1)。

注 2: 关于碳补偿和碳中性的足迹通信和相关索赔包含在 ISO 14026 和 ISO 14021 中。

注 3: 改编自 ISO 14021:2016, 3.1.12 中“抵消”的定义。

3.1.1.8

产品类别

能够实现等效功能的产品组 (3.1.3.1)

[来源: ISO 14025:2006, 3.12]

3.1.1.9

产品类别规则

为一个或多个产品类别 (3.1.1.8) 制定第三类环境声明和足迹通信的一套具体规则、要求和指南

注 1: PCR 包括量化规则, 符合 ISO 14044。

注 2: ISO/TS 14027 描述了适用于本文件的 PCR 的开发。

注 3: 条目: ISO 14026:2017, 3.1.1 中定义了“足迹通信”。

[来源: ISO/TS 14027:2017, 3.1, 修改 - 条目注释 1、2 和 3 替换了原始条目注释 1。]

3.1.1.10

产品性能跟踪的碳足迹

比较同一组织 (3.1.5.1) 的某一特定产品 (3.1.3.1) 的 CFP (3.1.1.1) 或部分 CFP (3.1.1.2) 随时间的变化。

注 1: 它包括计算一个特定产品的 CFP 变化, 或在同一功能单元 (3.1.3.7) 或申报单元 (3.1.3.8) 的替代产品之间的变化。

3.1.2 与温室气体相关的术语

3.1.2.1

温室气体

GHG

大气成分, 既包括自然的也包括人为的, 这些气体在地表、大气和云层发出的红外辐射光谱内以特定波长吸收并发出辐射。

注 1: 有关温室气体清单, 请参阅最新的政府间气候变化专门委员会评估报告。

注 2: 水蒸气和臭氧 (人为的和自然的温室气体) 不包括在 CFP (3.1.1.1) 和部分 CFP (3.1.1.2) 中。

注 3: 本文件的重点仅限于长寿命温室气体, 因此不包括由于地表反射率 (反照率) 和短寿命辐射强迫因子 (如黑碳和气溶胶)

[来源: ISO 14064-1:2006, 2.1, 修改 - 条目注释 1、2 和 3 已将原始注释 1 替换为条目, 其中列出了 GHG 的示例。]

3.1.2.2

二氧化碳当量

将某一温室气体 (3.1.2.1) 的辐射强迫与二氧化碳的辐射强迫进行比较的单位。

注 1: 通过将温室气体的质量乘以相应的温室气体 GWP (3.1.2.4) 或 GTP (3.1.2.3), 将温室气体的质量转换为二氧化碳当量。

注 2：对于 GTP，二氧化碳当量是将温室气体引起的全球平均表面温度变化与二氧化碳引起的温度变化进行比较的单位。

[来源：ISO 14064-1:2006, 2.19, 已修改-已包括一个附加的首选术语，已对条目注释 1 进行了修改，以提供澄清，并将注释 2 替换为条目的新注释 2。]

3.1.2.3

全球温度变化潜力

GTP

根据温室气体（3.1.2.1）排放脉冲，相对于二氧化碳（CO₂）引起的温度变化，在选定时间点测量全球平均表面温度变化的指数。

注 1：本文件所用的“索引”是 ISO 14040:2006, 3.37 中定义的“表征因子”。

注 2：GTP 基于所选年份的温度变化。

注 3：摘自工作组 1《IPCC 第五次评估报告》(AR5),《2013 年气候变化：物理科学基础》。

[来源：IPCC (2013)。]

3.1.2.4

全球变暖潜势

GWP

描述在特定时间内某一特定温室气体（3.1.2.1）单位质量相对于二氧化碳当量单位的辐射强迫影响的特征因子（ISO 14050:2009, 第 7.2.2.2 条）。

注 1：本文件中使用的“索引”是 ISO 14040:2006, 3.37 中定义的“表征因子”。

注 2：一个“脉冲发射”是一个时间点的发射。

3.1.2.5

温室气体排放

向大气中释放温室气体（3.1.2.1）

3.1.2.6

温室气体清除

从大气中提取温室气体（3.1.2.1）

3.1.2.7

温室气体排放因子

与温室气体排放相关的活动数据系数（3.1.2.5）

3.1.3 产品，产品系统和过程

3.1.3.1

产品

商品或服务

注 1：产品分类如下：

- 服务（如运输、事件实施）；
- 软件（如计算机程序）；
- 硬件（如发动机机械部分）；
- 加工材料（如润滑剂、矿石、燃料）；
- 未加工材料（如农产品）。

注 2：服务具有有形和无形要素。例如，提供服务可能涉及以下内容：

- 在客户提供的有形产品（如待修理的汽车）上进行的活动；

- 在顾客提供的无形产品上进行的活动（例如准备纳税申报所需的收益表）；
- 无形产品的交付（例如，在知识传播的背景下交付信息）；
- 为客户创造氛围（例如在酒店和餐厅）。

[来源：ISO 14044:2006, 3.9, 已修改 - 对条目和示例的注释 1 进行了轻微修改，省略了对定义原点的条目的注释 3。]

3.1.3.2

产品系统

具有基本流程（3.1.3.10）和产品流程的单元流程（3.1.3.6）的集合，执行一个或多个定义的功能，并对产品（3.1.3.1）的生命周期（3.1.4.2）建模。

注 1：“产品流”在 ISO 14040:2006, 3.27 中定义。

[来源：ISO 14044:2006, 3.28, 修改 - 已添加条目注释 1。]

3.1.3.3

共生产品

来自同一单元过程（3.1.3.6）或产品系统（3.1.3.2）的两个或多个产品（3.1.3.1）中的任何一个。

[资料来源：ISO 14040:2006, 3.10]

3.1.3.4

系统边界

基于一组标准的边界，表示哪个单元过程（3.1.3.6）是正在研究的系统的一部分。

[来源：ISO 14044:2006, 3.32, 修改- “已添加基于”的边界，是产品的一部分系统“已更改为”正在研究的系统的一部分，条目注释已删除。]

3.1.3.5

过程

将输入转换为输出的一组相互关联或相互作用的活动

[资料来源：ISO 14044:2006, 3.11]

3.1.3.6

单元过程

在量化投入（ISO 14050:2009, 第 6.17 条）和产出（ISO 14050:2009, 第 6.18 条）数据所需的生命周期清单分析中考虑的最小要素。

[来源 ISO 14040:2006, 第 3.34 条]

3.1.3.7

功能单位

作为基准单元的某一产品系统（3.4.2）可量化的性能。

注 1：由于产品碳足迹（3.1.1）处理有关产品（3.4.1）的信息，所以功能单元能够是一个产品单元、销售单元或服务单元。

[来源：改编自 ISO 14040:2006, 第 3.20 条— 增加了注 1。]

3.1.3.8

申报单位

在部分 CFP（3.1.1.2）量化中用作参考单位的产品数量（3.1.3.1）

示例质量（1 千克一次钢）、体积（1 立方米原油）。

[来源：ISO 21930:2017, 3.1.11, 修改-将定义扩展到适用于所有产品和部分 CFP 的量化，删除条目注释 1。]

3.1.3.9

基准流

为完成功能单位 (3.1.3.7) 表示的功能需要对某一特定产品系统 (3.1.3.2) 过程 (3.1.3.5) 的产量 (ISO 14050:2009, 第 6.18 条) 作出的衡量。

注 1: 有关应用参考流概念的示例, 请参见 6.3.3 中的示例。

注 2: 对于部分 CFP (3.1.1.2), 参考流量指申报单位 (3.1.3.8)。

[来源: ISO 14040:2006, 3.29, 修改后-“输入到”和注 1 和注 2 已添加到条目中。]

3.1.3.10

基本流

进入所研究系统的从以前人类从未改变的环境中获取的材料或能源, 或离开所研究系统的释放到无后续人类改变的环境中的材料或能源。

注 1: 条目: “环境”在 ISO 14001:2015, 3.2.1 中定义。

[来源: ISO 14044:2006, 3.12, 修改 - 已添加条目注释 1。]

3.1.3.11

服务期限

使用的某一产品 (3.1.3.1) 满足或超过性能要求的时间段

[资料来源: ISO 15661:2011, 3.25, 已修改-更一般的措辞已被使用]。

3.1.4 与生命周期评价相关的术语

3.1.4.1

截止标准

与单元过程 (3.1.3.6) 或产品系统 (3.1.3.2) 相关的材料或能量流量或温室气体排放量 (3.1.2.5) 的显著性水平规范, 不包括在 CFP 研究 (3.1.1.4) 中。

注 1: “能量流”在 ISO 14040:2006, 3.13 中定义。

[来源: ISO 14044:2006, 3.18, 修订。——术语“环境重要性”已更改为“温室气体排放的重要性”, “研究”已更改为“CFP 研究”, 并添加了条目注释 1。]

3.1.4.2

生命周期

与产品 (3.1.3.1) 相关的连续和相互关联的阶段, 从原材料获取或从自然资源产生到最终处置。

注 1: “原材料”在 ISO 14040:2006, 3.15 中定义。

注 2: 与产品相关的生命周期阶段包括原材料采购、生产、分销、使用和寿命终止处理。

[来源: ISO 14044:2006, 3.1, 已修改。——对“最终处置”的引用已更改为“寿命终止处理”, 并添加了条目注释 1 和 2。]

3.1.4.3

生命周期评价

产品系统 (3.1.3.2) 在其整个生命周期 (3.1.4.2) 中的输入、输出和潜在环境影响的汇编和评估。

注 1: “环境影响”在 ISO 14001:2015 第 3.2.4 条中定义。

[来源: ISO 14044:2006, 3.2, 修改 - 已添加条目注释 1。]

3.1.4.4

生命周期清单分析

如需要获取全文

请联系北京三星九千认证中心有限公司技术部

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