IECQ Carbon Footprint Verification Implementation Rules

IECQ 产品碳足迹核查实施规则

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CESI Certification Co., Ltd.

（原中国电子技术标准化研究所认证中心）

(formerly China Electronic Standardization Institute

Certification Center)

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1 General 总则

1.1 Purpose 目的

In active response to the global challenges of climate change, to promote green and low-carbon industrial transformation, and to provide internationally credible "green credentials" for products from China's electronic information industry and other related sectors entering the international market, CESI Certification Co., Ltd. (hereinafter referred to as "the Body" or "CESI") has formulated these CESI IECQ Carbon Footprint of Product Verification Implementation Rules (hereinafter referred to as "these Rules") based on the Regulations of the People's Republic of China on Certification and Accreditation and as a formally authorized Certification Body (CB) of the IEC Quality Assessment System (IECQ).

为积极响应全球应对气候变化的挑战，推动产业绿色低碳转型，并为中国电子信息产业及其他相关行业的产品进入国际市场提供具有全球公信力的绿色凭证，北京赛西认证有限责任公司（以下简称“本机构”或“CESI”）依据《中华人民共和国认证认可条例》并作为国际电工委员会质量评价体系（IECQ）正式授权的认证机构（CB），特制定本《CESI IECQ 产品碳足迹核查实施规则》（以下简称“本规则”）。

These Rules aim to provide a comprehensive, systematic, and standardized description of the Carbon Footprint of Product (CFP) verification services conducted by the Body under the framework of the IECQ Approved Process Scheme (AP Scheme).

本规则旨在对本机构在 IECQ 批准过程方案（AP Scheme）框架下开展的产品碳足迹（CFP）核查服务进行全面、系统和规范的阐述。

These Rules serve as the public, guiding programmatic document for the Body to instruct clients/responsible parties on how to apply for and obtain an "IECQ Verification Statement", and simultaneously act as the strict operating guidelines for all relevant internal personnel of the Body (including but not limited to marketing, contract review, verification, technical review, and certification decision personnel). Through the implementation of these Rules, the Body is committed to providing high-quality, efficient, impartial, and consistent CFP verification services to all stakeholders.

本规则是本机构向社会公开的、用于指导委托方/责任方申请并获得“IECQ 核查声明书”（IECQ Verification Statement）的纲领性文件，同时也是本机构内部所有相关人员（包括但不限于市场、合同评审、核查、技术复核、认证决定人员）必须严格遵守的作业准则。通过实施本规则，本机构致力于为所有利益相关方提供高质量、高效率、公正且一致的 CFP 核查服务。

1.2 Scope of Application 适用范围

These Rules stipulate the model, fundamental principles, procedures, post-certification management, and requirements for the rights, obligations, and responsibilities of relevant parties when the Body implements IECQ Carbon Footprint of Product verification.

本规则规定了本机构实施 IECQ 产品碳足迹核查的模式、基本原则、流程、获证后管理以及对相关方的权利、义务和责任要求。

These Rules apply to all verification activities conducted by the Body, based on standards such as ISO 14067:2018, regarding the quantification results and reporting of Greenhouse Gas (GHG) emissions (i.e., the Carbon Footprint of Product) over the life cycle of a specific product (including goods or services) as declared by the applicant.

本规则适用于本机构依据 ISO 14067 等标准,对申请方声明的特定产品(包括货物或服务）在其生命周期内的温室气体排放量（即产品碳足迹）的量化结果

和报告所开展的全部核查活动。

These Rules are applicable to all organizations seeking to obtain an "IECQ Verification Statement" issued by the IECQ System, which features a globally unique and traceable code, through the Body. The verification scope of the Body covers all technical sectors authorized by IECQ, and the specific scope can be accessed via the official website of the Body or the official website of IECQ.

本规则适用于所有希望通过本机构获得由 IECQ 体系签发的、具有全球唯一可追溯编码的“IECQ 核查声明书”的组织。本机构的核查业务范围覆盖了经 IECQ 授权的所有技术领域，具体范围可通过本机构官方网站或 IECQ 官方网站查询。

2 Main Reference Documents 主要依据文件

These Rules are applicable to all organizations seeking to obtain an "IECQ Verification Statement" issued by the IECQ System, which features a globally unique and traceable code, through the Body. The verification scope of the Body covers all technical sectors authorized by IECQ, and the specific scope can be accessed via the official website of the Body or the official website of IECQ.

下列文件对于本文件的应用是必不可少的。凡是注日期的引用文件，仅注日期的版本适用于本文件。凡是不注日期的引用文件，其最新版本（包括所有的修改单）适用于本文件。

ISO 14067:2018, Greenhouse gases — Carbon footprint of products — Requirements and guidelines for quantification.

ISO 14064-3:2019, Greenhouse gases — Part 3: Specification with guidance for the verification and validation of greenhouse gas statements.

ISO/IEC 17029:2019, Conformity assessment — General principles and requirements for validation and verification bodies.

ISO 14065:2020, General principles and requirements for bodies validating and verifying environmental information..

ISO 14066:2023, Environmental information — Competence requirements for teams validating and verifying environmental information.

ISO 14071:2024, Environmental management — Life cycle assessment — Critical review processes and reviewer competencies: Additional requirements and guidelines to ISO 14044:2006.

ISO 14040:2006, Environmental management — Life cycle assessment — Principles and framework.

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

IECQ 01A, Rules of Procedure – IECQ Specification Guidance.

IECQ 02, Rules of Procedure – IECQ System General Requirements.

IECQ 03-1, Rules of Procedure – Part 1: IECQ Approved Components (AC) Scheme.

IECQ OD 14067, Application of ISO 14067 within IECQ for issuing IECQ Carbon Footprint of Product Verification Statements.

ISO 14067:2018 温室气体—产品碳足迹—量化要求和指南

ISO 14064-3:2019 温室气体—第 3 部分：温室气体声明审定与核查的规范及指南

ISO/IEC 17029:2019 合格评定—审定与核查机构通用原则和要求

ISO 14065:2020 环境信息—审定与核查机构要求

ISO 14066:2023 环境管理—信息验证和核查团队的能力要求

ISO 14071:2024 环境管理—生命周期评价—关键性审查过程和审查员能力

ISO 14040:2006 环境管理—生命周期评价—原则与框架

ISO 14044:2006 环境管理—生命周期评价—要求与指南

IECQ 01A, Rules of Procedure – IECQ Specification Guidance.

IECQ 02, Rules of Procedure – IECQ System General Requirements.

IECQ 03-1, Rules of Procedure – Part 1: IECQ Approved Components (AC) Scheme.

IECQ OD 14067, Application of ISO 14067 within IECQ for issuing IECQ Carbon Footprint of Product Verification Statements.

3 Terms and Definitions 术语和定义

The terms and definitions given in ISO 14067 , ISO 14064-3, and the following apply to these Rules.

本规则采用 ISO 14067, ISO 14064-3 等标准中界定的以及下列术语和定义。

3.1 Carbon Footprint of Product (CFP) ，产品碳足迹

The sum of GHG emissions and GHG removals in a product system , expressed as CO2 equivalents and based on a life cycle assessment using the single impact category of climate change. 产品系统中的 GHG 排放量和 GHG 清除量之和,以二氧化碳当量表示,并基于气候变化这一单一环境影响类型进行生命周期评价。

3.2 Product System 系统边界

A collection of unit processes with elementary flows and product flows, performing one or more defined functions and which models the life cycle of a product . 拥有基本流和产品流,同时具有一种或多种特定功能,并能模拟产品生命周期的单元过程的集合。

3.3 Life Cycle 生命周期

Consecutive and interlinked stages related to a product, from raw material acquisition or generation from natural resources to end-of-life treatment. 一个产品系统从原材料获取或自然资源生成到最终处置的连续的、相互关联的各个阶段。

3.4 Functional Unit 功能单位

Quantified performance of a product system as a reference unit. 量化产品系统性能的、作为参照单位的已量化的性能，即用来量化产品系统功能的基准单位。

3.5 Declared Unit 声明单位

Quantity of a product for use as a reference unit in the quantification

of a partial CFP. 当产品系统的功能或服务的输出不能用功能单位来量化时，用作参照单位的一种量，即用来量化部分产品碳足迹的基准单位

3.6 System Boundary 系统边界

Boundary based on a set of criteria representing which unit processes are a part of the system under study. 在产品系统设定的一组准则，用以规定哪些单元过程属于产品系统

3.7 Client 委托方

The organization or person requesting verification or validation from the Body.

3.8 Responsible Party 责任方

The person or persons responsible for the provision of the GHG statement and the supporting GHG information. 提供产品碳足迹声明并对该声明承担责任的组织。

3.9 Verification 核查

The process for evaluating a statement of historical data and information to determine if the statement is materially correct and conforms to criteria .本机构基于客观证据，对责任方作出的产品碳足迹声明是真实、准确、完整的，并符合相关标准和准则的声明提供独立保证的过程。

4 Verification Model 核查模式

The model adopted by the Body for IECQ CFP verification is: Document Review + Carbon Footprint of Product Verification + Posted-Certification Management.

本机构 IECQ CFP 核查采用的模式为：文件评审 + 产品碳足迹核查 + 获

证后管理。

Document Review. A comprehensive and systematic technical review of the CFP Study Report, LCA model, and all supporting evidence submitted by the responsible party, to assess conformity of its methodology, data selection, calculation process, and report content.

文件评审。对责任方提交的《产品碳足迹研究报告》、LCA 模型及所有支持性证据进行全面、系统的技术审查，以评估其方法论、数据选择、计算过程和报告内容的符合性。

Carbon Footprint of Product Verification. Typically conducted in combination with an on-site verification to gather core evidence through data tracing, process observation, and personnel interviews, ultimately determining the validity, accuracy, and reliability of the CFP statement. For first-time applicants, on-site verification is a mandatory step.

产品碳足迹核查。通常结合现场核查验证，通过数据追溯、过程观察和人员访谈等方式收集核心证据，以最终确定产品碳足迹陈述的有效、准确、可靠。对于首次申请的责任方，现场核查验证是必须的环节。

Posted-Certification Management. After issuing the IECQ Verification Statement, the statement's valid status is managed via the IECQ online system, and significant changes affecting the statement's validity are addressed. This model does not include routine annual surveillance audits; the validity period of the Verification Statement is two years.

获证后管理。在签发《IECQ 核查声明书》后，通过 IECQ 在线系统对声明书的有效状态进行管理，并对其声明有效性产生影响的重大变更进行处理。此模式不包含例行的年度监督审核，核查声明书有效期为两年。

5. Certification Unit Subdivision 认证单元划分

5.1 Subdivision Principles 划分原则

The subdivision of certification units aims to group products applying for verification in a scientific and rational manner to ensure the effectiveness and consistency of verification. The subdivision should adhere to the following principles：

认证单元的划分旨在以科学、合理的方式对申请核查的产品进行分组，以确保核查的有效性和一致性。划分应遵循以下原则：

a) **Product Category Rules (PCR) Priority Principle**: Where recognized PCRs applicable to the product for which application is made exist, the provisions regarding product grouping in the PCR should be followed as a priority.

产品种类规则（PCR）优先原则：若存在适用于申请产品的、公认的 PCR，应优先遵循 PCR 中关于产品分组的规定。

b) **Production Process Similarity Principle**: Products with fundamentally similar production processes, technological routes, equipment, and manufacturing locations can be grouped into one verification unit.

生产过程相似性原则：生产工艺、技术路线、生产设备和生产地点基本相同的产品可划分为一个核查单元。

c) **Raw Material and Supply Chain Similarity Principle**: Series products with fundamentally similar types, specifications, and suppliers of main raw materials, as well as energy structures, can be grouped into one verification unit. **原材料与供应链相似性原则：**主要原材料种类、规格、供应商以及能源结构基本相同的系列产品可划分为一个核查单元

d) **Function and Use Similarity Principle**: Products whose core functions, target markets, and intended uses are fundamentally similar can be considered one verification unit. **能与用途相似性原则：**产品的核心功能、目标市场和预期用途基本相同，可视为一个核查单元。

5.2 Typical Subdivision Examples 典型划分示例

a) **Single Model Product:** A specific model product serves as an independent certification unit.

单一型号产品：一个具体型号的产品作为一个独立的认证单元。

b) **Product Series:** For series products that differ only in non-critical parameters (e.g., color, appearance, auxiliary functions) but have identical core components, materials, and production processes, they can be grouped as one certification unit. The responsible party must provide sufficient evidence to demonstrate that the differences will not materially affect the carbon footprint.

c) **Multi-site Production:** If the same product model is manufactured at different production locations, each location should, in principle, be treated as a separate certification unit, unless the responsible party can demonstrate a high degree of consistency in the processes, energy efficiency, and supply chain across all locations, and that data has been reasonably handled, e.g., through weighted averaging.

多地点生产：同一型号产品若在不同生产地点制造，原则上每个生产地点应作为一个独立的认证单元，除非责任方能证明各生产地点的工艺、能效和供应链具有高度一致性，且通过加权平均等方式进行了合理的数据处理。

5.3 Certification Unit Confirmation 认证单元确认

赛西对委托方/责任方提出的认证单元划分方案进行评审和确认。对于复杂的划分情况，本机构保留要求进行多个单元核查的权利。

CESI reviews and confirms the certification unit subdivision proposal submitted by the client/responsible party. The Body reserves the right to require verification of multiple units for complex subdivision cases.

6. Verification Procedure 核查程序

6.1 Certification Application and Acceptance 认证委托与受理

The client submits the intention to verify to the Body's Customer Service Department, along with the following preliminary documents:

委托方向本机构客户服务部提交核查意向，并提供以下初步材料：

a) The formally completed *IECQ Carbon Footprint of Product Verification Application Form* 正式填写的《IECQ 产品碳足迹核查申请表》。

b) Documentation proving the responsible party's legal status (e.g., copy of business license).责任方法律地位证明文件（如营业执照副本）。

c) The complete *CFP Study Report* (draft or final version).完整的《产品碳足迹研究报告》（草案或正式版）。

d) Product description, process flow diagrams, and relevant production and management documents.产品描述、工艺流程图及相关的生产和管理文件。

e) Other necessary materials, such as PCRs.其他必要的材料，如多个 PCR 等.

The Customer Service Department reviews the completeness of the application documents. The Green and Low-Carbon Department organizes a Contract Review Team for a technical review of the application, covering issues including but not limited to whether the verification scope is within the Body's IECQ authorization scope ; whether the methodology in the CFP Study Report is clear and conforms to the principles of ISO 14067; and whether the Body possesses the necessary technical capability and resources to execute the project.

客户服务部对申请材料的完整性进行审查。绿色低碳部组织合同评审小组对申请进行技术评审，内容包括但不限于核查范围是否在本机构 IECQ 授权范围

内；CFP 研究报告的方法论是否清晰、是否符合 ISO 14067 原则；本机构是否具备实施该项目所需的技术能力和资源。

Prior to contract signing, the Body performs a preliminary assessment based on the application documents and evaluates the required verifier-days based on the necessary resources. The total number of verifier-days serves as the main basis for the verification fee and is clearly specified in the verification contract. The on-site verification days are a critical component, requiring sufficient time to complete all necessary on-site activities.

在合同签订前，本机构将根据申请材料进行初步评估，并依据所需的资源条件对核查人日数进行评估。总人日数将作为核查费用的主要依据，并在核查合同中予以明确。现场核查验证人日是其中的关键部分，需确保充足的时间以完成所有必要的现场活动。

Upon successful review, the Body signs a legally binding *IECQ Carbon Footprint of Product/Service Verification Contract* with the client. The contract clearly defines：

评审通过后，本机构与委托方签订具有法律效力的《IECQ 产品/服务碳足迹核查合同书》。合同中将明确：

a) The verification scope (product name, model, functional/declared unit , system boundary).核查范围（产品名称、型号、功能/声明单位、系统边界）。
b) The verification criteria.核查准则。
c) The level of assurance (reasonable or limited). 保证等级（合理或有限）。
d) The materiality threshold. 重要性水平。
e) The rights, obligations, and confidentiality responsibilities of both parties.双方的权利、义务和保密责任。
f) The verification fees and payment terms.核查费用及支付方式。

6.2 Verification Planning 核查策划

After the contract is signed, the Green and Low-Carbon Department, based on the characteristics of the verification project, appoints a qualified Verification Team Leader and assembles the Verification Team. All members must be independent of the client and the responsible party, with no conflict of interest. The list of Verification Team members is formally communicated to the responsible party, which has the right to object to the impartiality of any member within a reasonable period.

合同签订后，绿色低碳部根据核查项目特点，任命一名合格的核查组长，并组建核查组。所有成员均独立于委托方和责任方，不存在利益冲突。核查组名单将正式通知责任方，责任方有权在合理期限内对成员的公正性提出异议。

After accepting the assignment, the Verification Team Leader must convene a planning meeting to conduct an in-depth strategic analysis of the responsible party and its product system, and perform a systematic risk assessment. This process strictly follows the *PD31-GHG IECQ Carbon Footprint Verification Management Procedure*, focusing on identifying inherent risks, control risks, and detection risks , with particular attention to the reliability of data sources, the rationality of allocation procedures , the completeness and uncertainty of system boundary selection , the complexity and accuracy of the calculation model, and the effectiveness of the responsible party's internal data quality control system.

核查组长在接受任务后，需主持召开策划会议，对责任方及其产品系统进行深入的战略分析，并开展系统的风险评估。此过程严格遵循《IECQ 碳足迹核查管理程序》，重点识别固有风险、控制风险和未发现风险，尤其关注数据来源的可靠性、分配方法的合理性、系统边界选择的完整性与不确定性、计算模型的复杂性与准确性、责任方内部数据质量控制体系的有效性等。

6.3 Document Review 文件评审

Document review is the first technical step in the verification process, where the Verification Team conducts a systematic review of all documents submitted by the responsible party, including but not limited to:

文件评审是核查过程的第一个技术环节，核查组将对责任方提交的全部文件进行系统性审查，包括但不限于：

a) *CFP Study Report*：Checking against the requirements of ISO 14067 item-by-item, assessing whether the goal and scope definition , functional unit , system boundary , allocation procedures , data collection , calculation, uncertainty analysis , and report content are complete and compliant.《产品碳足迹研究报告》：对照 ISO 14067 的要求逐条检查，评估其目标与范围定义、功能单位、系统边界、分配程序、数据收集、计算、不确定性分析、报告内容等是否完整、合规。

b) LCA model or calculation sheet: Reviewing the model's logical structure, formula settings, source, and correct citation of emission factors. LCA 模型或计算表：审查模型的逻辑结构、公式设置、排放因子来源及引用是否正确。

c) Data collection list and original documentation: Checking data completeness, consistency, and traceability.数据收集清单与原始凭证：检查数据的完整性、一致性和可追溯性。

Any issues identified during the document review will be communicated in writing to the responsible party, requesting clarification or supplementary materials.

文件评审中发现的任何问题将以书面形式通知责任方，要求其澄清或补充材料。

The Verification Team Leader is responsible for preparing the core

planning documents, including:

核查组长负责编制核心策划文件,包括：

a) *IECQ CFP Evidence-Gathering Plan* (Internal document): Detailing the type of evidence to be collected for each risk point, collection methods (document review, interview, data tracing, etc.), sampling strategies , and verification procedures.《IECQ CFP 证据收集计划》（内部文件）：详细说明针对每个风险点需要收集的证据类型、收集方法（文件审查、访谈、数据追溯等）、抽样策略和验证程序。

b) *IECQ CFP Verification Plan* (Document communicated to the client): Clearly defining the verification objectives , scope , criteria, schedule, Verification Team members, key personnel for interviews, list of documents to be prepared, and detailed arrangements for the on-site verification. This plan must be sent to the responsible party for confirmation in advance.《IECQ CFP 核查计划》（与客户沟通的文件）：明确核查的目标、范围、准则、日程安排、核查组成员、需访谈的关键岗位、需准备的文件清单以及现场核查验证的详细安排。该计划需提前发送给责任方确认。

6.4 Carbon Footprint of Product Verification and On-site Assessment 产品碳足迹核查与现场验证

This stage is the critical link for gathering core evidence, typically conducted through on-site verification. For first-time applicants, on-site verification is a mandatory step, aiming to:

此阶段是收集核心证据的关键环节，通常通过现场核查验证的方式进行。对于首次申请的责任方，现场核查验证是必须的环节，其目的在于：

a) Verify whether the responsible party has established an effective management system for data collection, processing, and reporting 核实责任方是否建立了有效的数据收集、处理和报告的管理体系。

b) Assess the understanding and execution competence of the responsible party's personnel regarding the CFP quantification work.评估责任方相关人员对 CFP 量化工作的理解和执行能力。

c) Check whether equipment used for data measurement is in a controlled state.检查用于数据计量的设备是否处于受控状态。

d) Confirm that the production process and operating conditions align with the description in the CFP report.确认生产工艺和操作条件与 CFP 报告中的描述一致。

核查组将通过以下方式收集客观证据：

The Verification Team collects objective evidence through the following means:

a) **Data Tracing and Cross-Verification**: Randomly sampling key activity data (e.g., energy consumption, material input), tracing it from the CFP report back to original records (e.g., invoices, weighbridge tickets, production reports, monitoring data), and performing cross-verification.数据追溯与交叉验证：随机抽取关键的活动数据（如能源消耗、物料投入），从 CFP 报告追溯至原始记录（如发票、磅单、生产报表、监测数据），并进行交叉验证。

b) **On-site Observation**: Observing the actual production flow, material flow, and energy usage, and comparing them with the documentation description.现场观察：观察实际生产流程、物料流、能源使用情况，与文件描述进行比对。

c) **Personnel Interviews**: Interviewing personnel at various levels responsible for data collection, calculation, and management to understand the actual operational procedures and internal controls.人员访谈：与负责数据收集、计算、管理的各级人员进行访谈，了解实际操作流程和内部控制措施。

d) **Recalculation Verification**: Independently calculating the carbon footprint for some key unit processes to verify the

accuracy of the responsible party's calculation model.追溯验证：对部分关键单元过程的碳足迹进行独立计算，以验证责任方计算模型的准确性。

6.5 Carbon Footprint Verification and On-site Assessment Completion 产品碳足迹核查与现场验证

After all verification activities are completed, the Verification Team Leader is responsible for preparing a complete set of verification records, including but not limited to the *IECQ Standard Assessment Report* and *Nonconformity Report* (if applicable). The *IECQ Standard Assessment Report* (SAR 14067) is the core technical document submitted to the IECQ System, detailing findings and evidence from the conformity assessment against each clause of ISO 14067. For any identified nonconformities , the Verification Team shall issue a *Nonconformity Report* , requiring the responsible party to submit a corrective action plan and evidence of completion within a specified timeframe. The Verification Team must verify the effectiveness of the corrective actions, which serves as a crucial part of the verification records.

所有核查活动结束后，核查组长负责编制一套完整的核查档案，包括不限于《IECQ 标准评估报告》和《不符合项报告》（如适用）等内容。其中《IECQ 标准评估报告》（SAR 14067）是提交给 IECQ 系统的核心技术文件，详细记录了对 ISO 14067 各条款的符合性评估发现和证据。对于发现的不符合项，核查组应签发《不符合报告》，并要求责任方在规定期限内提交纠正措施计划及完成证据。核查组需对纠正措施的有效性进行验证，作为核查档案的重要组成部分。

6.6 Verification Result Review and Approval 核查结果复核与批准

The Verification Team submits the complete project records to the Technical Committee. The Technical Committee appoints an independent reviewer who did not participate in the project and

possesses the required competence to conduct a comprehensive review , ensuring the compliance of the verification process, the sufficiency of the evidence , and the validity of the conclusion.

核查组将完整的项目档案提交至技术委员会。技术委员会指派未参与该项目的、具备相应能力的独立复核人员进行全面复核，确保核查过程的合规性、证据的充分性和结论的有效性。

Following successful review, an authorized, independent Certification Decision maker from the Body makes the final decision on whether to approve the responsible party's CFP statement. This decision is based on the final evaluation of the entire verification process and all evidence.

复核通过后，由本机构授权的、独立的认证决定人员做出是否批准责任方产品碳足迹陈述的最终决定。此决定基于对整个核查过程和所有证据的最终评估。

6.7 Time Limit Requirements 时限要求

The Body commits to completing the contract review within 5 working days of receiving the complete application documents; and completing the verification report drafting and technical review, and making the final decision, within 10 working days of completing all on-site verification activities and receiving all necessary evidence of corrective actions.

本机构承诺在收到完整申请材料后 5 个工作日内完成合同评审；在完成所有现场核查活动并收到所有必要纠正措施证据后 10 个工作日内完成核查报告编制和技术复核，并做出最终决定。

7. Posted-Certification Management 获证后管理

The validity period of the IECQ CFP Verification Statement is a maximum of two years from the date of issue. Within the validity period, the responsible party shall ensure the continuous validity of its CFP statement and retain all relevant data and records. If any change occurs that could materially affect the verified carbon

footprint value, the responsible party is obliged to promptly notify the Body in writing. The definition of a significant change is provided in Appendix B.

IECQ CFP 核查声明书自签发之日起，有效期最长为两年。在有效期内，责任方应确保其产品碳足迹声明的持续有效性，并保留所有相关的数据和记录。若发生可能对已核查的碳足迹值产生重大影响的变更，责任方有义务及时以书面形式通知本机构。重大变更的界定参见附录 B。

In the event of a significant change, the responsible party must submit an Verification Change Application, accompanied by a detailed explanation of the change and an assessment report on its impact on the carbon footprint. The Body reviews the change to determine its impact on the original verification conclusion. Depending on the review result, supplementary document review, on-site verification, or a full re-verification may be required. After verifying the change, the Body determines, based on the circumstances, whether to issue a new statement, add a remark to the original statement, or require the cancellation of the original statement and perform a completely new verification. All changes are recorded in the IECQ online system.

若发生重大的变更时，责任方需提交核查变更申请，并附上详细的变更说明及对碳足迹影响的评估报告。本机构将对变更进行评审，以确定其对原核查结论的影响程度。根据评审结果，可能需要进行文件审查、补充的现场核查验证，或一次完整的重新核查。经核查确认变更后，本机构将根据情况决定是换发新的声明书，还是在原声明书上进行备注，或要求撤销原声明书并进行全新的核查。所有变更都将在 IECQ 在线系统中进行记录。

The Body has the right to suspend the IECQ Verification Statement in the following circumstances:

出现以下情况时，本机构有权暂停其 IECQ 核查声明书：

a) A significant change occurred but the Body was not notified

promptly.发生重大变更但未及时通知本机构。

b) Improper use of the IECQ Mark, and failure to correct within the specified period after warning.不当使用 IECQ 标志，经警告后未在规定期限内纠正。

c) Verified data misstatement that may affect the validity of the statement, but the responsible party is actively implementing rectification.被证实存在可能影响声明有效性的数据错报，但责任方正在积极整改。

d) The responsible party voluntarily applies for suspension.责任方主动申请暂停。

The Body revokes the IECQ Verification Statement in the following circumstances:

出现以下情况时，本机构将撤销其 IECQ 核查声明书：

a) The issue that led to the suspension has not been effectively resolved after the suspension period expires.暂停期满后，导致暂停的问题仍未得到有效解决。

b) Verified deliberate and material data falsification or misrepresentation.被证实存在故意的、重大的数据造假或虚假陈述行为。

c) The product has been discontinued or the production process has undergone a fundamental change, rendering the original statement completely invalid.产品已停产或生产过程发生根本性改变，导致原声明完全失效。

d) The responsible party voluntarily applies for revocation.责任方主动申请撤销。

The statement is automatically canceled upon expiry of its validity period. All decisions on suspension and revocation are publicly announced through the IECQ online certificate system.

声明书有效期届满将自动注销。所有暂停和撤销的决定都将通过 IECQ 在线

证书系统对外公告。

8. IECQ Verification Statement and Mark IECQ 核查声明书和标志

Upon final approval, the Body's authorized personnel issue the globally unified *IECQ Verification Statement* through the "IECQ online certificate system." The format and content of the statement strictly follow the provisions of *IECQ OD 14067*, as shown in Appendix A.

通过最终批准后，由本机构授权人员通过“IECQ 在线证书系统”签发全球统一的《IECQ 核查声明书》。声明书的格式和内容严格遵循《IECQ OD 14067》的规定，参见附录 A。

Any holder can verify its authenticity and current status (valid, suspended, or revoked) by entering the statement number on the IECQ official website.

任何持有方均可通过 IECQ 官方网站，输入声明书编号，验证其真实性和当前状态（有效、暂停或撤销）。

When using the IECQ promotional mark in publicity, the certified organization must strictly comply with the provisions of *IECQ 01A*, including:

获证组织在宣传中使用 IECQ 推广标志时，必须严格遵守《IECQ 01A》的规定，包括：

a) It must be clearly stated that the mark solely represents that the Carbon Footprint of Product statement has undergone independent verification by the IECQ System.严禁将标志用于产品本身或产品包装上，以避免消费者误认为其是产品合格标志。
b) When using the mark, the complete IECQ Verification Statement number must be clearly marked adjacent to the mark.在使用标志时，必须将完整的 IECQ 核查声明书编号清晰地标注在标志的紧邻位置。
c) It must be clearly stated that the mark solely represents that

the Carbon Footprint of Product statement has undergone independent verification by the IECQ System.必须明确声明该标志仅代表其产品碳足迹声明经过了 IECQ 体系的独立核查。

d) The mark shall not be used in any way to mislead the public or harm the reputation of the IECQ System.不得以任何方式误导公众或损害 IECQ 体系的声誉。

For any improper use of the statement information or the IECQ Mark, the Body issues a written warning and requires correction within a specified period. If not corrected within the specified period or in severe cases, the suspension or revocation procedure of the statement is initiated.

对于任何不当使用声明书信息或 IECQ 标志的行为，本机构将发出书面警告并要求限期纠正。若在规定期限内未纠正或情节严重，将启动声明书的暂停或撤销程序。

9. Fees 收费

The Body's IECQ CFP verification service is a paid service, adhering to principles of impartiality and transparency. The main fee items include:

本机构的 IECQ CFP 核查服务为有偿服务，遵循公正、透明的原则。收费项目主要包括以下：

a) **Application Fee**: Covers initial administrative costs such as application intake and contract review. 申请费：用于覆盖申请受理、合同评审等初始管理成本。

b) **Verification Fee**: Calculated based on the total number of verifier-days determined in Section 6.1.2 "Determination of Verifier-Days and Fee Estimation," this constitutes the main part of the fee. 核查费：基于 6.1.2 节中“核查人日确定与费用估算”部分确定的核查总人日数进行计算，是费用的主体部分。

c) **Travel Expenses**: Costs for transportation, accommodation,

etc., incurred by verification personnel during on-site verification activities, which may be covered by the responsible party or collected based on actual costs.差旅费：核查人员在实施现场核查验证等活动中产生的交通、食宿等费用，可选择由责任方承担或据实收取。

Detailed fee standards and calculation methods are clearly stipulated in the *IECQ Carbon Footprint of Product/Service Verification Contract*.

详细的收费标准和核算方式将在《IECQ 产品碳足迹核查合同书》中明确约定。

10. Appeals, Complaints, and Disputes 申诉、投诉和争议

Any organization or individual, including the client, responsible party, and other stakeholders, has the right to submit an appeal, complaint, or dispute regarding the Body's IECQ CFP verification work and decisions. The Body ensures the processing procedure is impartial, timely, and effective. The detailed handling process follows the Body's publicly available *Rules for Handling Appeals, Complaints, and Disputes*.

任何组织或个人，包括委托方、责任方及其他利益相关方，均有权对本机构的 IECQ CFP 核查工作及其决定提出申诉、投诉或争议。本机构将确保处理过程的公正、及时和有效。详细处理流程遵循本机构公开的《申诉、投诉和争议处理规则》。

11. Verification Personnel Competence Requirements 核查人员能力要求

The Body ensures all personnel involved in IECQ CFP verification possess the requisite competence. Personnel selection, training, evaluation, and continuous monitoring strictly adhere to the

requirements of the *PD30-GHG IECQ Carbon Footprint Verification Personnel Competence Management Procedure*, ensuring compliance with ISO 14066 and specific IECQ requirements, particularly the mandatory requirements for LCA Critical Review (ISO 14071) competence.

本机构确保所有参与IECQ CFP核查的人员均具备相应的能力。人员的遴选、培训、评价和持续监控严格遵循《IECQ 碳足迹核查人员能力管理程序》的要求，确保满足 ISO 14066 及 IECQ 的特定要求，特别是对 LCA 关键性审查（ISO 14071）能力的强制性要求。

12. Information Disclosure and Confidentiality

信息公开与保密

The Body discloses the following non-confidential information to the public through its official website and other channels:本机构将通过官方网站等渠道，向社会公开以下非保密信息：

a) These Implementation Rules.本实施规则。
b) The Body's verification scope.本机构的核查业务范围。
c) Fee principles and standards.收费原则和标准。
d) Appeals, complaints, and dispute resolution procedures.申诉、投诉和争议处理程序。
e) Public information regarding issued IECQ Verification Statements (via the IECQ online system).已签发的 IECQ 核查声明书的公开信息（通过 IECQ 在线系统）。

The Body has a strict obligation to maintain the confidentiality of the responsible party's commercial, technical secrets, and all non-public information obtained during verification activities. All employees and relevant parties sign confidentiality agreements. The Body does not disclose relevant information to any third party unless required by laws and regulations or with the written authorization of the responsible party.

本机构对在核查活动中获知的责任方的商业、技术秘密和所有非公开信息负有严格的保密义务。所有员工及相关方均签署保密协议。除非法律法规要求或获得责任方的书面授权，本机构绝不向任何第三方泄露相关信息。

13. Responsibilities 责任

The responsibilities of the Body when implementing IECQ CFP verification services are as follows:在实施 IECQ 产品碳足迹核查业务时，本机构的责任如下：

a) Comply with national laws and regulations and the rules of the IECQ System.遵守国家法律法规和 IECQ 体系的各项规则。
b) Ensure the impartiality, independence, and objectivity of verification activities.确保核查活动的公正性、独立性和客观性。
c) Appoint verification personnel with appropriate competence and no conflict of interest.委派具备相应能力且无利益冲突的核查人员。
d) Take responsibility for the verification decision.为核查决定承担责任。
e) Fulfill confidentiality obligations.履行保密义务。

The responsibilities of the client/responsible party are as follows:委托方/责任方的责任如下：

a) Ensure the truthfulness, accuracy, and completeness of all information, data, and documents provided.确保所提供的所有信息、数据和文件的真实性、准确性和完整性。
b) Provide necessary cooperation and resources for verification activities.为核查活动提供必要的配合和资源。
c) Pay fees as agreed upon in the contract.按合同约定支付费用。
d) Comply with the regulations for the use of the IECQ Verification Statement and Mark.遵守 IECQ 核查声明书和标志的使用规定。
e) Promptly inform the Body of any significant changes that may affect the statement's validity.及时通报任何可能影响声明有效性的

重大变更。

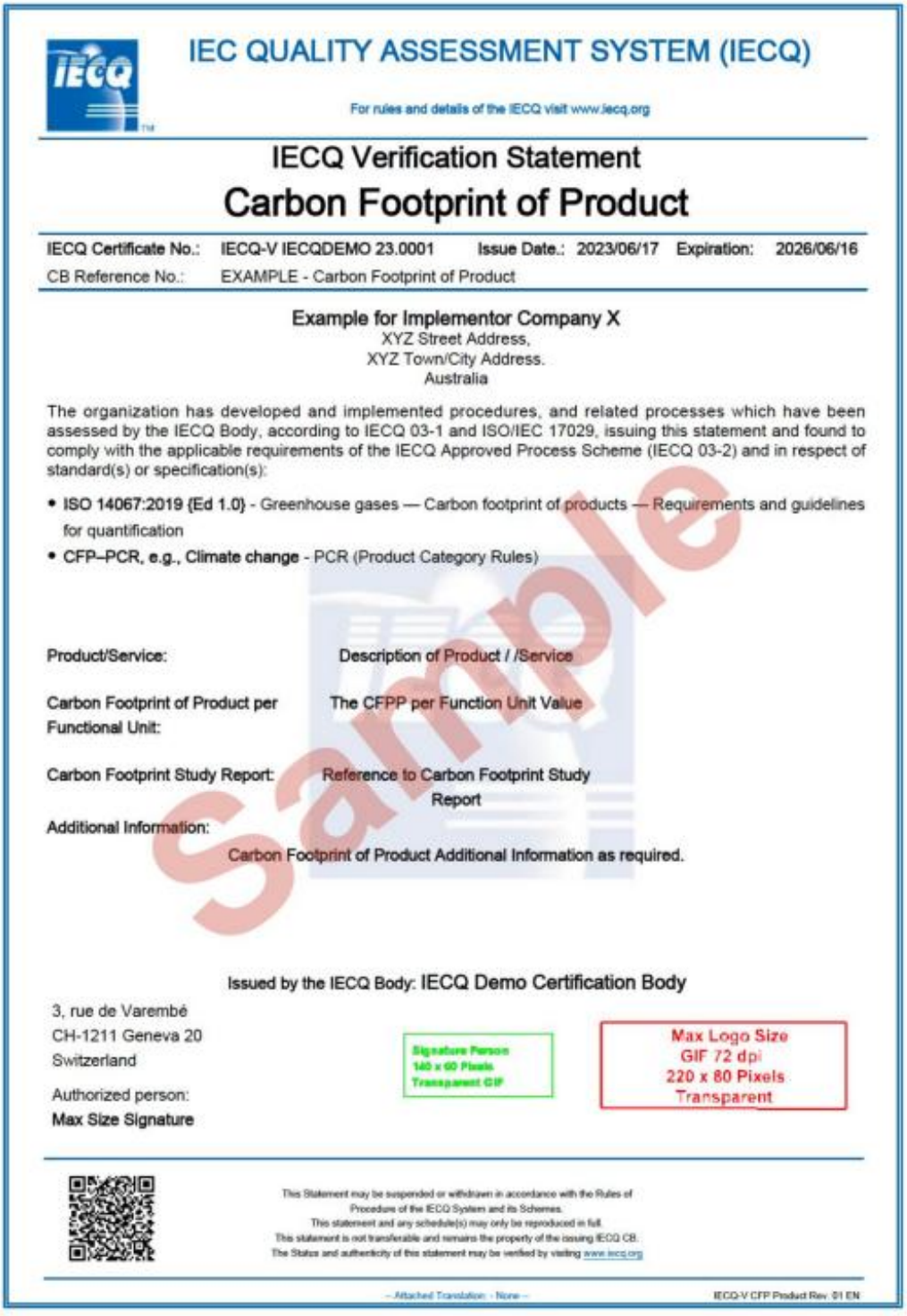
14. 附则

These Rules are approved by the General Manager of CESI Certification Co., Ltd. and are effective from the date of promulgation. The Body reserves the right to revise these Rules based on updates to laws, regulations, standards, and IECQ rules. The final right of interpretation of these Rules belongs to the Body.

本规则由北京赛西认证有限责任公司总经理批准，自发布之日起实施。本机构保留根据法律法规、标准和 IECQ 规则的更新而对本规则进行修订的权利。本规则的最终解释权归本机构所有。

Appendix A: IECQ Verification Statement (Sample)

附录 A：IECQ 核查声明书（样本）



IEC QUALITY ASSESSMENT SYSTEM (IECQ)

For rules and details of the IECQ visit www.iecq.org

IECQ Verification Statement

Carbon Footprint of Product

IECQ Certificate No.: IECQ-V IECQDEMO 23.0001 Issue Date.: 2023/06/17 Expiration: 2026/06/16

CB Reference No.: EXAMPLE - Carbon Footprint of Product

Example for Implementor Company X
XYZ Street Address,
XYZ Town/City Address.
Australia

The organization has developed and implemented procedures, and related processes which have been assessed by the IECQ Body, according to IECQ 03-1 and ISO/IEC 17029, issuing this statement and found to comply with the applicable requirements of the IECQ Approved Process Scheme (IECQ 03-2) and in respect of standard(s) or specification(s):

- **ISO 14067:2019 {Ed 1.0}** - Greenhouse gases — Carbon footprint of products — Requirements and guidelines for quantification
- **CFP–PCR, e.g., Climate change** - PCR (Product Category Rules)

Product/Service: Description of Product / /Service

Carbon Footprint of Product per Functional Unit: The CFPP per Function Unit Value

Carbon Footprint Study Report: Reference to Carbon Footprint Study Report

Additional Information:
Carbon Footprint of Product Additional Information as required.

Issued by the IECQ Body: IECQ Demo Certification Body

3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Authorized person:
Max Size Signature

Signature Person
140 x 60 Pixels
Transparent GIF

Max Logo Size
GIF 72 dpi
220 x 80 Pixels
Transparent

This Statement may be suspended or withdrawn in accordance with the Rules of Procedure of the IECQ System and its Schemes.
This statement and any schedule(s) may only be reproduced in full.
This statement is not transferable and remains the property of the issuing IECQ CB.
The Status and authenticity of this statement may be verified by visiting www.iecq.org

-- Attached Translation: - None --

IECQ-V CFP Product Rev. 01 EN

Sample

Appendix B: Guidance on Significant Changes

附录 B：重大变更指南

This guidance aims to provide responsible parties holding a valid "IECQ Verification Statement" with a clear and detailed framework for identifying, assessing, reporting, and managing any change that may affect the validity of their verified Carbon Footprint of Product (CFP) statement.

本指南旨在为持有有效“IECQ 核查声明书”的责任方提供一个清晰、详尽的框架，用于识别、评估、报告和管理任何可能影响其已核查产品碳足迹（CFP）声明有效性的变更。

A "Significant Change" refers to any change made to the Product System [133] that, upon reasonable assessment, may lead to a change in the verified CFP value, where the absolute value of this change exceeds the materiality threshold (e.g., $\pm 5\%$) mutually agreed upon by both parties in the contract at the time of verification.

重大变更”是指任何对产品系统（Product System）进行的、经合理评估后可能导致已核查的 CFP 值发生变化的变更，且该变化的绝对值超过了核查时双方在合同中约定的重要性水平（例如，±5%）。

In addition to the quantitative threshold, any fundamental adjustment to the underlying assumptions, methodology, system boundary , or allocation procedures in the original CFP Study Report must be considered a significant change, even if the resulting numerical change does not exceed the materiality threshold, as they undermine the basis of the original verification conclusion.

除定量阈值外，任何对原 CFP 研究报告中的基础假设、方法论、系统边界或分配原则进行的根本性调整，即使其直接导致的数值变化未超过重要性水平，

也应视为重大变更，因为它们动摇了原核查结论的基础。

The responsible party shall systematically identify all potential changes and assess their potential impact on the CFP as soon as possible (usually within one month) before or after the change implementation. The impact of the change should be analyzed quantitatively or qualitatively using the methodology and data quality requirements consistent with the original CFP Study Report. Once a change is confirmed to be significant, the Body must be formally notified in writing within 30 calendar days.

责任方应系统性地识别出所有潜在的变更，在变更实施前或实施后尽快（通常在一个月内）评估其对 CFP 的潜在影响。使用与原 CFP 研究报告一致的方法论和数据质量要求，对变更的影响进行定量或定性分析。一旦确认某项变更为重大变更，必须在 30 个自然日内以书面形式正式通知本机构。

The formal notification submitted by the responsible party to the Body shall include at least the *IECQ CFP Verification Change Application*, a detailed descriptive explanation of the change, the difference and change in the original result, and all related supporting evidence documents.

责任方向本机构提交的正式通知应至少包括《IECQ CFP 核查变更申请书》、对变更内容的详细描述说明以及原来结果的差异及变化情况、以及所有相关的支持性证据文件。

B1. Raw Material and Supply Chain Changes 原材料与供应链变更

Raw materials and the supply chain are core elements determining a product's "cradle-to-gate" carbon footprint (CFP), and any major movement in them can directly and significantly affect the carbon footprint accounting result. Therefore, effective management of related changes is key to ensuring the continued validity of the CFP statement.

原材料与供应链是决定产品“从摇篮到大门”碳足迹（CFP）的核心要素，其

任何重大变动都可能直接且显著地影响碳足迹核算结果。因此，对相关变更实施有效管理，是确保产品碳足迹声明持续有效的关键。

Changes in key raw materials are the primary focus. "Key raw materials" generally refer to materials that account for a high proportion of the total product mass, or those that contribute prominently to the product's total carbon footprint due to the "embodied carbon" from their upstream production process. Significant changes include the replacement of material types, i.e., the adoption of new materials with completely different chemical compositions, physical properties, or production processes. For example, replacing virgin ABS plastic with bio-based plastic (such as PLA) or 100% recycled content ABS in electronic products; substituting copper conductors with aluminum conductors in cable production; or changing lithium iron phosphate cathode material to ternary lithium material in battery manufacturing. Such changes directly affect the most important upstream emission factors in the life cycle inventory analysis, and their effects are often very pronounced. For instance, bio-based plastics may form a carbon sink during their growth phase, while recycled plastics can avoid a large amount of emissions from the mining and refining process of virgin materials, thus generating a clear carbon reduction effect in the model.

关键原材料的变更是首要关注点。“关键原材料”通常指在产品总质量中占比较高，或因其上游生产过程的“隐含碳”而对产品总碳足迹贡献突出的材料。重大变更包括材料类型的替换，即采用化学成分、物理特性或生产工艺完全不同的新材料。例如，在电子产品中，将原生 ABS 塑料替换为生物基塑料（如 PLA）或 100%回收再生 ABS；在电缆生产中，以铝导体替代铜导体；或在电池制造中，将磷酸铁锂正极材料更换为三元锂材料。这类变更直接影响生命周期清单分析中最重要的上游排放因子，其效应往往非常显著。例如，生物基塑料在其生长阶段

可能形成碳汇，再生塑料则可规避原生料开采和提炼过程中的大量排放，从而在模型中产生明显的降碳效果。

Even if the raw material type remains unchanged, merely switching main suppliers may constitute a significant change requiring reassessment. Different suppliers, due to factors such as production technology level, regional energy structure, geographical location (affecting transportation distance), and data transparency, may lead to significant differences in the carbon footprint of the same material. For example, a European chip supplier mainly relying on hydropower typically has a lower embodied carbon in its products than an Asian supplier primarily using thermal power; steel produced using the Electric Arc Furnace (EAF) process also has a far lower carbon footprint than steel made using the traditional Blast Furnace-Basic Oxygen Furnace (BF-BOF) process. Typically, suppliers whose annual procurement volume accounts for more than 20% of the total volume of that key raw material are considered "main suppliers," and changes involving them should be taken seriously.

即使原材料类型不变，仅更换主要供应商也可能构成需要重新评估的重大变更。不同供应商因生产技术水平、区域能源结构、地理位置（影响运输距离）及数据透明度等因素，可能导致同种材料的碳足迹差异显著。例如，主要依赖水电的欧洲芯片供应商，其产品隐含碳通常低于以火电为主的亚洲供应商；采用电弧炉（EAF）工艺的钢材，其碳足迹也远低于传统高炉-转炉（BF-BOF）工艺的钢材。通常，年采购量占该关键原材料总量 20%以上的供应商被视为“主要供应商”，其变动应予以重视。

Changes in the proportion of recycled material used are also an important factor affecting the CFP. Whether it is Post-Consumer Recycled (PCR) or Pre-Industrial Recycled (PIR) material, a significant increase in their proportion usually helps to lower the carbon footprint. For example, increasing the recycled cardboard content in packaging

from 30% to 80%, or introducing 25% marine recycled plastic into plastic components, can both significantly reduce the CFP by avoiding the emissions from virgin material production. Conversely, a decrease in the proportion of recycled material used may lead to an increase in the CFP.

回收材料的使用比例变化也是影响 CFP 的重要因素。无论是消费后回收（PCR）还是消费前回收（PIR）材料，其比例的显著提升通常有助于降低碳足迹。例如，将包装中回收纸板含量从 30%提高至 80%，或在塑料部件中引入 25%的海洋回收塑料，均可因避免原生材料生产排放而显著降低 CFP。反之，若回收材料使用比例下降，则可能导致 CFP 上升。

When assessing the above changes, rigorous quantitative analysis is required. Priority should be given to obtaining primary data such as verified Environmental Product Declarations (EPD) or CFP reports for the new materials or new suppliers; if unavailable, representative secondary data from authoritative Life Cycle Assessment (LCA) databases should be used, with the basis and source of selection recorded in detail. Subsequently, the mass and emission factor data for the original materials in the existing LCA model should be updated, the product CFP should be recalculated, and compared with the verified baseline value. If the rate of change (i.e., the absolute difference between the new and old CFP values relative to the original CFP value) exceeds the agreed materiality threshold (e.g., 5%), the certification or reporting body must be notified. Furthermore, even if the numerical change does not reach the threshold, if the introduction of the new material represents a major technological breakthrough in the industry or leads to inaccuracies in the material statement in the original report, it should also be reported as a significant change from a qualitative perspective.

评估上述变更时，需进行严谨的量化分析。应优先获取新材料或新供应商经第三方验证的环境产品声明（EPD）或 CFP 报告等初级数据；如不可得，则应选用权威生命周期评估（LCA）数据库中具有代表性的背景数据，并详细记录选择依据与来源。随后，在既有 LCA 模型中将原有材料数据更新为新的质量与排放因子，重新计算产品 CFP，并与已核查的基准值进行比较。若变化率（即新旧 CFP 差值的绝对值与原 CFP 值的比率）超过约定的重要性阈值（如 5%），必须向认证或报告机构通报。此外，即便数值变化未达阈值，若新材料引入代表行业重大技术突破，或导致原报告中材料声明失准，也应从定性角度视作重大变更予以报告。

B2. Energy Structure Changes 能源结构变更

Energy consumption is the main source of carbon emissions during the product manufacturing phase, and changes in its structure directly affect both direct and indirect energy emissions, thus playing a decisive role in the product carbon footprint.

能源消耗是产品制造阶段碳排放的主要来源，其结构变化直接影响直接排放和能源间接排放，对产品碳足迹具有决定性作用。

One aspect is the direct substitution of main energy types during production. For example, replacing a coal-fired boiler with a natural gas boiler can significantly reduce direct emissions; substituting a diesel forklift with an electric model shifts emissions from direct to indirect energy emissions. Installing a photovoltaic system on a factory roof for self-consumption effectively reduces electricity purchased from the grid, significantly lowering indirect energy emissions.

生产过程中主要能源类型的直接替换。例如将燃煤锅炉改为天然气锅炉，可大幅降低直接排放；将柴油叉车替换为电动车型，则使排放由直接排放转移至能源间接排放。在厂房屋顶安装光伏系统并实现自用，能有效减少电网外购电，显著降低能源间接排放。

The second aspect is changes in the source of purchased energy.

If a factory moves from a region dominated by thermal power to a grid region with a higher proportion of hydropower and wind power, using a lower grid emission factor will significantly reduce indirect energy emissions. Enterprises can also use near-zero emission factors for accounting by signing green power purchase agreements or purchasing green electricity certificates.

二是外购能源来源的变更。若工厂从火电为主区域迁至水电、风电占比较高的电网区域，采用更低的电网排放因子将显著降低能源间接排放。企业还可通过签订绿色电力采购协议或购买绿电证书等方式，在核算时使用接近零的排放因子。

When assessing energy changes, strict adherence to standards such as ISO 14067 is required, accurately collecting data on new fuel consumption, regional grid emission factors, and green certificate purchase and cancellation proofs, and updating the energy module in the LCA model for quantitative analysis. If the change leads to a rate of change in the carbon footprint that exceeds the set threshold, it must be reported. Furthermore, even if the numerical impact does not reach the threshold, the first implementation of large-scale green power procurement or self-built photovoltaic projects represents a fundamental shift in the enterprise's energy strategy and should be reported from a qualitative perspective.

评估能源变更时，需严格遵循 ISO 14067 等标准，准确收集新燃料消耗量、区域电网排放因子、绿证购买与注销证明等数据，并在 LCA 模型中更新能源模块进行量化分析。若变更导致碳足迹变化率超过设定阈值，必须进行报告。此外，首次实施大规模绿电采购或自建光伏等项目，即使数值影响未达阈值，也代表企业能源战略的根本转变，建议从定性角度予以报告。

B3. Production Process and Product Structure Changes 生产工艺与产品结构变更

Changes in production process and product design are important

pathways for enterprises to enhance quality and efficiency while reducing energy consumption and carbon, having a systemic impact on a product's carbon footprint across its entire life cycle. Changes in the production segment mainly include updates to core process equipment, improvements in production efficiency, and adjustments to production sites or lines. For example, replacing traditional casting processes with 3D printing, using new catalysts to reduce reaction energy consumption, or upgrading high-energy-consuming equipment to a Level 1 energy efficiency model, all effectively reduce energy and material consumption, cutting carbon emissions at the source. Concurrently, continuously improving product yield and production efficiency through lean manufacturing and other methods can reduce the energy and material carbon footprint allocated to each unit of product. Moreover, relocation of a production site changes the grid emission factor and transportation distance, while adding or closing production lines can affect the unit product carbon allocation due due to capacity distribution and technological differences; all these must be incorporated into the carbon footprint assessment system.

生产工艺与产品设计的变更是推动企业提质增效与节能降碳的重要路径，对产品在全生命周期内的碳足迹具有系统性影响。生产环节的变更主要包括核心工艺设备更新、生产效率提升以及生产地点或产线调整等方面。例如，将传统铸造工艺替换为 3D 打印、采用新型催化剂降低反应能耗，或将高耗能设备升级为一级能效型号，均能有效降低能源与物料消耗，从源头减少碳排放。同时，通过精益生产等方式持续提升产品良率和生产效率，能够降低单位产品所分摊的能源与物料碳足迹。此外，生产地点的搬迁会改变电网排放因子和运输距离，新增或关闭产线则可能因产能分配和技术差异影响单位产品的碳分摊，这些都需纳入碳足迹评估体系。

At the product design level, lightweight design and energy

efficiency upgrades of core components are key strategies for achieving carbon reduction. For example, substituting ordinary steel with aluminum alloy in auto parts, or optimizing packaging box structure to reduce cardboard usage, not only minimizes carbon emissions during the raw material stage but also helps to reduce energy consumption during the transportation and use stages. On the other hand, upgrading the energy efficiency of core components, such as replacing high-power consumption CPUs with low-power models, or using variable-frequency compressors in air conditioners, can continually yield energy savings during the use phase, with their long-term accumulated carbon reduction potential often being very significant.

在产品设计层面，常见的一种模式时轻量化设计和核心组件能效升级是实现碳减排的关键策略。如以铝合金替代普通钢材用于汽车零部件，或优化包装箱结构以降低纸板用量，不仅减少了原材料阶段的碳排放，也有助于降低运输和使用阶段的能耗。另一方面，核心组件的能效升级，例如将高功耗 CPU 更换为低功耗型号、在空调中采用变频压缩机等，能够在使用阶段持续发挥节能效果，其长期累积的碳减排潜力往往十分显著。

Effective management and assessment of the above changes are key to maintaining the accuracy of the carbon footprint statement. After the changes are implemented, information such as new process parameters, energy consumption data, yield changes, and new site grid factors should be systematically collected, and the corresponding process data in the Life Cycle Assessment (LCA) model should be updated, the carbon footprint recalculated, and the impact assessment reported.

对上述变更进行有效管理与评估，是维持碳足迹声明准确性的关键。在实施变更后，应系统收集新工艺参数、能耗数据、良率变化及新地点电网因子等信息，并在生命周期评价（LCA）模型中更新相应过程数据，重新计算碳足迹，评价影

响变更后予以报告。

B4. Waste Treatment Method Changes 废弃物处理方式变更

Waste generated during the production process, as an important output flow, undergoes fundamental changes in its treatment method that will directly affect the product carbon footprint. Assessing such changes requires accurate measurement of waste types and quantities, obtaining contractual documents for the new treatment pathway and corresponding emission factors, and updating the treatment unit and calculation parameters in the LCA model. The results after the change should be evaluated, and if a large impact occurs, the Body needs to be reported to.

生产过程中产生的废弃物作为重要的输出流，其处理方式的根本性变化将直接影响产品碳足迹。评估此类变更需准确计量废弃物种类与质量，获取新处理路径的合同文件及相应排放因子，并在 LCA 模型中更新处理单元与计算参数，评估变更后的结果，若发生较大的影响，需要向机构进行报告。