Natural Carbon Solutions

Natural Carbon Solutions
Products Footprinting Protocol

An in-depth explanation of the Natural Carbon Solutions' carbon footprinting methodology, rules of certification and labelling scheme

Version 2.0 - July 2025

www.naturalcarbonsolutions.com

Contents

1. Foreword

In today's marketplace, product sustainability and commercial success are increasingly interconnected. Leading manufacturers and brands recognise that sustainable growth requires sophisticated carbon management approaches that drive both environmental impact reduction and business value throughout the product lifecycle.

Natural Carbon Solutions (NCS) was founded to provide these advanced frameworks for product sustainability. Since launching our first Protocol in 2022, we've witnessed how traditional product carbon footprinting approaches often fail to capture the full picture of a product's environmental contribution and market positioning. Through extensive collaboration with product manufacturers, sustainability professionals, environmental specialists, and industry thought leaders, we're pleased to share version 2.0 of the Natural Carbon Solutions Protocol for Products—designed to enable superior environmental performance whilst supporting business growth.

Our protocol advances three fundamental principles:

1. **Comprehensive carbon measurement** aligned with product-specific international standards
2. **Intelligent carbon management** that recognises product development realities and market dynamics
3. **Rigorous third-party verification** for supply chain credibility and consumer trust

The distinctive value of Natural Carbon Solutions for products lies in our sophisticated approach to product carbon management. We provide comprehensive third-party verification against multiple international standards, including ISO 14067, ISO 14040/14044, and relevant Product Category Rules (PCRs), coupled with our proprietary Carbon Efficiency methodology and broader value chain contributions through avoided emissions verification, that enables meaningful environmental progress aligned with business objectives.

NCS product certification represents the evolution of product sustainability, moving beyond simple compliance to deliver frameworks that enable both environmental leadership and commercial success. When you choose NCS for your products, you're adopting methodologies designed for modern businesses that recognise environmental stewardship and business excellence as complementary objectives.

2. What is Natural Carbon Solutions?

Natural Carbon Solutions (NCS) is a comprehensive carbon management certification and verification scheme designed for modern manufacturers and brands that recognise environmental leadership and commercial excellence as interconnected objectives. Our platform serves products across all categories and scales, delivering sophisticated methodologies firmly grounded in international standards whilst addressing real-world product development and market contexts.

NCS provides three core verification services for products:

1. **Comprehensive Standards Verification:** We provide rigorous third-party verification of product carbon footprint data aligned with ISO 14067, ISO 14040/14044, and relevant Product Category Rules (PCRs), ensuring your product carbon accounting meets the highest professional standards across all lifecycle stages.
2. **Carbon Efficiency Methodology:** Our proprietary approach to product carbon management that measures how effectively products use carbon to create value, enabling meaningful environmental progress whilst supporting product innovation and market positioning.
3. **Avoided Emissions Verification:** Quantification and verification of greenhouse gas emissions avoided through your products' use compared to conventional alternatives, using comparative lifecycle assessment methodologies. This addresses emissions reductions that occur in customers' operations or value chains through product substitution or enabling technologies.

Our approach recognises that whilst absolute reduction targets serve specific contexts, intelligent carbon management must balance environmental objectives with commercial realities such as market demand, technological constraints, and business growth. By participating in the NCS scheme, manufacturers and brands are able to demonstrate sophisticated environmental leadership whilst maintaining the flexibility to pursue innovation and market expansion.

NCS enables product teams to move beyond basic compliance toward strategic environmental management that creates both stakeholder value and competitive advantage in increasingly sustainability-conscious markets.

3. The Protocols of Natural Carbon Solutions

The Natural Carbon Solutions certification scheme provides comprehensive frameworks for carbon footprinting, verification, and certification across diverse entities. To address the unique characteristics and requirements of different reporting entities, NCS operates through four distinct protocols:

Protocol Structure

The NCS General Standard encompasses four specific protocols, each tailored to the unique characteristics and requirements of different reporting entities:

1. **Organisations Protocol:** Designed for any company, institution, or association comprising one or more people with a particular business purpose. This protocol addresses the specific needs of organisational carbon accounting across all operational boundaries and emission scopes.

2. **Products Protocol:** Created for objects, systems, or services made available for customer use, defined by a distinct reference unit. This protocol focuses on lifecycle carbon assessment methodology, from raw material extraction through manufacturing, distribution, use, and end-of-life.

3. **Events Protocol:** Tailored for one-off or recurring, planned public or social occasions. This protocol addresses the temporal nature of events and their unique supply chain considerations.

4. **Buildings Protocol:** Divided into two distinct applications:

    - **Building Construction:** For finite projects to construct or refurbish buildings, immobile structures, or external physical infrastructure.

    - **Building Operation:** For the operation of a portfolio, whole building, or part of a building for one calendar year.

About This Document

This document specifically details the **Products Protocol** of the Natural Carbon Solutions certification scheme. It provides comprehensive guidance on product carbon footprint measurement, verification, and certification specifically for product entities across all categories and business models.

The other protocols (Organisations, Events, and Buildings) are detailed in separate documents, each addressing the unique methodological considerations and certification requirements relevant to those specific reporting entities.

Whilst each protocol is tailored to different entity types, all share NCS's core principles of comprehensive measurement, verification-based credibility, and practical accessibility, ensuring a consistent approach to carbon management across diverse applications whilst recognising the distinct needs of product sustainability.

4. How does it work?

The Natural Carbon Solutions certification process provides a comprehensive framework that enables multiple approaches to product environmental leadership whilst maintaining rigorous standards and verification protocols specific to product lifecycle management.

The Certification Process:

1. **Comprehensive Measurement:** Manufacturers and brands conduct complete product carbon footprint assessments following NCS methodology, which integrates requirements from ISO 14067, ISO 14040/14044, relevant Product Category Rules, and other international standards.
2. **Third-Party Verification:** NCS conducts rigorous verification of product carbon footprint data through our Vero platform, ensuring compliance with applicable standards and methodological rigour across all product lifecycle stages.
3. **Pathway Selection:** Manufacturers choose their certification pathway based on product strategy, market requirements, customer demands, and environmental objectives.
4. **Certification:** Upon successful verification, NCS issues the appropriate certification, enabling manufacturers to communicate verified environmental achievements to customers, supply chain partners, and stakeholders.
5. **Biennial Recertification:** Certified products maintain their status through recertification every two years, demonstrating continued compliance and performance improvement.

Certification Pathways Available

NCS offers three distinct pathways to product environmental leadership, each designed for different business contexts and strategic objectives:

- **Carbon Efficient Certification:** Built on our proprietary Carbon Efficiency methodology, this certification measures how effectively products use carbon to deliver functionality, enabling meaningful environmental progress whilst supporting innovation and market growth.
- **Carbon Neutral Certification:** For products seeking immediate carbon neutrality through verified offsetting, combined with systematic reduction efforts across all lifecycle stages.
- **Avoided Carbon Emissions Certification:** For products seeking to demonstrate and verify the climate benefits they enable for customers through substitution of higher-carbon alternatives and solutions, providing recognition of broader contribution to decarbonisation beyond their own footprint.

Product-Specific Considerations

The NCS framework is designed to recognise the unique characteristics of product sustainability:

- **Lifecycle Complexity:** Products involve multiple stages from materials through manufacturing, distribution, use, and end-of-life, requiring sophisticated carbon accounting approaches.
- **Functional Value:** Products must deliver consistent functionality whilst improving environmental performance, requiring intensity-based metrics that reflect value creation.
- **Market Dynamics:** Product certification must accommodate innovation cycles, market positioning, and competitive pressures whilst maintaining environmental integrity.
- **Supply Chain Integration:** Product sustainability requires collaboration across complex, often global supply chains with multiple stakeholders and varying capabilities.

5. The Verification and Certification Process

Natural Carbon Solutions provides robust third-party verification that ensures full compliance with international product standards whilst recognising multiple legitimate approaches to product carbon management. Our verification methodology aligns with ISO 14065 and ISO 14066, providing assurance that product carbon claims meet all regulatory and reporting requirements across supply chains and markets.

Why Verification Matters for Products

- **Supply Chain Credibility:** Product verification provides independent assurance of carbon data essential for B2B customer confidence, procurement decisions, and supply chain transparency requirements
- **Consumer Trust:** Verified product carbon footprints support credible consumer-facing environmental claims and marketing communications in increasingly sustainability-conscious markets
- **Regulatory Compliance:** Product verification supports compliance with emerging product carbon labelling regulations, environmental disclosure requirements, and extended producer responsibility frameworks
- **Competitive Differentiation:** NCS certification distinguishes products in sustainability-focused markets whilst demonstrating compliance with international standards
- **Innovation Insights:** Verification provides valuable insights that balance environmental objectives with product development realities, all within the context of international best practices

Verification Components for Products

- **Lifecycle Standards Verification:** Products submit carbon footprint data through our Vero platform, enabling efficient verification against ISO 14067, ISO 14040/14044, relevant PCRs, and other applicable international frameworks
- **Functional Performance Analysis:** We evaluate environmental performance using appropriate metrics for each certification pathway, recognising different forms of legitimate progress within established product standards
- **Avoided Emissions Assessment:** For products providing low-carbon alternatives or enabling technologies, we evaluate avoided emissions using comparative lifecycle methodologies that quantify GHG reductions enabled in customers' operations
- **Supply Chain Integration Verification:** Assessment of data quality and collection methodologies across complex, multi-stage product supply chains
- **Comprehensive Verification Report:** Independent verification confirms environmental achievements and compliance with international product standards, providing credible credentials for B2B and B2C markets

Product-Specific Verification Components

For All Product Types:

- **Functional Unit Verification:** Assessment of functional unit definition, ensuring appropriate basis for comparison and meaningful impact assessment
- **System Boundary Verification:** Evaluation of lifecycle stage inclusion and exclusion decisions, ensuring compliance with ISO 14067 and relevant PCR requirements
- **Data Quality Assessment:** Review of primary versus secondary data sources across complex multi-stage product supply chains

For Physical Products:

- **Material Impact Verification:** Assessment of raw material selection, sourcing data, and supply chain carbon accounting methodologies
- **Manufacturing Process Verification:** Evaluation of production energy data, process efficiency measures, and facility-level carbon accounting
- **Distribution Verification:** Assessment of transportation modes, packaging impacts, and logistics carbon accounting

For Digital Products:

- **Infrastructure Verification:** Assessment of data centre energy consumption, cloud service provider carbon accounting, and digital infrastructure impacts
- **User Impact Verification:** Evaluation of methodology for estimating user device energy consumption and network data transmission impacts
- **Lifecycle Boundary Verification:** Assessment of appropriate system boundaries for digital product lifecycle stages

The Vero Platform for Products

NCS verification is conducted through Vero, our proprietary carbon footprint verification platform designed to ensure efficiency, transparency, and rigour for product assessments:

- **Product Lifecycle Integration:** Verification workflow organised around product lifecycle stages with appropriate data collection and assessment tools
- **Supply Chain Collaboration:** Tools for coordinating engagement across suppliers, manufacturers, and distribution partners
- **Carbon Efficiency Tracking:** Tools for monitoring carbon intensity improvements over time and across product portfolios
- **Real-Time Collaboration:** Time-stamped comments and feedback systems enable clear communication between product teams and verifiers
- **Quality Assurance:** Built-in validation checks identify potential errors before formal verification begins, streamlining the process

Quality Assurance for Products

- **Product Category Expertise:** Verifiers assigned to product projects have relevant experience in the specific product category and its associated supply chains
- **Lifecycle Assessment Competency:** All product verifiers maintain current LCA expertise and knowledge of evolving product carbon footprinting standards
- **Supply Chain Understanding:** Verification processes accommodate the complex, often global supply chains typical of modern products

The NCS product verification process provides manufacturers and brands with confidence that their product carbon accounting meets current best practices while supporting their broader sustainable product development and marketing objectives.

6. Compliance with International Standards

Natural Carbon Solutions advances product carbon management by integrating best practices from leading international frameworks. Rather than creating competing standards, NCS harmonises and enhances existing methodologies to provide comprehensive, accessible product carbon management solutions across all product categories and business models.

By achieving Natural Carbon Solutions product certification, manufacturers and brands demonstrate alignment with requirements from multiple international standards, including:

- **ISO 14067:** International standard for quantifying and reporting the carbon footprint of products
- **ISO 14040/14044:** International standards for lifecycle assessment principles and framework
- **GHG Protocol Product Standard:** International accounting and reporting framework for product lifecycle emissions
- **Product Category Rules (PCRs):** Where available, specific methodological requirements for product categories
- **ISO 14068-1:** Guidelines for carbon neutrality achievement and verification (for Carbon Neutral certification)

Standards Integration Approach for Products

- **Methodological Harmonisation:** NCS provides clear methodological solutions where international product standards may have conflicting requirements or gaps in guidance, particularly for emerging product categories
- **Comprehensive Coverage:** Where product categories lack sufficient footprinting guidance or verification schemes, NCS provides proprietary methodologies within the international standards framework, including verification of avoided emissions enabled through products using GHG Protocol Product Standard and ISO lifecycle assessment principles
- **Practical Implementation:** NCS methodologies work within real product development and market contexts whilst maintaining environmental integrity and international standards compliance
- **PCR Integration:** Where relevant Product Category Rules exist, NCS provides enhanced verification of PCR compliance while maintaining global applicability

Integration with Product Standards Ecosystem

The Natural Carbon Solutions Products Protocol operates as a comprehensive, globally applicable certification framework that interoperates with established product sustainability standards:

Core Product Standards:

- **ISO 14067:** Full alignment with the international standard for product carbon footprint quantification and reporting, ensuring methodological consistency and comparability
- **ISO 14040/14044:** Integration with international standards for lifecycle assessment principles and framework, providing comprehensive environmental impact context
- **Product Category Rules (PCRs):** Where available, alignment with relevant PCRs for specific product categories, ensuring industry-specific methodological accuracy

Regional Product Standards:

- **EU Product Environmental Footprint (PEF):** Compatibility with European Union product environmental impact assessment methodologies
- **UK Product Carbon Footprinting:** Alignment with UK-specific product carbon assessment guidance and requirements
- **APAC Product Standards:** Integration with Asia-Pacific regional product sustainability frameworks where they exist

Industry-Specific Standards:

- **Textile and Apparel:** Integration with Sustainable Apparel Coalition methodologies and Product Environmental Profile standards
- **Food and Beverage:** Compatibility with Food and Agriculture Organization guidelines and industry-specific carbon footprinting methodologies
- **Electronics:** Alignment with EPEAT criteria and electronics industry carbon footprinting standard
- **Automotive:** Integration with automotive lifecycle assessment standards and industry carbon accounting frameworks

Supply Chain Standards:

- **GHG Protocol Product Standard:** Full compliance with greenhouse gas accounting protocols for product-level carbon footprinting
- **Science-Based Targets Product Guidance:** Alignment with SBTi guidance for product-level target setting and carbon reduction planning where relevant
- **CDP Supply Chain:** Integration with CDP supply chain carbon reporting requirements and methodologies
- **ISO 14001:** Compatibility with environmental management system requirements for product-related environmental aspects

Continuous Standards Alignment for Products

NCS maintains leadership in product carbon management through:

- **Annual Protocol Review:** The NCS Products Protocol undergoes formal annual review to incorporate newly published standards, updated emission factors, and emerging best practices specific to product categories
- **Structured Transitions:** When significant standards updates occur, NCS implements structured transition provisions with adequate notice periods, guidance documentation, and phased adoption where appropriate

Product Category Flexibility

NCS recognises the diversity of product types and their associated sustainability challenges:

1. **Complex Manufactured Products:** Sophisticated supply chains requiring comprehensive materials and process carbon accounting across multiple stages and geographies
2. **Digital Products:** Emerging impact categories requiring innovative measurement and assessment approaches for infrastructure and user interactions
3. **Service Products:** Operational carbon footprints requiring different system boundary considerations and customer interaction accounting
4. **Hybrid Products:** Products combining physical and digital elements requiring integrated assessment methodologies

The NCS Products Protocol has been specifically designed to address this diversity while maintaining alignment with core international carbon accounting principles and product lifecycle assessment standards.

Carbon Efficiency and Innovation Focus for Products

The protocol emphasises carbon efficiency improvement as a key pathway for product sustainability, recognising that:

- Growing businesses and expanding product lines may experience absolute carbon increases while achieving significant efficiency improvements per functional unit
- Innovation in product design, materials, and manufacturing can deliver substantial carbon intensity reductions
- Consumer and B2B customer choice is increasingly influenced by product carbon performance and improvement trajectories
- Supply chain partners require reliable, comparable carbon data to support their own sustainability commitments and procurement decisions

By achieving Natural Carbon Solutions product certification, manufacturers and brands demonstrate alignment with this comprehensive range of international standards while benefiting from a unified verification approach that reduces complexity and ensures consistency across diverse product portfolios.

7. Natural Carbon Solutions Certification for Products

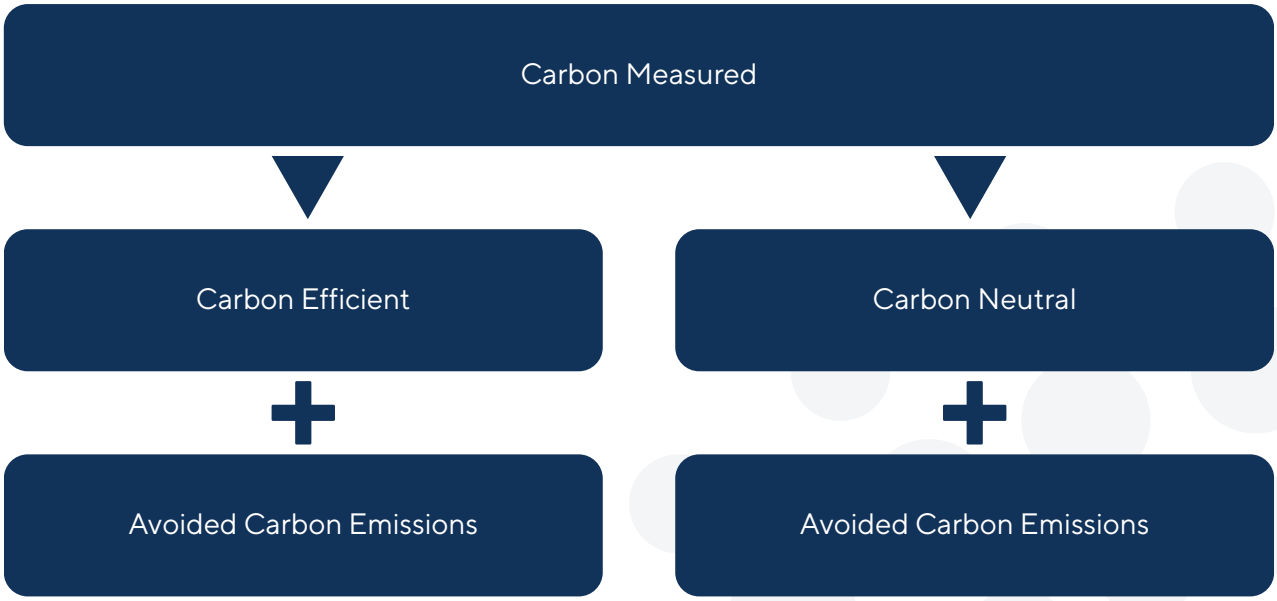
Definition of an Product:

For the purposes of this protocol, a product is defined as any object, system or service made available for customer use which can be defined by a distinct reference unit.

Natural Carbon Solutions Certification Journey for Products:

NCS certification for products is sequential in nature, with manufacturers and brands advised to follow the requirements of each certification in turn. Each certification builds upon the previous level's requirements whilst providing progressively more sophisticated environmental recognition and market differentiation.

Certification Pathways



Carbon Measured is the first step for all products. After completing Carbon Measured, manufacturers choose one of two primary pathways based on their strategy and capabilities:

- **Carbon Efficient:** Based on annual improvements in Carbon Efficiency per functional unit
- **Carbon Neutral:** Systematic reductions and carbon offsetting to achieve neutrality

Avoided Carbon Emissions is an additional certification that can be pursued alongside either primary pathway to demonstrate a product's avoided emissions contribution to broader decarbonisation.

Each pathway represents a different approach to demonstrating environmental leadership and climate action through product development. All certifications require recertification every two years and third-party verification through NCS.

General Requirements for all Certifications:

Functional Unit Definition Establishes the basis for quantifying product performance and carbon intensity.	**Requirements for All Certifications:** • Define clear, appropriate functional units that reflect the product's primary function and value proposition • Ensure functional units enable meaningful comparison between products serving similar functions • Maintain consistency in functional unit definitions across certification periods • Document functional unit selection rationale with supporting evidence • Apply functional units consistently across all product variants and applications *Note: Functional unit requirements become more stringent at higher certification levels, requiring enhanced justification and market validation.*
System Boundaries Defines the scope of lifecycle stages included in carbon footprint assessment.	**Requirements for All Certifications:** • Define clear system boundaries appropriate to product application and market context • For B2B products: typically cradle-to-gate boundaries covering materials, manufacturing, and delivery • For B2C products: typically cradle-to-grave boundaries including use phase and end-of-life • Document all boundary decisions and justify any exclusions with quantified reasoning • Ensure consistency in boundary application across reporting periods • Include at least 95% of lifecycle emissions within defined boundaries *Note: Higher certification levels require more comprehensive boundary coverage and enhanced justification for any exclusions.*
Data Quality Standards Standards for data collection, management, and quality assurance across product supply chains.	**Requirements for All Certifications:** • Prioritise primary data from direct measurements of specific processes and operations • Use primary data from similar processes within the company where specific data unavailable • Apply secondary data from industry databases with clear documentation and justification • Exclude VAT from any financial data used in calculations • Implement processes to continuously improve data quality over time • Document data collection methodologies for all lifecycle stages *Note: Higher certification levels require progressively higher proportions of primary data, particularly for material emission sources.*

Product Category Rules (PCR) Compliance Application of industry-specific methodological guidance where available.	**Requirements for All Certifications:** • Apply relevant Product Category Rules (PCRs) where they exist for the product category • Where PCRs are not available, follow ISO 14067 and ISO 14040/14044 principles • Document any deviations from PCRs with clear justification • Ensure methodological consistency across product variants within the same category • Maintain awareness of emerging PCRs and update methodologies accordingly *Note: Compliance requirements become more stringent at higher certification levels with enhanced verification of PCR adherence.*
Emission Factors Sources and application of emission factors used in lifecycle calculations.	**Requirements for All Certifications:** • Use the most recent, relevant, and reliable emission factors for all calculations • Prioritise region-specific and technology-specific emission factors where available • Clearly document all databases and emission factors used with source references • Apply emission factors consistently across reporting periods • Make reasonable corrections for outdated databases (e.g., inflation adjustments for financial data) *Note: Advanced certifications require demonstrable year-on-year reductions in calculation uncertainty.*
Uncertainty Analysis Assessment of data reliability and accuracy across product lifecycle.	**Requirements for All Certifications:** • Conduct quantitative uncertainty analysis of all datasets used in the product carbon footprint • Use the NCS Uncertainty Analysis Tool to quantify uncertainty aligned with established methodologies • Focus uncertainty analysis on material emission sources with simplified approaches for minor sources • Document how uncertainty results will guide data quality improvements in subsequent assessments • Prioritise improvement of data sources with high uncertainty values • Note: Different certification levels align with different combinations of standards; for example, Carbon Neutral certification specifically requires alignment with ISO 14068-1. *Note: Advanced certifications require demonstrable improvements in calculation uncertainty over time.*

Compliance with Standards Alignment with international product lifecycle assessment standards.	**Requirements for All Certifications:** • Calculate all product carbon footprints in accordance with ISO 14067, ISO 14040, and ISO 14044 • Apply the standards' principles of relevance, completeness, consistency, transparency, and accuracy • Incorporate GHG Protocol Product Standard principles where applicable • Clearly reference adherence to each standard's relevant clauses • Maintain awareness of and adaptation to evolving standards *Note: Different certification levels align with different combinations of standards; Carbon Neutral certification specifically requires alignment with ISO 14068-1*
Reporting Requirements Documentation and disclosure of product carbon footprint information.	**Requirements for Higher-Level Certifications:** • Report carbon footprint on an intensity basis using appropriate functional units • Provide breakdown of emissions by lifecycle stage and major contributing processes • Report both intensity metrics and absolute emissions for transparency • Clearly document and justify any exclusions from the assessment • Use NCS's provided standardised reporting templates • Include visual representations alongside tabular data *Note: Public disclosure requirements vary by certification level, with higher levels requiring more comprehensive public reporting.*
Carbon Management Plan Strategic approach to emissions reduction over time for higher-level certifications.	**Requirements for Higher-Level Certifications:** • Develop comprehensive Carbon Management Plan outlining baseline period, reduction targets, and timelines • Set specific short-term and long-term reduction targets aligned with science-based pathways • Implement emissions reduction measures meeting documented feasibility criteria • Include all technologically and economically feasible measures for carbon reduction across the product lifecycle • Review and update the carbon management plan every 2-3 years *Note: Carbon Efficient certification allows intensity-based targets, while Carbon Neutral certification requires absolute impact reduction combined with offsetting.*

Emission Reductions Demonstration of actual emissions reductions achieved for higher-level certifications.	**Requirements for Higher-Level Certifications:** • Demonstrate reductions in product carbon intensity for the reporting period • Implement reduction measures across the product lifecycle as outlined in the carbon management plan • Ensure carbon reductions are achieved within the product lifecycle boundaries • Document and justify calculation methods and any external influencing factors • Focus on carbon efficiency per functional unit as primary measure of progress *Note: Required reduction approaches vary by certification level, with Carbon Efficient focusing on intensity improvements and Carbon Neutral requiring absolute impact reduction.*
Avoided Carbon Emissions Assessment Quantification of emissions avoided through product use compared to conventional alternatives.	**Requirements for Avoided Carbon Emissions Certification:** • Conduct comparative lifecycle assessment for the product compared to conventional alternatives • Establish baseline scenarios representing technologies or products that would occur without the certified product • Apply functional equivalence between baseline and certified product using consistent system boundaries • Document all key assumptions with supporting evidence and apply conservative estimation methods • Quantify avoided emissions using GHG Protocol Product Standard and ISO 14040/14044 principles • Base calculations on actual market adoption patterns rather than theoretical potentials • Conduct uncertainty analysis for all avoided emissions datasets • Provide separate reporting of avoided emissions alongside product lifecycle footprint *Note: Avoided Carbon Emissions Certification can be pursued alongside any primary certification pathway.*
Offsetting Requirements Use of carbon credits to address residual emissions for applicable certifications.	**Requirements for Applicable Certifications:** • Offset residual emissions using only carbon credits that meet NCS quality requirements • Ensure all purchased carbon credits meet international standards for additionality, permanence, and verification • Develop a carbon offsetting plan for addressing residual carbon emissions across the product lifecycle • Provide evidence of the retirement of carbon credits with appropriate documentation • Publicly report carbon credits used with transparent disclosure *Note: Carbon Neutral certification requires offsetting of all residual emissions after reduction efforts, using high-quality carbon removal credits.*

Certification Process Formal recognition of achievement of certification requirements.	**Requirements for All Certifications:** • Upon successful verification of all applicable requirements, NCS will issue the appropriate certification • All certifications are valid for two years from the date of issuance • Recertification requires demonstration of continued adherence to all requirements • All verification findings must be addressed prior to certification issuance *Note: All certifications are subject to NCS's terms of use, and certification necessitates addition to the NCS Alumni Network.*

Carbon Offsetting Framework for Products:

Carbon offsetting serves important functions in product certification:

- **Immediate Climate Action:** Offsetting enables products to address their carbon impact whilst implementing longer-term reduction strategies in design and manufacturing, providing immediate environmental benefit during transition periods
- **Addressing Unavoidable Emissions:** Certain emissions remain challenging to eliminate entirely, particularly in materials-intensive products, complex manufacturing processes, and specific use applications. Quality offsetting provides a mechanism to address these residual emissions
- **Supporting Innovation:** Offset purchases generate funding for emission reduction and removal projects, accelerating deployment of clean technologies whilst product teams develop internal capabilities and supply chain improvements
- **Market Positioning:** Carbon Neutral products provide immediate market differentiation whilst longer-term reduction strategies are implemented across product portfolios

Carbon offsetting complements rather than substitutes for direct emission reductions, with NCS requiring systematic reduction efforts alongside any offsetting activities for product certifications.

Reporting Standards for Products

When reporting emissions and reductions, products must:

- Clearly specify whether absolute emissions or emissions intensity is being used for each reported figure and target
- Always report absolute emissions alongside intensity metrics to ensure transparency
- When setting targets, specify whether these are absolute or intensity-based with necessary context
- Ensure chosen intensity metrics are relevant to product function and consistent with value proposition

Products providing enabling technologies or efficiency solutions may report stable or increasing absolute emissions with decreasing intensity metrics when appropriately justified through market substitution analysis.

NCS assesses the appropriateness of chosen metrics and justifications as part of the verification process.

Understanding Avoided Emissions for Products

What Are Avoided Emissions for Products?

Avoided emissions represent greenhouse gas reductions that occur in customers' operations or value chains through use of the certified product compared to conventional alternatives. These emissions quantify a product's broader contribution to global decarbonisation through market substitution, efficiency improvements, or enabling technologies.

Core Principle for Products

Avoided emissions are quantified through comparative lifecycle assessment, measuring the difference between:

- **Baseline scenario:** Conventional product or technology that customers would use without the certified product
- **Comparative scenario:** The certified product's actual performance
- **Difference = avoided emissions**

Why This Matters for Products

For products providing low-carbon alternatives, efficiency solutions, enabling technologies, or innovative substitutes for higher-carbon conventional products, Avoided Carbon Emissions Certification provides essential recognition of their contribution to global climate action beyond their own lifecycle footprint.

Practical Examples for Products

- Electric vehicles: Avoided emissions from reduced fossil fuel consumption vs. conventional vehicles
- Digital services: Avoided emissions from reduced physical product consumption or travel
- Efficient equipment: Avoided emissions from optimised energy consumption vs. standard alternatives

Relationship to Product Carbon Footprinting

Avoided emissions are separate from and additional to traditional product carbon footprinting:

- Cannot be used to offset a product's own lifecycle emissions
- Reported alongside, not instead of, product lifecycle carbon footprint
- Use comparative product assessment rather than standalone product footprinting
- Represent broader market and economic system effects of product adoption

Avoided Carbon Emissions Certification can be pursued alongside any primary certification pathway (Carbon Efficient or Carbon Neutral) to provide comprehensive recognition of a product's total climate contribution.

Natural Carbon Solutions

Carbon Measured Product

Natural Carbon Solutions **Carbon Measured** Products

7.1 Carbon Measured

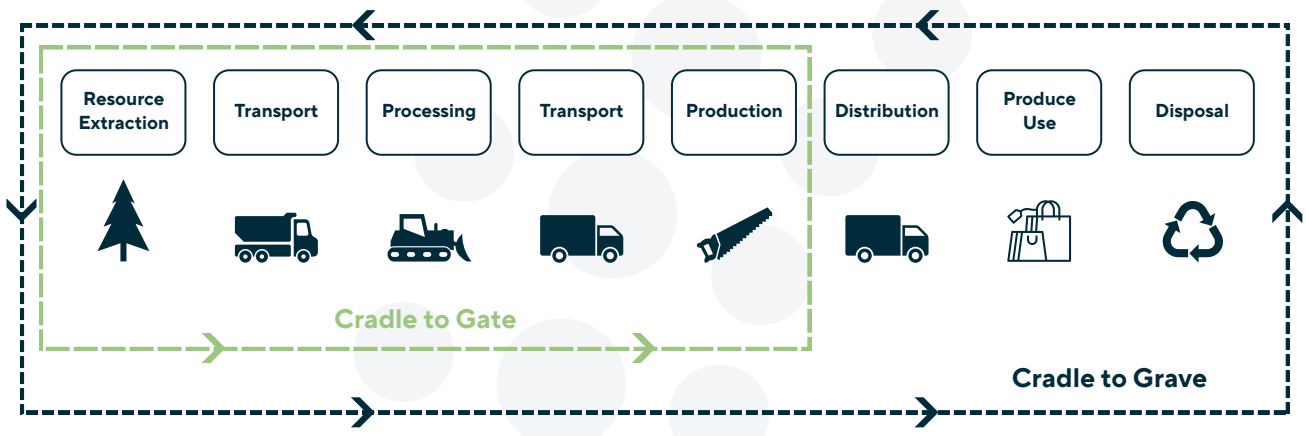
About this Certification

The Carbon Measured certification is the foundational step in the Natural Carbon Solutions (NCS) certification journey for products. This certification demonstrates your organisation's commitment to accurately measuring product carbon footprints using methodologies that harmonise international best-practice guidance and provide essential data for supply chain transparency and customer decision-making.

This certification can be complemented by **Avoided Carbon Emissions Certification** to provide comprehensive recognition of your product's total climate contribution both its own footprint and the emissions reductions it enables for customers.

Certification Requirements:

1. **Emissions Scope and Measurement:**
    - Measure the product carbon footprint (PCF) in accordance with ISO 14067, ISO 14040 and ISO 14044.
    - Report the PCF on an intensity basis (e.g., $kgCO_2e$ per functional unit, such as $kgCO_2e$/t-shirt).
    - Define a clear, appropriate functional unit that reflects the product's primary function and enables meaningful comparison
    - Where Product Category Rules (PCR) exist for the product category, these shall be used in the PCF measurement.
2. **System Boundaries:**
    - Define clear cradle-to-gate or cradle-to-grave system boundaries appropriate to the product application
    - For business-to-business (B2B) products, report upfront carbon emissions (cradle-to-gate)
    - For business-to-consumer (B2C) products, report whole life carbon emissions (cradle-to-grave)
    - Provide clear documentation of boundary decisions and exclusions



3. Data Quality:

- Prioritise primary data from direct measurements of specific processes (highest quality)
- Use primary data from similar processes or facilities within the company where specific data unavailable
- Apply secondary data from industry-specific databases or suppliers with clear documentation
- Use high quality databases (e.g., Ecoinvent, GaBi) where better data is not available
- Exclude VAT from any financial data used in calculations

4. Cut-off Criteria:

- Apply a 5% cut-off criteria to the analysed system's product, waste, and elementary flows
- Verify robustness and replicability of cut-off criteria for future assessments
- Provide quantitative uncertainty analysis to support cut-off implementation

5. Uncertainty Analysis:

- Conduct quantitative uncertainty analysis as required by ISO 14067
- Use the NCS Uncertainty Analysis Tool to quantify uncertainty aligned with established methodologies
- Focus uncertainty analysis on material emission sources

6. Compliance with Standards:

- Calculate all product carbon footprints in accordance with ISO 14067, ISO 14040, and ISO 14044
- Apply relevant Product Category Rules where they exist
- Maintain alignment with GHG Protocol Product Standard principles

8. Reporting:

- Use NCS's provided standardised reporting template
- Report both intensity metrics and absolute emissions for transparency
- Include visual representations alongside tabular data
- Clearly document functional unit selection and system boundary decisions

9. Certification:

- Upon successful verification, NCS will issue the Carbon Measured certification

Technical Standards:

This certification aligns with and incorporates requirements from the following internationally recognised standards:

- ISO 14067: Greenhouse gases — Carbon footprint of products
- ISO 14040: Environmental management — Life cycle assessment — Principles and framework
- ISO 14044: Environmental management — Life cycle assessment — Requirements and guidelines

Validity and Recertification:

The Carbon Measured certification for Products is valid for two years from the date of issuance. To maintain certification, entities must recalculate and reverify their product carbon footprint before expiry, demonstrating continual improvement in data quality and completeness.

Next Steps:

Upon achieving Carbon Measured certification, manufacturers are encouraged to proceed to either Carbon Efficient certification (focusing on efficiency improvements) or Carbon Neutral certification (focusing on absolute impact reduction and offsetting). Products providing low-carbon alternatives may separately pursue **Avoided Carbon Emissions Certification** to quantify emissions reductions enabled for customers through comparative analysis against conventional alternatives.

Natural Carbon Solutions

Carbon Efficient Product

Natural Carbon Solutions **Carbon Efficient** Products

7.2 Carbon Efficient

About this Certification

The Carbon Efficient certification demonstrates that a product's carbon footprint is being actively reduced through improved Carbon Efficiency per functional unit. This certification provides manufacturers and brands with the opportunity to show they are implementing comprehensive measures to reduce the carbon intensity of their products throughout the lifecycle, focusing on how effectively carbon is used to deliver product value and functionality.

Built on the concept of Carbon Efficiency, this certification recognises meaningful progress while accommodating the realities of product development, market growth, and innovation cycles. This approach follows a straightforward principle: when efficiency improvements outpace any volume increases, environmental impact decreases relative to function delivered, allowing businesses to demonstrate meaningful progress while accommodating their operational and market realities.

This certification can be complemented by **Avoided Carbon Emissions Certification** to provide comprehensive recognition of your product's total climate contribution—both reducing its own footprint intensity and enabling reductions for others.

Certification Requirements:

1. **Carbon Footprint Measurement:**
    - Comply with all requirements of the Carbon Measured certification for Products.
    - Conduct a full lifecycle carbon footprint measurement in accordance with ISO 14067, ISO 14040, and ISO 14044.
    - Maintain consistency in functional unit definition and system boundaries between measurement periods to ensure valid comparison of Carbon Efficiency improvements.
2. **Carbon Efficiency Plan:**
    - Develop a comprehensive Carbon Efficiency plan for the product aligned with science-based pathways.
    - Set specific short-term and long-term targets for carbon intensity reductions, aligned with the following minimum targets:
        - 43% reduction by 2030
        - 60% reduction by 2035
        - 90% reduction by 2050
    - Include all technologically and economically feasible measures for improving Carbon Efficiency across the product lifecycle.
    - Document how Carbon Efficiency improvements will be measured using appropriate intensity metrics.

3. Carbon Efficiency Improvement:

- Demonstrate actual reductions in the product's carbon intensity using appropriate Carbon Efficiency metrics
- Implement efficiency improvement measures across the product lifecycle as outlined in the Carbon Efficiency plan
- Report both absolute emissions and efficiency metrics for complete transparency
- Focus on carbon intensity per functional unit as the primary measure of progress

4. Carbon Efficiency Review Process:

- A dedicated Carbon Reduction Specialist shall propose optimisations to improve the Carbon Efficiency of the product
- For each measure to be considered 'feasible', it shall fulfil the following criteria:
  - The function of the product shall remain the same or be improved
  - Statutory and regulatory requirements are met
  - Prioritisation of Carbon Efficiency measures in reducing lifecycle carbon emissions

5. Continuous Improvement:

- Demonstrate improvement in Carbon Efficiency across product development cycles
- Regularly review and update the Carbon Efficiency plan to reflect new opportunities and technologies
- Document innovation in materials, processes, or design that contribute to efficiency gains

6. Supply Chain Engagement:

- Engage with key suppliers to improve Carbon Efficiency in the product's upstream supply chain.
- Provide evidence of collaborative initiatives or support programmes for suppliers.

7. Transparency and Reporting:

- Clearly communicate the product's Carbon Efficient commitment, including scope and boundaries
- Provide public disclosure of lifecycle carbon footprint, efficiency metrics, and improvement achievements
- Use NCS's standardised reporting templates for consistency

8. **Monitoring and Verification:**

   - Implement systems for ongoing monitoring and reporting of product lifecycle emissions and efficiency metrics
   - Engage NCS to verify carbon footprint and efficiency improvements

9. **Certification:**

   - Upon successful verification of all requirements, NCS will issue the Carbon Efficient certification

Technical Standards:

This certification aligns with and incorporates requirements from internationally recognised standards:

- ISO 14067: Greenhouse gases — Carbon footprint of products
- ISO 14040: Environmental management — Life cycle assessment — Principles and framework
- ISO 14044: Environmental management — Life cycle assessment — Requirements and guidelines
- ISO 14068-1: Greenhouse gas management and related activities — Carbon neutrality

Emissions Measurement and Reporting:

The product shall demonstrate improvements in Carbon Efficiency over time:

- Report product carbon footprint on an intensity basis (e.g., $kgCO_2e$/functional unit)
- Clearly specify efficiency metrics being used and their relevance to product function
- Report absolute emissions alongside intensity metrics for transparency
- Provide context for chosen intensity metrics and their relevance to product value

Validity and Recertification:

The Carbon Efficient certification for Products is valid for two years from the date of issuance. To maintain certification, entities must:

- Recalculate their full product lifecycle carbon footprint before expiry
- Demonstrate continued Carbon Efficiency improvements aligned with science-based reduction pathways
- Update their Carbon Efficiency plan
- Verify all data and claims with NCS

Next Steps:

The Carbon Efficient certification represents an advanced approach to product sustainability, particularly valuable for products undergoing development or in growth markets. By focusing on Carbon Efficiency, this certification recognises that product innovation and climate progress can be compatible when manufacturers continuously improve how effectively they use carbon to create product value.

This approach is especially valuable for:

- Products in growth markets where absolute metrics would penalise success
- Innovative products that enable broader system efficiency gains
- Products transitioning toward more comprehensive decarbonisation approaches
- Manufacturers implementing structured carbon reduction across product portfolios

Products achieving Carbon Efficiency improvements may also qualify for **Avoided Carbon Emissions Certification** to verify how their enhanced efficiency enables emissions reductions for customers compared to conventional alternatives.

Natural Carbon Solutions

Carbon Neutral Product

Natural Carbon Solutions
Carbon Neutral Products

7.3 Carbon Neutral

About this Certification

The Carbon Neutral certification for Products demonstrates that a product's net carbon emissions have been reduced to zero through a combination of reduction measures and high-quality carbon removal credits. This certification, aligned with ISO 14068-1, provides manufacturers and brands with the opportunity to show they are taking significant action to address the climate impact of their products whilst supporting customer sustainability commitments.

This certification serves as a credible approach to achieving immediate carbon neutrality whilst building capabilities for longer-term systematic reduction strategies.

This certification can be complemented by **Avoided Carbon Emissions Certification** to provide comprehensive recognition of your product's total climate contribution—both achieving neutrality and enabling reductions for others.

Certification Requirements:

1. **Carbon Footprint Measurement:**
    - Comply with all requirements of the Carbon Measured certification for Products.
    - Conduct a full lifecycle carbon footprint measurement in accordance with ISO 14067, ISO 14040, and ISO 14044.
    - Maintain consistency in functional unit definition and system boundaries for offsetting calculations
2. **Carbon Management Plan and Neutrality Pathway:**
    - Develop a comprehensive carbon management plan and carbon neutrality pathway for the product
    - Demonstrate systematic emissions reductions aligned with science-based pathways and sectoral pathways
    - Include all technologically and economically feasible measures for emissions reduction across the product lifecycle
    - Set specific short-term and long-term targets for carbon footprint reductions
3. **Emissions Reduction:**
    - Demonstrate actual reductions in the product's carbon intensity for the chosen reporting period
    - Implement reduction measures across the product lifecycle as outlined in the carbon management plan
    - Ensure carbon reductions are achieved within the boundary of the product lifecycle assessment

4. **Carbon Offsetting:**

- Offset any residual emissions after reduction efforts using only high-quality carbon removal credits
- Ensure all purchased carbon removal credits meet NCS carbon credit requirements
- Develop a carbon offsetting plan for addressing residual carbon emissions across the product lifecycle

5. **Transparency and Reporting:**

- Clearly communicate the product's Carbon Neutral commitment, including scope and boundaries of neutrality
- Provide public disclosure of full lifecycle carbon footprint, reduction achievements, and offsetting strategy
- Report the quantity and type of carbon credits used for offsetting

6. **Monitoring and Verification:**

- Implement systems for ongoing monitoring and reporting of product lifecycle emissions
- Engage NCS to verify carbon footprint, reduction achievements, and offsetting claims

7. **Continual Improvement:**

- Demonstrate improvements in carbon reduction efforts across product development cycles
- Regularly review and update the carbon management plan to reflect new opportunities and technologies

8. **Certification:**

- Upon successful verification of all requirements, NCS will issue the Carbon Neutral certification.

Technical Standards:

This certification aligns with and incorporates requirements from internationally recognised standards:

- ISO 14068-1: Greenhouse gas management and related activities — Carbon neutrality
- ISO 14067: Greenhouse gases — Carbon footprint of products
- ISO 14040: Environmental management — Life cycle assessment — Principles and framework
- ISO 14044: Environmental management — Life cycle assessment — Requirements and guidelines

Emissions Measurement and Reporting:

The product carbon footprint shall be reported on an intensity basis, clearly stating the functional unit used. Both cradle-to-gate and cradle-to-grave emissions shall be calculated where applicable. The entity must:

- Clearly specify the intensity metric used for reporting
- Provide context for the chosen functional unit and its relevance to the product
- Report absolute emissions alongside intensity metrics for transparency
- Clearly communicate the quantity and type of carbon credits used for offsetting

Validity and Recertification:

The Carbon Neutral certification for Products is valid for two years from the date of issuance. To maintain certification, entities must:

- Recalculate their full product lifecycle carbon footprint before expiry
- Demonstrate continued emissions reductions
- Update their carbon management plan and neutrality pathway
- Offset residual emissions with carbon removal credits
- Verify all data and claims with NCS

Next Steps:

While Carbon Neutral certification represents significant achievement in product sustainability, entities are encouraged to consider Carbon Efficient certification to focus on systematic intensity improvements, or to explore how their products enable broader decarbonisation through **Avoided Carbon Emissions Certification** for comprehensive climate impact recognition.

Natural Carbon Solutions

Avoided Carbon Emissions Product

Natural Carbon Solutions
Avoided Carbon Emissions
Products

7.4 Avoided Carbon Emissions

About this Certification

The Avoided Carbon Emissions Certification for Products demonstrates that a product has been accurately assessed, measured, and verified for the emissions it enables customers to avoid compared to conventional alternatives. This certification provides manufacturers and brands with the opportunity to showcase the positive climate impacts their products deliver beyond their own lifecycle boundaries, verifying their contribution to broader decarbonisation efforts through product innovation and market substitution.

This certification is particularly valuable for products that serve as low-carbon alternatives, enabling technologies, efficiency solutions, or any offerings that substitute higher-carbon conventional products. It recognises that many products contribute to global climate action not only through their own optimised footprint but by enabling emission reductions in customers' operations and value chains.

The certification employs rigorous comparative lifecycle assessment methodologies to quantify the difference between conventional baseline products and the certified product, providing stakeholders with verified evidence of broader climate contributions that complement traditional product carbon footprinting with comprehensive avoided emissions assessment.

Certification Requirements:

1. **Product Carbon Footprint Measurement:**
    - Comply with all requirements of the Carbon Measured certification for Products
    - Conduct full lifecycle carbon footprint measurement in accordance with ISO 14067, ISO 14040, and ISO 14044
    - Maintain clear separation between product lifecycle footprint and avoided emissions assessment
2. **Avoided Emissions Assessment:**
    - Conduct comprehensive assessment of emissions avoided through the product's use compared to conventional alternatives
    - Apply the GHG Protocol's "Estimating and Reporting the Comparative Emissions Impacts of Products" as the primary methodological framework
    - Document complete lifecycle comparative scenarios for the product category
    - Ensure calculations are based on conservative assumptions with appropriate sensitivity analysis
    - Cover the product's primary use applications and market segments

3. Methodology and Boundaries:

- Establish identical functional units for both baseline and alternative products ensuring true comparability
- Define clear system boundaries encompassing all relevant lifecycle stages (manufacturing, distribution, use, end-of-life)
- Document all key assumptions with supporting evidence from credible sources
- Apply conservative estimation methods where data gaps exist, clearly documenting limitations
- Consider geographical variations in baseline products and emission factors

4. Baseline Product Development:

- Identify the most likely conventional product that would be used without your product's availability
- Use market research, technology assessments, and industry data to support baseline product selection
- Ensure baseline scenarios are conservative, transparent, and aligned with current market realities
- Document technological, economic, and behavioural factors influencing baseline selection
- Plan for regular baseline scenario updates to reflect technological advancement and market changes

5. Market Implementation Analysis:

- Base calculations on actual market adoption patterns rather than theoretical potentials
- Document market penetration data and substitution rates with appropriate evidence
- Consider real-world implementation factors including user behaviour, performance variations, and market constraints
- Account for regional variations in baseline products and market conditions
- Provide evidence of actual deployment and performance data where available

6. Functional Equivalence Verification:

- Demonstrate that the product delivers equivalent or superior functionality compared to baseline alternatives
- Document any performance trade-offs and their implications for avoided emissions calculations
- Consider full product lifecycle performance including durability, maintenance, and end-of-life characteristics
- Account for any auxiliary products or systems required for equivalent functionality

7. **Uncertainty Analysis:**

- Conduct quantitative uncertainty analysis of all datasets used in avoided emissions assessment
- Use the NCS Uncertainty Analysis Tool to quantify uncertainty aligned with established methodologies
- Apply uncertainty assessment to both baseline product scenarios and comparative product performance
- Document how uncertainty results will be addressed in subsequent assessments
- Prioritise improvement of data sources with highest uncertainty contributions

8. **Compliance with Standards:**

- Calculate and report avoided emissions in accordance with GHG Protocol's "Estimating and Reporting the Comparative Emissions Impacts of Products"
- Apply ISO 14067 principles for product carbon footprint comparison
- Incorporate ISO 14040/14044 lifecycle assessment principles for system boundary definition and impact assessment
- Align with relevant Product Category Rules where applicable
- Demonstrate compliance with international best practices for comparative product assessment

9. **Transparency and Reporting:**

- Clearly communicate the product's avoided emissions assessment, including scope, boundaries, and methodologies
- Use NCS's provided standardised reporting template for avoided emissions
- Include appropriate context for avoided emissions claims, including limitations, uncertainties, and assumptions
- Provide product-specific performance metrics relevant to stakeholder needs
- Ensure all public communications align with verified assessment results

10. **Verification Process:**

- Submit complete assessment documentation through the Vero platform
- Engage NCS to verify avoided emissions assessment, methodological compliance, and supporting data
- Address all verification findings before certification issuance
- Provide evidence of ongoing monitoring and data collection systems
- Demonstrate capacity for biennial recertification and continuous improvement

Technical Standards:

This certification aligns with and incorporates requirements from internationally recognised standards:

- GHG Protocol: "Estimating and Reporting the Comparative Emissions Impacts of Products" (primary standard)
- ISO 14067: Greenhouse gases — Carbon footprint of products — Requirements and guidelines for quantification
- ISO 14040/14044: Environmental management — Life cycle assessment principles and framework
- ISO 14064-2: Specification for quantification, monitoring, and reporting of greenhouse gas emission reductions
- Relevant Product Category Rules (where applicable)

Avoided Emissions Relationship to Product Carbon Footprinting:

- Product Footprint: Direct lifecycle emissions from the product itself
- Avoided Emissions: Emissions prevented in the broader economy through product substitution
- Methodological Distinction: Avoided emissions use comparative product assessment rather than standalone product footprinting
- Complementary Reporting: Avoided emissions results reported alongside, not instead of, traditional product footprint

Avoided Emissions Measurement, Reporting, and Verification:

The entity shall follow a structured approach to measuring, reporting, and verifying avoided emissions:

1. **Baseline Product Definition and Validation:**
    - Define clear and realistic baseline product scenarios representing conventional alternatives
    - Document baseline product specifications, performance characteristics, and market positioning
    - Ensure baseline assumptions are conservative and aligned with market realities
    - Validate baseline scenarios through industry consultation and market research

2. **Comparative Assessment Implementation:**

   - Ensure functional equivalence between baseline and certified products across all relevant criteria
   - Apply consistent system boundaries and calculation methodologies across scenarios
   - Consider full lifecycle impacts including manufacturing, distribution, use, and end-of-life phases
   - Document all material differences between baseline and certified products

3. **Calculation Approach and Quality Assurance:**

   - Calculate avoided emissions as the difference between baseline product emissions and certified product emissions
   - Apply appropriate allocation methods where multiple products contribute to the avoidance
   - Present results with appropriate uncertainty ranges and contextual information
   - Validate calculations through sensitivity analysis and scenario testing

4. **Reporting Requirements and Communication:**

   - Clearly specify functional units for each calculation ensuring comparability
   - Document calculation methodologies, key assumptions, limitations, and uncertainties
   - Communicate results in context of product positioning and customer benefits
   - Include visual representations and case studies to enhance stakeholder understanding

Validity and Recertification:

The Avoided Carbon Emissions Certification for Products is valid for two years from the date of issuance. To maintain certification, entities must:

- Recalculate their product lifecycle carbon footprint using current NCS requirements
- Update avoided emissions assessment with current market data, product performance, and adoption patterns
- Review and refine baseline product scenarios to reflect technological and market developments
- Demonstrate continuous improvement in data quality and methodological sophistication
- Address any changes in product specifications, market conditions, or competitive landscape
- Verify all data and claims with NCS through established verification processes

Next Steps:

Upon achieving Avoided Carbon Emissions Certification, manufacturers are encouraged to:

1. **Expand Product Assessment Scope:** Consider additional use applications and market segments for avoided emissions quantification

2. **Enhance Product Innovation:** Use avoided emissions insights to guide product development priorities and innovation strategies

3. **Strategic Market Positioning:** Integrate avoided emissions achievements into product marketing and customer value propositions

4. **Supply Chain Integration:** Collaborate with customers and distributors to maximise avoided emissions potential through optimised implementation

5. **Continuous Improvement:** Explore strategies to increase the climate benefits of existing products and develop new solutions with higher avoided emissions potential

This certification provides products with rigorous, standardised verification of their broader climate contributions, complementing traditional carbon footprinting with recognised acknowledgement of enabled emissions reductions throughout the value chain.

8. Low Carbon Pathway Tool

The Natural Carbon Solutions (NCS) Low Carbon Pathway Tool is an integral part of the NCS Certification process for products, guiding manufacturers and brands in strategically planning and prioritising carbon reduction activities across their product lifecycles and supply chains.

This structured, product-focused approach, accessible through the Vero Platform, provides entities with clear guidance on prioritisation via a simple Impact vs. Influence matrix, complemented by additional practical criteria specifically designed for product sustainability management.

Step 1: Define Product Activities

- Clearly define product boundaries and lifecycle activities in line with NCS Carbon Measured certification requirements
- Utilise predefined product categories or custom categories relevant to your product type within the Vero Platform
- Map activities across all relevant lifecycle stages (materials, manufacturing, distribution, use, end-of-life)

Step 2: Quantify Product Emissions

Report carbon emissions for each identified product activity, expressed typically as kgCO2e per functional unit, categorising these emissions based on impact:

- High Impact: Activities contributing >20% of total product lifecycle emissions
- Medium Impact: Activities contributing 5-20% of total product lifecycle emissions
- Low Impact: Activities contributing 1-5% of total product lifecycle emissions
- Negligible Impact: Activities contributing <1% of total product lifecycle emissions

Step 3: Assess Product Influence

Classify each product activity based on your organisation's level of influence or control across the product supply chain:

- High Influence: Direct control over design decisions, material selection, or manufacturing processes
- Medium Influence: Partial control through supplier relationships, specifications, or procurement requirements
- Low Influence: Limited influence through supplier engagement, standards compliance, or market pressure
- No Influence: No direct control, typically downstream use phase or end-of-life activities

Step 4: Prioritise Product Reductions (Impact vs. Influence Matrix)

Plot product activities using the simplified Impact vs. Influence matrix within the Vero Platform to clearly identify immediate and longer-term priorities:

	High Influence	Medium Influence	Low/No Influence
High Impact	Immediate Priority	Near-term Priority	Long-term Action
Medium Impact	Near-term Priority	Near-term Priority	Long-term Action
Low/Negligible	Long-term Action	Long-term Action	Monitor Only

Note: Consider high-quality carbon offsetting as an option within this matrix, especially when offsetting might deliver greater emissions reductions per investment compared to internal product improvements. Additionally, consider how your product enables emissions reductions for customers, which can be verified through Avoided Carbon Emissions Certification to demonstrate broader climate impact.

Step 5: Additional Product-Specific Criteria

After initial prioritisation, you shall consider the following criteria within the Vero Platform to refine action selection for products:

- **Cost-effectiveness:** Identify actions providing the greatest emissions reductions per investment across the product lifecycle
- **Technical Feasibility:** Prioritise actions that are technically viable within product performance requirements and regulatory constraints
- **Supply Chain Readiness:** Select measures where suppliers have capability and willingness to implement changes
- **Market Acceptance:** Consider customer and market acceptance of product modifications or performance changes
- **Innovation Opportunity:** Identify measures that could provide competitive advantage or market differentiation

These criteria will assist you in efficiently selecting among multiple actions within each priority level whilst maintaining product functionality and market positioning.

Step 6: Set Product Reduction Targets

Clearly define within the Vero Platform:

- Annual carbon intensity reduction targets for each prioritised action (e.g., % reduction per functional unit)
- Specific timelines for meeting these targets aligned with product development cycles
- Documentation of reduction actions and supporting calculations for NCS review
- Integration with product development roadmaps and innovation planning

Step 7: Monitor Product Progress and Adapt

- Regularly update emissions data within the tool to track performance against reduction targets
- Assess progress at key product development milestones
- Annually review and adapt your prioritisation and reduction strategies to ensure continuous improvement
- Integrate learnings into next-generation product development

Step 8: Product Lifecycle Scenario Planning

Utilise the Product Lifecycle Scenario Module within the Vero Platform to:

- Model potential future emissions scenarios across different product design options and supply chain configurations
- Assess the effectiveness of various reduction pathways, enabling informed product development decisions
- Evaluate trade-offs between different reduction strategies and their impact on product performance

Step 9: Product Supply Chain Resilience Assessment

Perform a simplified Supply Chain Resilience Assessment within the Vero Platform to:

- Quickly evaluate key climate-related risks across your product supply chain
- Assess supplier readiness for carbon reduction initiatives
- Integrate resilience insights into your product carbon reduction planning
- Identify opportunities for supply chain collaboration and improvement

You are also encouraged to explore the "Product Innovation Hub" within the NCS Alumni Network for peer insights, case studies, and innovative solutions specific to product carbon reduction across different categories and applications.

Alignment with Product Standards

This tool explicitly aligns measurement and prioritisation of product emissions with ISO 14067, ISO 14040/14044, and relevant Product Category Rules. Clear references and guidance are provided within the Vero Platform to ensure transparency and adherence to product-specific best practices.

By employing this structured yet comprehensive approach, you will effectively prioritise product carbon reduction efforts, ensuring meaningful progress that consistently aligns with international product standards whilst supporting innovation and market competitiveness.

9. Uncertainty Analysis Tool

The Uncertainty Analysis Tool is a crucial component in calculating the product carbon footprint inventory uncertainty, aligning strictly with the GHG Protocol's established methodology and ISO 14067 requirements. All reporting entities shall use this tool as part of the product certification process to ensure ongoing improvements in data quality and accuracy of product lifecycle measurements. The following enhanced guidance complements this robust and compliant approach for product applications:

Methodology for Products

You shall follow the GHG Protocol-compliant methodology, calculating parameter uncertainty based on Data Quality Indicators (DQIs) specific to product lifecycle assessment. Activity data and emission factor uncertainties shall be evaluated separately across all product lifecycle stages, using Taylor series expansion for uncertainty propagation.

Product-Specific Process

You shall:

- Define product lifecycle activities clearly in alignment with Carbon Measured certification and your product carbon reduction plan
- Specify the use of primary or secondary data across materials, manufacturing, distribution, use, and end-of-life stages
- Assign Basic Uncertainty numerical factors according to GHG Protocol and ISO 14067 guidance
- Evaluate data quality for product activities and emission factors using provided DQI tables
- Report carbon emissions for each product lifecycle activity in kgCO2e per functional unit to weight the data quality
- For products pursuing **Avoided Carbon Emissions Certification**, apply the same uncertainty analysis methodology to avoided emissions datasets using comparative product lifecycle assessment data quality indicators

Data Quality Indicator

	Data Quality Indicator				
	Technology	**Time**	**Geography**	**Completeness**	**Reliability**
Very Good	Data generated using the same technology	Data with less than 3 years of difference	Data from the same area	Data from all relevant sites over an adequate time period to even out normal fluctuations	Verified data based on measurements
Good	Data generated using a similar but different technology	Data with less than 6 years of difference	Data from a similar area	Data from more than 50 percent of sites for an adequate time period to even out normal fluctuations	Verified data partly based on assumptions or non-verified data based on measurements
Fair	Data generated using a different technology	Data with less than 10 years of difference	Data from a different area	Data from less than 50 percent of sites for an adequate time period to even out normal fluctuations or more than 50 percent of sites but for a shorter time period	Non-verified data partly based on assumptions, or a qualified estimate (e.g. by a sector expert)
Poor	Data where technology is unknown	Data with more than 10 years of difference or the age of the data are unknown	Data from an area that is unknown	Data from less than 50 percent of sites for shorter time period or representativeness is unknown	Non-qualified estimate
N/A	-	-	-	-	-

Product Lifecycle Materiality Thresholds

You shall identify and address uncertainty thresholds specific to product applications:

- Materials Phase: Target uncertainty <15% for materials contributing >50% of product footprint
- Manufacturing Phase: Target uncertainty <10% for energy-intensive production processes
- Use Phase: Target uncertainty <20% for products with significant use-phase emissions
- End-of-Life Phase: Accept higher uncertainty (up to 30%) where data availability is limited

Annual Product Uncertainty Improvement Reporting

You shall explicitly document annual uncertainty improvements within your product carbon footprint report, specifying:

- Actions undertaken to enhance data quality across specific product lifecycle stages
- Quantifiable improvements in data quality indicators
- Supplier engagement outcomes and data quality improvements
- Technology or measurement improvements implemented

Linking Product Uncertainty to Reduction Planning

You shall integrate uncertainty analysis outcomes into your Product Low Carbon Pathway planning by:

- Prioritising reduction actions in lifecycle stages with highest data quality and confidence
- Investing in improved data collection for high-impact, high-uncertainty activities
- Collaborating with suppliers to improve data quality for upstream processes
- Implementing measurement technologies where feasible to reduce estimation uncertainty

Product-Specific Qualitative Uncertainty Commentary

You shall optionally include qualitative commentary in your uncertainty analysis for products, explaining:

- Uncertainties specific to your product category not fully captured quantitatively
- Supply chain complexities affecting data availability and quality
- Emerging technologies or processes where uncertainty is inherently higher
- Customer use patterns and their impact on use-phase uncertainty

Supporting Tools within Vero for Products

You shall utilise the Vero Platform for:

- **Dynamic Product Uncertainty Tracking:** Visually track uncertainty changes across product development cycles and supply chain improvements
- **Lifecycle Stage Analysis:** Identify uncertainty patterns across different product lifecycle stages
- **Supplier Collaboration Tools:** Facilitate data quality improvement initiatives with supply chain partners
- **Product Category Benchmarking:** Compare uncertainty levels with similar products in your category

Product Innovation and Uncertainty Management

You shall consider uncertainty management as part of product innovation strategy:

- **Design for Measurability:** Consider data availability and measurement feasibility in product design decisions
- **Supply Chain Transparency:** Prioritise suppliers with robust environmental data management systems
- **Technology Integration:** Explore opportunities for real-time monitoring and measurement technologies
- **Collaborative Initiatives:** Participate in industry initiatives to improve product category data quality

Continuous Improvement for Products

You shall consistently strive to improve data quality and reduce uncertainties across product lifecycles, ensuring product carbon footprint measurements become increasingly accurate, reliable, and aligned with international product standards.

Special considerations for product uncertainty improvement include:

- **Supplier Development:** Work with key suppliers to improve their environmental data management capabilities
- **Industry Collaboration:** Participate in Product Category Rule development and industry data sharing initiatives
- **Technology Adoption:** Implement measurement technologies where cost-effective and practical
- **Standardisation:** Adopt standardised measurement approaches across product portfolios where possible

By adopting these enhanced requirements alongside the robust GHG Protocol and ISO 14067 methodology, you will significantly enhance the practical value of uncertainty analysis for products, driving continuous data quality improvements essential for effective product carbon management and supply chain transparency.

10. Natural Carbon Solutions (NCS) Alumni Network

The Natural Carbon Solutions (NCS) Alumni Network provides ongoing support and value to product manufacturers and brands that have completed their carbon footprint verification. The network fosters credibility, facilitates strategic knowledge sharing, and encourages meaningful collaboration, driving continuous progress in product sustainability and supply chain decarbonisation.

Recognising the importance of balancing public transparency with competitive confidentiality, the Alumni Network offers distinct public and private resources, ensuring product alumni maintain control over their information while maximising their sustainability impact and market positioning.

Public-Facing Platform

The public component ensures transparent communication of product carbon footprint outcomes, allowing customers, supply chain partners, and the wider market to easily verify and appreciate each product's sustainability achievements. Key features include:

- Public Disclosure Dashboard: Clear, verified summaries of high-level product carbon footprint data and certification status
- Product Certification Verification System: Quick and straightforward validation of product certification status for customers and procurement teams
- Product Highlight Pages: Professionally presented profiles highlighting product sustainability milestones and commitments, enhancing market visibility and customer trust

Private Members Area

The exclusive private platform offers product alumni access to valuable resources and structured collaboration opportunities, carefully curated and facilitated by the NCS team:

Recognition and Credibility

- Annual NCS Product Sustainability Awards: Celebrating outstanding alumni achievements in product innovation, supply chain emissions reduction, and data quality excellence across different product categories
- Digital Product Certification Badges: Official digital badges affirming product sustainability leadership, suitable for marketing materials, procurement documentation, and customer communications

Strategic Knowledge Sharing

- **Quarterly Product Insights Summary:** Concise, curated updates featuring practical insights, emerging trends, and best practices relevant to product decarbonisation across different categories and markets
- **Expert Q&A Library:** A structured repository of strategic insights captured from prior expert sessions, ensuring ongoing value from collective expertise in product lifecycle management
- **Product Innovation Case Studies:** Examples of how alumni organisations are achieving carbon efficiency improvements through design innovation, material substitution, and supply chain optimisation
- **Avoided Emissions Impact Studies:** Examples of how alumni products are quantifying and communicating their broader climate contributions through enabling customer emissions reductions

Facilitated Peer Collaboration

- **Product Category Roundtables:** Regular, NCS-hosted discussions organised by product category, providing targeted forums to collaboratively address specific sustainability challenges, exchange practical solutions, and share experiences among product teams
- **Supply Chain Collaboration Forums:** Structured discussions focused on supplier engagement, data collection, and collaborative carbon reduction across product supply chains
- **Innovation Showcases:** Platforms for sharing breakthrough innovations in product design, materials, and manufacturing that deliver significant carbon improvements

Product-Specific Resources

- **Lifecycle Assessment Toolkit:** Advanced resources and templates for conducting robust product carbon footprints across different product categories
- **Supplier Engagement Guide:** Best practices and tools for engaging suppliers in carbon data collection and reduction initiatives
- **Customer Communication Templates:** Verified approaches for communicating product sustainability achievements to different customer segments
- **Regulatory Update Service:** Timely updates on emerging product carbon regulations, labelling requirements, and compliance frameworks

Success Story Showcase

- **Product Innovation Library:** Regularly featured case studies illustrating tangible sustainability successes achieved through product design, material innovation, and supply chain transformation
- **Market Impact Stories:** Examples of how sustainable product innovations have achieved commercial success whilst delivering environmental benefits
- **Customer Collaboration Examples:** Case studies of successful partnerships with customers to maximise product sustainability benefits

The NCS Alumni Network offers a collaborative environment designed to empower and inspire continuous product sustainability advancement, strengthening alumni impact, innovation, and market competitiveness whilst driving broader supply chain transformation.

10.1 Certification Disclosure Requirements

NCS Certification	Alumni Disclosure Requirements
	• Confirmation of the product range • The measured carbon footprint • The scope of the footprint • The year that the calculation was undertaken
	• The measured carbon footprint in absolute terms and as an intensity metric of kgCO2e/unit for each measurement period • A summary of the carbon efficiency improvement measures incorporated • Evidence of efficiency improvements achieved across the product lifecycle
	• The reporting year for which a Carbon Neutral certification has been issued • Summary of the carbon reduction plan • Details of the carbon credits purchased to achieve certification
	• Brief summary of avoided emissions methodology applied • Total verified avoided emissions by product category • Key baseline product scenarios and conventional technologies assessed • Market penetration data supporting avoided emissions calculations

11. Natural Carbon Solutions Offsetting Requirements

All reporting entities that purchase carbon credits shall meet quality standards to achieve NCS Certification. To ensure compliance with international best practices and the latest standards, including ISO 14068-1 and ICVCM guidelines, the following requirements must be met:

1. Eligible Carbon Credits

All carbon credits used for NCS Certification must originate from projects that:

- Are validated and verified by an independent third-party according to recognised international standards (e.g., VCS, Gold Standard, CDM, or ICROA Endorsed Standards).
- Demonstrate **additionality**: The project must prove that the carbon credits generated are additional to what would have occurred in the absence of the project. This includes financial additionality, ensuring that the project relied on carbon finance to be viable.
- Ensure **permanence**: The project must implement safeguards to prevent the reversal of carbon sequestration or reductions. In the case of potential reversals, the credits must be backed by buffer reserves or insurance mechanisms.
- Mitigate **leakage**: Projects must demonstrate that carbon reductions within the project boundary do not lead to increased emissions outside the project boundary.

2. Expiry and Retirement of Carbon Credits

All purchased carbon credits must be retired within 12 months of the transaction to maintain alignment with international standards and ensure that credits reflect the latest carbon footprint. Credits that exceed this timeframe must be retired, and new credits must be purchased to account for the current carbon footprint for re-certification with NCS.

3. Public Disclosure and Verification

Entities are required to:

- Publicly disclose the number and type of carbon credits purchased.
- Provide evidence that these credits meet the NCS quality standards and are aligned with ISO 14068-1 and ICVCM best practices.

4. Selection of Carbon Credits from Alternative Standards

NCS will consider carbon credits from standards not listed in ICROA Endorsed Standards or those that are not classified as NCS Carbon Credits on a case-by-case basis. Such credits must:

- Meet or exceed the requirements of ISO 14068-1 and ICVCM guidelines.
- Demonstrate compliance with all legal and regulatory requirements, including the proof of full and uncontested legal land title/tenure rights.
- Ensure that the project activities do not convert or degrade native ecosystems, and that they positively contribute to socio-economic benefits without negative impacts on human livelihoods or the environment.

5. Offsetting Hierarchy and Strategy

In line with ISO 14068-1:

- Emission Reduction First: Entities must prioritise actual emission reductions within their product lifecycles and supply chains before relying on offsets. Offsetting should only address residual emissions that cannot be eliminated through reductions.
- Removal Credits: Over time, entities should transition towards carbon credits that focus on carbon removal (e.g., afforestation, reforestation, soil carbon sequestration). For residual GHG emissions, all credits should be Removal credits.
- No Double Counting: Projects must ensure that carbon credits are not double counted, either within the country's national inventory or across different schemes. Credits must be clearly attributed to the purchaser, and registry systems should have mechanisms in place to prevent and correct any double counting or reversals.

6. Additional Requirements for 'High-Risk' Projects

For high-risk projects, such as those involving renewable energy in well-developed markets, entities must:

- Provide additional documentation to prove financial additionality, demonstrating that the project would not have occurred without carbon finance.
- Ensure that the project is implemented in regions where the grid mix remains dominated by fossil fuels, ensuring the relevance and impact of the carbon credits.

Product-Specific Considerations

For product certifications, additional considerations apply:

- **Lifecycle Boundary Alignment:** Carbon credits used must address residual emissions within the defined product lifecycle boundaries (cradle-to-gate or cradle-to-grave as appropriate).
- **Functional Unit Consistency:** Credit quantities must be calculated based on the same functional units used for product carbon footprint measurement.
- **Supply Chain Integration:** Where possible, credits should support emission reduction projects within relevant supply chains or product categories to maximise alignment with product sustainability objectives.
- **Customer Communication:** Product-level offsetting claims must be clearly communicated to avoid confusion with organisational-level carbon neutrality claims.

By adhering to these guidelines, entities will ensure that their carbon credit purchases and offsetting strategies are not only compliant with NCS standards but also reflect the latest and highest international best practices. This will support credible and effective carbon neutrality claims for products, aligned with global efforts to mitigate climate change and support sustainable consumption patterns.

12. Standards used in Natural Carbon Solutions

The Natural Carbon Solutions certification scheme integrates requirements from multiple internationally recognised standards to ensure comprehensive compliance and methodological rigour for product sustainability. The following table details the standards applied across different product certification pathways:

Standard	Publication Date	Last Updated	Summary of Standard	NCS Application	NCS Compliance
Greenhouse Gas (GHG) Corporate Accounting and Reporting Standard	2001	2004	The most widely used international framework for organisational greenhouse gas emissions inventory and reporting	All Organisation certifications	Full
GHG Protocol Corporate Value Chain (Scope 3) Standard	2011	2013	Provides requirements and guidance for companies to prepare and publicly report a corporate-level Scope 3 emissions inventory	All Organisation certifications	Full
GHG Protocol Product Standard	2011	2011	Provides requirements and guidance for quantifying and publicly reporting GHG emissions throughout the lifecycle of products	All Product certifications & Avoided Emissions assessments	Full
GHG Protocol "Estimating and Reporting the Comparative Emissions Impacts of Products"	2019	2019	Primary methodological framework for quantifying avoided emissions through comparative lifecycle assessment	Avoided Emissions assessments	Full
ISO 14064-1	2006	2018	International standard specifying principles and requirements for quantifying and reporting greenhouse gas emissions and removals at the organisation level	All Organisation certifications	Full

Standard	Publication Date	Last Updated	Summary of Standard	NCS Application	NCS Compliance
ISO 14064-2	2006	2019	International standard specifying principles and requirements for quantification, monitoring and reporting of GHG emission reductions or removal enhancements	Avoided Emissions assessments	Full
ISO 14068-1	2023	2023	International standard outlining requirements for achieving and demonstrating carbon neutrality at organisation and product levels	Carbon neutrality pathways	Full
ISO 14040	2006	2020	Environmental management - Life cycle assessment principles and framework	Product certifications & Avoided Emissions assessments	Supporting
ISO 14044	2006	2020	Environmental management - Life cycle assessment requirements and guidelines	Product certifications & Avoided Emissions assessments	Supporting
ISO 14067	2018	/	ISO 14067 sets out the principles, requirements and guidelines for quantifying and reporting the carbon footprint of a product. The requirements build on Life Cycle Assessment (LCA) methodologies, such as ISO 14040 and ISO 14044.	Product certifications	Full
ISO 14065	2013	2020	Requirements for greenhouse gas validation and verification bodies for use in accreditation	Verification processes	Methodological alignment

Standard	Publication Date	Last Updated	Summary of Standard	NCS Application	NCS Compliance
ISO 14066	2011	2011	Requirements for greenhouse gas validation and verification teams	Verification processes	Methodological alignment
Science Based Targets Initiative (SBTi) Corporate Net Zero Standard	2021	/	This standard provides recommendations and guidance towards setting corporate-level Net-Zero targets that can be verified through the SBTi.	Organisation certifications	Full Corporate Compliance
Product Category Rules (PCRs)	Various	Various	Industry-specific methodological guidance for product carbon footprinting where available	Product certifications where applicable	Full compliance where PCRs exist
PAS 2060 (Now superseded by ISO 14068)	2010	2014	PAS 2060 outlines how an organisation can demonstrate Carbon Neutrality.	Organisation & Product	N/A

Notes:

- Full Compliance: NCS certification demonstrates complete adherence to all applicable requirements
- Supporting: Standards provide methodological guidance but are not primary compliance frameworks
- Methodological Alignment: NCS verification processes align with standards' principles without requiring direct certification
- PCR Integration: Where Product Category Rules exist for specific product categories, NCS ensures full compliance whilst providing enhanced verification and global applicability

Product-Specific Standard Applications:

- ISO 14067 serves as the primary standard for all product carbon footprint measurements
- ISO 14040/14044 provide the foundational lifecycle assessment framework for product assessments
- GHG Protocol Product Standard ensures consistency with international product carbon accounting principles
- Product Category Rules (PCRs) are applied where they exist for specific product categories, with NCS providing enhanced verification
- ISO 14068-1 governs carbon neutrality claims for products pursuing Carbon Neutral certification
- GHG Protocol Comparative Emissions Guidance is the primary framework for Avoided Carbon Emissions assessments

Standards Evolution and Maintenance:

NCS maintains engagement with evolving standards through:

- Annual review of all referenced standards for updates and revisions
- Structured transition processes when significant standard changes occur
- Integration of emerging standards relevant to product sustainability and lifecycle assessment

Ready to Begin Your Certification Journey?

Whether you're taking your first steps in carbon measurement or advancing towards being a low carbon organisation, Natural Carbon Solutions provides the verification frameworks and technical expertise to support your environmental leadership.

Our comprehensive certification pathways offer organisations the flexibility to demonstrate meaningful climate action aligned with international standards whilst supporting business growth. Contact our team today to discuss how NCS certification can enhance your sustainability strategy and position your organisation as a verified leader in carbon management.

About Natural Carbon Solutions

Natural Carbon Solutions is a leading independent carbon management certification and verification scheme, combining rigorous third-party verification with innovative methodologies that recognise the diverse ways organisations contribute to global decarbonisation. Since 2022, we have advanced carbon management beyond traditional compliance approaches, providing comprehensive frameworks that enable environmental leadership whilst supporting commercial excellence.

Through our ISO-certified verification processes, proprietary Vero platform, and expert verification team, NCS delivers internationally recognised certifications that meet the highest professional standards, empowering organisations across all sectors to demonstrate verified environmental achievements with confidence and credibility.