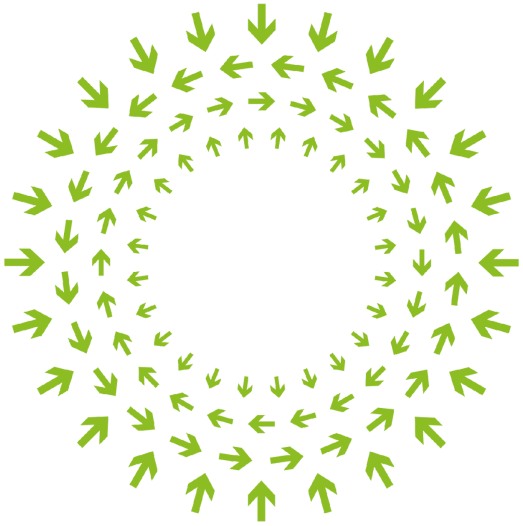


OPEN
Compute Project

Sustainability Project:
OCP/iCA Carbon Disclosure Workstream

Embodied Carbon Disclosure Base Specification v1

Effective July, 2025

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Table of Contents

1. License **4**
1.1. Acknowledgements 5
2. Compliance with OCP Tenets **6**
2.1. Openness 6
2.2. Efficiency 6
2.3. Impact 6
2.4. Scalability 6
2.5. Sustainability 7
3. Overview **8**
3.1. Definitions 8
4. Base Specifications **13**
4.1. Description 13
4.2. Goals and Vision 13
4.3. User Requirements/User Stories 13
4.4. Solution Architecture 14
4.5. Functional Requirements (Specification Content Definition) 17
4.6. Example Disclosure 20
4.7. Constraints 21
4.8. Test and Validation Requirements 22
4.9. Compliance 22
5. Additional References **24**
Appendix A - Checklist for IC approval of this Specification (to be completed by contributor(s) of this Spec) **25**
Appendix B - Recommended Databases and Tools to conduct Embodied Carbon Emission Calculation Studies **26**
Appendix C - OCP Base Specification Compliant Template **28**

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2. Compliance with OCP Tenets

This specification aligns with the OCP tenet of Openness in the following ways:

2.1. Openness

Methodological Flexibility: It does not mandate a specific methodology for calculating embodied carbon, thereby removing barriers and allowing all stakeholders (e.g., suppliers, customers) the freedom to utilize methods best suited to their context.

Accessibility and Collaboration: The specification is provided openly to facilitate its use, extension, and enhancement by others in various collaborative supplier and customer engagements.Efficiency

2.2. Efficiency

Directly addressing the OCP tenet of Efficiency, this specification establishes a single, standardized format for embodied carbon data requests and disclosures. This streamlined approach eliminates the significant operational overhead and complexity previously associated with developing, interpreting, and processing disparate data formats. By reducing this burden for both data center owners/operators and their vendors, the specification creates substantial time and resource efficiencies, making the entire data exchange and reporting process significantly more efficient than non-standardized methods.

2.3. Impact

This specification delivers significant impact by establishing standardized embodied carbon reporting that will drastically improve and accelerate transparency across the data center industry. This transparency, enabled by the specification's widely adaptable format, directly empowers owners and operators to make informed low-carbon design and procurement decisions. By facilitating these choices, the specification contributes to a meaningful positive environmental impact within the OCP ecosystem through the potential reduction of greenhouse gas emissions associated with data center construction and hardware. It also encourages upstream suppliers and component manufacturers to assess and reduce their own embodied carbon emissions.

2.4. Scalability

This specification is designed for **Scalability** by facilitating easy implementation and deployment across the industry. Its structure allows for straightforward insertion into

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procurement language within any customer/supplier relationship, ensuring it can be universally understood and applied **at any scale**. The format is Technology agnostic and flexible enough to accommodate a wide range of product categories spanning across hardware and construction materials to support infrastructure of the data center which makes it easy to adopt and inherently promotes scalability, enabling consistent carbon disclosure practices whether implemented by large enterprises or smaller operators.

2.5. Sustainability

Deep carbon reductions are necessary to limit rising global temperatures. Access to embodied carbon data empowers data center owners, operators, and end-users to effectively calculate their environmental impact and choose products and services based on lower embodied carbon emissions, best aligning with sustainability targets.

This specification directly supports the OCP tenet of Sustainability by maximizing the transparency of environmental impacts, specifically embodied carbon. By providing standardized access to this critical data, it empowers data center owners, operators, and end-users to accurately assess environmental footprints, enabling continuous improvement efforts.This transparency is fundamental for making informed procurement and design decisions that favor lower-carbon products and services, thereby minimizing environmental harm and aligning choices with sustainability goals.

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3. Overview

The **Base Specification for Embodied Carbon Disclosure** represents a key contribution originating from the Open Compute Project (OCP), designed to tackle the challenge of inconsistent and inefficient embodied carbon reporting across **the Data Center Industry supply chain.** It establishes a critically needed **standardized format** defining how vendors should prepare and submit embodied carbon disclosures and comprehensive supporting data (with minimum required data, including methodologies employed, referenced publications, emission factors used, etc.) to their customers.

This helps address the prevalent problems of disparate data requests, high reporting overhead for suppliers, and difficulty in data aggregation and comparison. Functioning as a defined module easily integrated into procurement workflows (aligning with OCP tenets like Openness and Scalability), its core utility is enabling **the entire Data Center Industry** to **coalesce around a singular, efficient disclosure format.** This unified approach is essential for improving data quality, reducing friction in the supply chain, and accelerating **industry-wide progress** in understanding and mitigating the embodied carbon footprint of data center ICT equipment, MEP equipment, and building materials.

ThisSpecification does not dictate the methodologies to be used in calculating embodied carbon, and is at this time purposely flexible allow a variety of industry carbon measurement tools. Rather than prescribing methodology, this base specification offers a standardized disclosure format to be used as a communication tool between data center owner/operators and their vendors. Data Center Owners/Operators may choose to add requirements, such as increased rigor or specific methodologies/data sources, when using this specification in the context of their own supplier engagement. To that end, the data collected by the data center operator shall not be compiled or published by OCP, the iMasons Climate Accord, or their partners. See section 4.4 Solution Architecture for a deeper explanation of the key elements, interfaces, and information flow facilitated by this standard.

3.1. Definitions

CO_2e (Carbon Dioxide Equivalent) A metric measure used to compare the emissions from various greenhouse gases based on their global warming potential (GWP).

Cradle to Gate (A1–A3) A life cycle boundary that includes raw material extraction (A1), transport (A2), and manufacturing (A3), but excludes use-phase and end-of-life impacts.

Embodied Carbon Disclosure The act of reporting a product's embodied carbon footprint, including methodology and assumptions used for calculation.

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Embodied Carbon The total greenhouse gas (GHG) emissions (expressed as CO_2e) associated with the production of a finished product, including raw material extraction, transport, and manufacturing (typically called cradle to gate covering life cycle stages A1 - A3). Please refer to standards; ISO 21930:2017, ISO 14044:2006 or ILCD Handbook for more details on cradle to gate/A1-A3

Embodied Carbon Footprint per functional unit (kg CO2e) The total GHG emissions expressed in kilograms of carbon dioxide equivalent (kg CO_2e), associated with the production of a product up to the point it leaves the manufacturing facility. This value is normalized to a functional unit, which is a standardized measure of the product's quantity or performance. For example,

5.1 kg CO_2e per 1 meter of cable
700 kg CO_2e per 500 kW UPS
18,009 kg embodied CO_2 per m^3
552.22 kg CO_2e per cubic meter (m^3) mixture

Environmentally-Extended Input-Output (EEIO) A modeling approach that estimates carbon emissions based on economic transactions and emissions factors for various industries or products. While there are many emissions factors databases, some of the most commonly used ones are the USEEIO and DEFRA. In the US, extended-input output models are governed by the USEEIO factors and modeling (US Environmentally-Extended Input-Output (USEEIO) Models, 2023). In the UK under the GHG protocol, DEFRA factors are used during spend-based calculations.

Environmental Product Declaration (EPD) A standardized, third-party verified document that reports the environmental impacts of products based on LCA performed by the organization, typically following ISO 14025.

Functional Unit A quantified description of the performance of a product system, used as a reference unit for LCA/EPD (e.g., 1 meter of cable, 1 kW of UPS capacity, 1GB capacity of Memory module or Solid State Drive).

Life Cycle Assessment (LCA) A methodology for assessing environmental impacts associated with all stages of a product's life cycle as per ISO Standards 14040/14044 from cradle to grave, or cradle to gate in context to this specification.

Part Number Unique identifier assigned to this equipment from Supplier such as SKU, commercial reference, Manufacturer Part Number (MPN), etc. Part number can also be an agreed-upon identifier originating from the customer and communicated to the supplier. Examples include *MPN #1234-5678, HMA82GU6DJR8N-XN* and *SKU CS2048326*.

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Product Carbon Footprint (PCF) Framework A subset of LCA that focuses solely on the carbon emissions associated with a product, often following a specific carbon accounting framework. There is no single global PCF framework, but there are several well-recognized methodologies or guidance documents which can be used to calculate PCFs: ISO 14067, GHG Protocol Product Life Cycle Accounting and Reporting Standard, Pathfinder Framework developed by WBCSD (World Business Council for Sustainable Development).

Product Category A classification that groups products based on their similar function, use, or application within the data center ecosystem. In the context of this specification, "product" encompasses a broad range of equipment and materials, extending from data center hardware to supporting infrastructure. This comprehensive interpretation ensures that the embodied carbon of both operational components and structural elements is considered for disclosure and assessment.”Product” in context of this specification document includes:

- **Information and Communication Technology (ICT) hardware** encompasses product categories such as:
    - Chassis & Enclosures (Chassis, Rack Cabinet, Enclosure, Panel)
    - Power Components (Power Amplifier, Power Distribution Unit, Power Supply Unit, Battery)
    - Cooling & Thermal (Heat Sink, Fan, Thermal Interface Material)
    - Networking (Network Assembly, Network Interface Card, Network Switch)
    - Data Storage Devices, Semiconductors (Hard Disk Drive, Tape Drive, Solid State Drive, Memory Module, Programmable and Application specific Integrated Circuits)
    - Structural/Mechanical Components (Beam/Bars, Bracket, Duct, Frame, Housing, Insert,Plate, Standoff, Stiffener, Baffle, Latch, Lever, Magnet, Valve, Rail, Screw, Nut, Bolt, Rivet, Support, Washer)
    - Electronic Components and Cables (Capacitor, Diode, Ferrite Bead, Fuse, Inductor, Resistor, Adapter, Connector, Transistors, Cables, Optical fibers)
    - Assemblies & Modules (Servers, Printed Circuit Boards, Printed Circuit Board Assemblies, Display unit)
    - Other - this list may not be exhaustive. Other product categories are possible, especially as the industry evolves.

- **Mechanical, Electrical, and Plumbing (MEP) systems** category includes products such as:
    - Bus Ducts
    - Cables, Conduit
    - Cooling (Chillers, CRAHs, Condensers, Chillers)
    - Fan Assembly

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  - Generators
  - Lighting
  - Load Banks
  - Power Distribution Units
  - Transfer Switches (Automatic Transfer Switches, Static Transfer Switches)
  - Transformers
  - Switchboards / Switchgear
  - UPS Systems and Batteries
  - Water Heaters
  - Other - this list may not be exhaustive. Other product categories are possible, especially as the industry evolves.

- **Construction materials** used in the physical build-out of the data center such as:
  - Metals
  - Glass
  - Wood
  - Masonry
  - Plastics
  - Thermal and Moisture Protection
  - Other - this list may not be exhaustive. Other product categories are possible, especially as the industry evolves.

Product Category Rule (PCR) A document that specifies rules for performing LCAs and developing EPDs for products within the same category, ensuring comparability.

Product Description The product description is intended to provide any applicable information about the product such as form factor, interface speed, memory type, thickness, gauge, material, alloy, dimensions, etc. If available, the vendor could also include a hyperlink to the complete product description on their website or online catalogue. For example: *”018" Stainless Sheet/Plate 316/316L 2B”, SK Hynix 1x 16GB DDR4-3200 UDIMM PC4-25600U Dual Rank x8 Module*.

Base Specification for Embodied Carbon Disclosure This document outlining the standardized requirements for carbon data disclosure in the data center industry.

Third-Party Verification It is an independent, external review of a product’s Life Cycle Assessment (LCA) study conducted by an accredited verification body or qualified verifier. It confirms that the LCA methodology, data, calculations, and documentation meet recognized standards such as ISO 14040/14044, ISO 14025 (EPD), EN 15804, ISO 14067, or the GHG Protocol. This process enhances the credibility, accuracy, and transparency of the LCA, providing stakeholders with confidence in the integrity and completeness of the results.

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TM65 A method developed by Chartered Institution of Building Services Engineers (CIBSE) for estimating embodied carbon in building services equipment, offering both basic and mid-level calculation methods.

Vendor Organization selling goods or services.

Verification (Third-Party) Independent assessment and review confirming the accuracy and validity of a disclosed carbon footprint or LCA/EPD.

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4. Base Specifications

4.1. Description

The core function of this specification is to define the minimum supporting information required to share along with the embodied carbon number for their product to give context for how the embodied carbon figure was calculated. It outlines the specific information (outlined in Section 4.5 Functional Requirements) vendors must collect and disclose to their customers, establishing a consistent and standardized framework for data sharing between data center owners/operators and their vendors. By doing so, it supports clarity, comparability, and credibility in embodied carbon reporting across the supply chain.

4.2. Goals and Vision

The vision is a data center supply chain that actively collaborates to minimize its carbon footprint through transparent and standardized data sharing. Currently, inconsistent **reporting** of embodied carbon data hinders meaningful comparison and targeted reduction efforts across the industry. While universal *measurement* standards are still evolving, this specification represents a **critical first step** by establishing a standardized **framework solely for reporting** this vital data. It engages the supply chain by defining requirements for the consistent **reporting** of embodied carbon figures *and* the crucial supporting context, including the **specific methodologies, assumptions, and emission factors used for quantification**. (See section 4.5 Functional Requirements, for full list of information requested in the specification.)

By mandating transparency not just in the results, but also in the methods used to derive them, this specification fosters comparability, builds trust, and empowers all stakeholders from suppliers to data center operators to take informed and data-driven action. This framework lays the groundwork for collaborative emissions reduction and accelerates the industry's alignment with net-zero and carbon neutrality goals.

4.3. User Requirements/User Stories

Key users and their primary requirements related to this specification include:

Data Center Owner/Operator: Require the ability to mandate and receive standardized embodied carbon disclosure format from vendors. This lays the foundation for consistent, comparable data across product categories and suppliers, supporting carbon accounting, procurement alignment, and sustainability performance tracking.

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Vendor/Supplier: Require a standardized disclosure format , as defined by this specification, to report embodied carbon data for their products. This enables them to meet diverse customer requirements efficiently and transparently.

Third-Party Entities: Require standardized embodied carbon data disclosures, formatted according to this specification, for their specific functions. Examples include:

> ***Integrators:*** *Require component embodied carbon data from multiple Original Equipment Manufacturers per this specification's format to compile, accurately calculate, and report the carbon footprint of integrated systems.*
>
> ***General Contractors:*** *Require access to embodied carbon data, formatted per this specification, for building materials and major equipment to incorporate into project sustainability metrics and reporting.*
>
> ***Sustainability Aggregation Platforms:*** *Require the capability to ingest data formatted according to this specification, allowing users to easily import, aggregate, and analyze embodied carbon information from diverse suppliers.*
>
> ***Data Center Design Software Solutions:*** *May need to integrate libraries or modules utilizing embodied carbon data formatted per this specification, enabling designers to assess the carbon implications of different design choices.*
>
> ***Training Companies:*** *Can utilize this specification as the basis for developing curriculum on standardized embodied carbon reporting practices within the data center industry.*

4.4. Solution Architecture

As the 'solution' contributed here is a specification document rather than software or hardware, this section describes the architecture of the *ecosystem* in which this Specification operates. It outlines the key elements, interfaces, and information flow facilitated by this standard.

Elements:

- **The Specification Standard:** The normative document defining the minimum data requirements and reporting format for embodied carbon disclosure. It standardizes *how* data is requested and shared.
- **Key Actors:** Data Center Vendors/Suppliers (data providers), Data Center Owners/Operators (data requestors/consumers), and potentially Third-Party entities such as Integrators, General Contractors, and Sustainability Platforms (data

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consumers/aggregators). The workstream actively engages the data center supply chain, including suppliers and hyperscalers.
- **Standardized Embodied Carbon Data:** The information packet formatted according to this specification, including quantitative footprint data (specifically cradle to gate or A1-A3 life cycle stages) and crucial methodological context.

Interfaces:

This Specification is intentionally designed to be flexible and system-agnostic, ensuring seamless integration across diverse digital ecosystems. It defines the **minimum content and standardized data format** required for embodied carbon reporting while deliberately avoiding prescription of the tools, platforms, or workflows used at various touchpoints. This approach supports **broad adoption**, **scalability**, and **future-proof interoperability** across the industry.

Key interfaces include:

- **Procurement Documents:** Customers can reference this specification when requesting embodied carbon disclosures, incorporating it into their *existing procurement systems and processes*. While the data structure is standardized, the actual request mechanism - from emails to procurement portals - remains user-defined.
- **Vendor Reporting Systems:** Vendors utilize their *preferred internal tools and processes* to calculate embodied carbon (using various methodologies permitted by the disclosure) and format the output according to this specification's requirements. The specification governs the format and content of the output not the internal methodology or tool used enabling flexibility in calculation methods, as long as disclosed transparently.
- **Data Exchange Mechanisms:** The standardized data packet can be transmitted using *various platforms or processes* chosen by the communicating parties (e.g., supplier portals, email attachments, potential future APIs), as the specification outlines the *data required*, not the transmission mechanism.
- **Customer/Third-Party Systems:** Operators or third parties utilize their *chosen tools, platforms, or databases* to ingest, store, analyze, and compare the received standardized data, leveraging the consistent format for interoperability without mandating specific analysis software.

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Interactions and Information Flow:

This specification standardizes the interaction and data flow for embodied carbon reporting within the Data Center Industry, ensuring consistent, transparent, and actionable exchanges across the ecosystem:

1. **Data Center Operator (Customer) Requests Data:**
   The Data Center Operator (Customer) initiates a request for embodied carbon data from their Vendor, referencing this Specification within procurement or contractual documents. This standardized request ensures that carbon data is aligned with this specification's format and content.
2. **Vendor Calculates Embodied Carbon Footprint:**
   The Vendor calculates the embodied carbon footprint of their product using their chosen methodology (e.g., Life Cycle Assessment (LCA), Environmental Product Declaration (EPD), Product Carbon Footprint (PCF), TM65, Environmentally-Extended Input-Output (EEIO)). While the methodology may vary, the Vendor must ensure transparency and consistency in reporting the results.
3. **Vendor Consults Specification for Data Requirements:**
   The Vendor refers to this specification to identify the minimum required data points, data formatting, and other key parameters such as methodology transparency, emission factors, and verification status. This ensures that the data provided meets the universal standard required for meaningful comparison.
4. **Vendor Prepares and Formats the Data Packet:**
   The Vendor prepares the embodied carbon disclosure, which includes:
   a. Respondent and Product Identification
   b. Product Identification
   c. Calculated Embodied Carbon Footprint (only A1-A3/cradle to gate)
   d. Detailed Information on the measurement methodology, such as:
      i. Measurement methodology
      ii. Verification Status
      iii. Software and Databases Used
      iv. Specific Framework or Standard Applied
      v. Product Category Rules, Product Specific Rules followed
      vi. Calculation Level and Emission Factors
5. **Vendor Submits Standardized Data Packet:**
   The Vendor submits the standardized data packet to the Customer or through an intermediary (such as a third-party sustainability platform) via the agreed-upon data exchange mechanisms (e.g., email, supplier portals, APIs).
6. **Customer Receives and Processes Data:**
   The Customer, or designated third-party platform, receives the standardized data packet.

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Because the data adheres to the specification's format and includes necessary contextual information, such as methodology and emission factors, it can be easily understood, processed, and used for initial comparisons, sustainability assessments, and decision-making.

7. **Continuous Improvement and Data Refinement:**
   Over time, the standardized data exchange process may evolve. As more vendors and customers engage with the specification, feedback loops will lead to continuous refinement of reporting practices and methodologies. This iterative process contributes to improved data quality and enhanced decision-making within the data center industry, helping to accelerate carbon reduction efforts and achieve net-zero goals.

This architecture ensures that while measurement methods may vary initially [based on Sec 4.2 discussion "Goals & Vision], the *reporting* of the data and its methodological context is consistent. This enables transparency and serves as a critical foundation for industry-wide carbon reduction efforts, addressing the challenge highlighted by the pilot phase where varied readiness and a standards gap made a single disclosure tool premature.

4.5. Functional Requirements (Specification Content Definition)

The functional requirements of this specification are met when a disclosure provides the defined minimum dataset structured according to the standard framework. This specification functions as a standard for requesting and sharing embodied carbon data, and it is explicitly not a data collection tool, database, or measurement methodology guide. A compliant disclosure functionally requires the inclusion of the following four core sections:

#1 - Respondent Identification

- **Function:** This section must provide essential identification and contact information about the entity submitting the disclosure. Its function is to allow the data user to know who submitted the data, which organization they represent, and how to conduct follow-up if required.
- **Required Data Fields:**
  - **Company Name:** The name of the company submitting the disclosure.
  - **Respondent Name & Job Title:** The name and title of the individual responsible for the submission.
  - **Respondent Email Address:** Contact email for the respondent.

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#2 - Product Identification

- **Function:** This section is designed to provide **standardized, product-specific data** that is relevant to the equipment or material being disclosed. For hardware or equipment, essential identifiers like the **Manufacturer's Part Number**, **Product Description**, and other critical attributes (such as model, serial number, and version) should be provided. These identifiers enable consistent and accurate categorization across the data center supply chain, facilitating effective traceability and comparison of embodied carbon data.
- **Required Data Fields:**
    - **Type of Equipment / Material:** The high-level classification (e.g., ICT Equipment, Mechanical, Electrical, Plumbing (MEP), Core and Shell Materials)
    - **Product Category:** A more specific category within the selected type (e.g., for ICT: Chassis & Enclosures, Power Components, Cooling & Thermal, Networking, Data Storage Devices/Semiconductors, Structural/Mechanical Components, Electronic Components/Cables, Assemblies/Modules; for MEP: Bus Ducts, Cables/Conduit, Cooling, Fan Assembly, Generators, Lighting, etc.; for Core & Shell: Concrete, Metals, Glass, Wood, Masonry, etc.)
    - **Product Name:** The specific name of the product
    - **Product Description:** Base specifications and characteristics relevant to the product (e.g., form factor, interface speed, memory type, thickness, gauge, material, dimensions); hyperlink to a detailed product description if available
    - **Part Number:** The unique identifier for the product (e.g., SKU, commercial reference, manufacturer part number)

#3 - Embodied Carbon Footprint

- **Function:** This section's function is to present the core quantitative data point of the disclosure. It requires the specific, calculated embodied carbon value of the product reported in kilograms of CO_2 equivalent (kg CO_2e). Crucially, this value must explicitly cover only life cycle stages A1-A3 (Raw Material extraction, Transport, Manufacturing).
- **Required Data Fields:**
    - **Embodied Carbon Footprint per functional unit (kg CO_2e):** The calculated value in kilograms of CO_2 equivalent, associated with a clearly defined functional unit
    - **Scope Confirmation:** Explicit confirmation that the reported value covers only life cycle stages A1-A3 (Raw Material Supply, Transport, Manufacturing)
    - **Hyperlink to Embodied Carbon Assessment:** A URL link to the full assessment document or EPD if publicly available. If not publicly available, Embodied Carbon Assessment is to be sent directly to the customer.

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#4 - Measurement Methodology

- **Function:** Functionally, this section must provide specific, transparent information detailing how the reported embodied carbon footprint figure was calculated. This context is essential for the end user to understand the assumptions and potential variability associated with the submitted value.
- **Required Data Fields:**
    - **Selected Measurement Methodology:** Indication of the primary methodology used (e.g., LCA/EPD, PCF Framework, TM65, EEIO, Other)
    - **Methodology-Specific Details** (Provide details relevant to the selected methodology above):
        - *If LCA/EPD:*
            - **Third-Party Verification Status:** Indicate if the LCA/EPD was third-party verified and, if so, the name of the validating party. While not required, Third-Party Verified LCA/EPD is considered the highest quality of data available
            - **LCA Software Used:** Specify the software employed (e.g., SimaPro, EIME, GaBi, Spreadsheet, One Click LCA, Open LCA, Makersite, Other).
            - **LCA Database Used:** Specify the database(s) used (e.g., Ecoinvent, GaBi, IPCC Emissions Factor Database, PLEX, Other).
            - **Product Category Rule (PCR):** Identify the specific PCR followed for the assessment, if applicable.
        - *If PCF:*
            - **Framework Used:** Specify the PCF framework applied (e.g., Pathfinder Framework, Other).
        - *If TM65:*
            - **Calculation Method Level:** Indicate whether a Basic or Mid-Level calculation was performed.
        - *If EEIO:*
            - **Emissions Factors Used:** Specify the emissions factors or model employed (e.g., USEEIO, DEFRA factors, Other).

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4.6. Example Disclosure

The following table provides an illustrative example of a completed disclosure conforming to the minimum data requirements as defined by the OCP Base Specification. This example uses a fictional UPS system and assumes an LCA/EPD methodology was used for calculation.

1. Respondent Identification	
Company Name	Acme Power Solutions Inc.
Respondent Name & Job Title	Jane Smith, Sustainability Manager
Respondent Email Address	J.Smith@ACMEpowersolutionsinc.net
2. Product Identification	
Type of Equipment / Material	Mechanical, Electrical, Plumbing (MEP)
Product Category	UPS Systems and Batteries
Product Name	EverUPS 500kW Module
Product Description	500kW modular uninterruptible power supply unit, 480V input/output, Lithium-Ion Battery
Part Number	EUPS-500M-LI
3. Embodied Carbon Footprint	
Embodied Carbon Footprint per functional unit (kg CO_2e)	750 kg CO_2e per 500kW Module
Scope Confirmation	Covers life cycle stages A1-A3 (Raw Material Supply, Transport, Manufacturing) only.
Hyperlink to Carbon Assessment	https://www.acmepower.example.com/epd/50

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(If not publicly available, Embodied Carbon Assessment is to be sent directly to the customer.)	
4. Measurement Methodology	
Measurement Methodology	LCA/EPD
Methodology-Specific Details (for LCA/EPD)	
Third-Party Verification Status	Verified by GreenCert Ltd. (Verification Statement #GC12345)
LCA Software Used	GaBi (LCA for Experts)
LCA Database Used	GaBi Database 2024 Service Pack 48; Ecoinvent v3.8
Product Category Rule (PCR)	PCR 2019:14 Construction products and construction services v1.2

4.7. Constraints

Key constraints for disclosures conforming to this specification include:

Completeness: Submitters must complete all required fields based on data availability.

Transparency on Gaps: Any unavailable data points must be explicitly identified, accompanied by an explanation for their absence.

Recognized Methodology: Reported embodied carbon values must be calculated using an industry-recognized methodology referenced or permitted within this specification.

Data Accuracy Attestation: The submitter is responsible for the accuracy of the provided data and, through the act of submitting the disclosure, attests to its validity to the best of their knowledge.

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4.8. Test and Validation Requirements

Conformance to this specification relies on **self-certification** by the data submitter (e.g., the Vendor). There is no separate OCP-defined testing or validation process required for individual disclosures created using this specification. Verification of a submitted disclosure's accuracy and adherence to the specified format and methodology reporting requirements is primarily handled through standard **customer-supplier engagement**, such as review during procurement or specific inquiries initiated by the data recipient (e.g., the Customer).

4.9. Compliance

This required section serves as a checklist for users of the specification to follow in order to declare compliance. This applies to all implementations (whether on the OCP Marketplace or not) that claim compliance with this specification.

ITEM	***REQUIREMENT***	***REFERENCE***	***MANDATORY***
1	*Data must be available to prospective customer within 120 days from the day it was asked, pending any required NDAs or other prerequisite agreements*		Y
2	*Required data fields are indicated with an asterisk (*)*	*figure 1*	Y
3	*Companies must explain any unavailable data and why it's unavailable*	*"must be filled out as completely as the data allows."*	Y
4	*Companies must clearly state which methodology they used and provide relevant details (e.g., software, databases, PCRs).*	*Companies must base their disclosures on one of the described embodied carbon calculation methodologies (LCA, EPD, PCF, TM65, EEIO)*	Y

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6	*All disclosures must use the defined terms as intended.*	*Appendix B*	Y

Compliance is self-certified
OCP Recognition FAQ

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5. Additional References

[1] Accounting for Carbon in Data Center Equipment: Environmental Product Declarations & Life Cycle Assessment; iMasons Climate Accord Equipment Working Group, 2024

[2] Accounting for Carbon in Data Center Equipment: CIBSE TM65 Material Disclosure Method, iMasons Climate Accord Equipment Working Group, 2024

[3] Accounting for Carbon in Data Center Equipment: Spend Based Embodied Carbon Accounting, iMasons Climate Accord Equipment Working Group, 2024

[4] [TEMPLATE] OCP Carbon Disclosure Form (OCP Base Spec Compliant): https://drive.google.com/file/d/11j6UW4DoMJkTKyvjCXRvvCI1h3MiD_tf/view?usp=drive_link

[5] Open Compute Project Foundation and iMasons Announce a New Collaboration, Open Compute Project Foundation, 2024

July 2025

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Appendix A - Checklist for IC approval of this Specification (to be completed by contributor(s) of this Spec)

Complete all the checklist items in the table with links to the section where it is described in this spec or an external document .

Item	Status	Link to detailed explanation
Has this contribution been presented to an OCP Project group during a project call or engineering workshop?	Yes	Presented at OCP EMA Summit and OCP Steering Committee
Approval by Project Leads	Yes	yes, Approved by Project LEad and incorporated comments review done by OCP Steering Committee
Is this contribution entered into the OCP Contribution Portal?	No	Will be done by 1st August 2025
Was it approved in the OCP Contribution Portal?	No	Not yet entered

July 2025

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Appendix B - Recommended Databases and Tools to conduct Embodied Carbon Emission Calculation Studies

The following are examples of commonly used, and widely recognized carbon modeling tools and databases. This is not an exhaustive list and represents both databases and tools that reference those databases.

1. **Ecoinvent**
    a. **Overview:** One of the largest and most transparent global Life Cycle Inventory (LCI) databases, including detailed data for electronics, metals, chemicals etc.
    b. **Relevance:** Includes manufacturing and auxiliary manufacturing processes, raw material mining and extraction and waste processes essential for ICT industry equipment.Can be used through any of these LCA tools: SimaPro, openLCA, Gabi LCA Software, OneClick LCA, Makersite, Environmental Information and Management Explorer (EIME)
    c. **Link:** **ecoinvent - Data with purpose.**

2. **GaBi & Sphera Databases**
    a. **Overview:** Industry-grade LCI datasets, including specialty databases for electronics, plastics, construction etc.
    b. **Relevance:** Offers component-level data for ICT devices and broader range of supply chain materials. Can be accessed via GaBi LCA Tool.
    c. **Link:** Life Cycle Assessment Software and Data | Sphera (GaBi)

3. **OpenLCA + ProBas / EIME**
    a. **Overview:** Free and open-source LCA software (openLCA) with compatible datasets. Includes **ProBas** (German electronics/electrical) and **EIME** (electronic/process tool) databases
    b. **Relevance:** Good to perform detailed life cycle analyses of electronic/electrical products.
    c. **Link:** openLCA.org

4. **Economic Input Output, EIO-LCA**
    a. **Overview:** Spend-based model using Comprehensive Environmental Data Archive (CEDA) database containing environmental data for use in EIO-LCA models. Can be used with U.S. Environmentally-Extended Input-Output (USEEIO) and Bureau of Economic Analysis (BEA).

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b. **Relevance:** Compliant with GHG Protocol standards and good for macro-level supply chain impact screening using procurement data.
c. **Link:** iMasons Climate Accord Spend-Based Embodied Carbon Accounting Case Study

5. **Pathfinder Framework:**
    a. **Overview:** It is an open, standardized framework developed by the World Business Council for Sustainable Development (WBCSD) and partners to enable the secure, consistent, and transparent exchange of product-level carbon footprint data across supply chains. It is based on the GHG Protocol Product Standard and incorporates guidance for Product Carbon Footprints (PCF) using primary and secondary data.
    b. **Relevance:** While not a database or tool itself, Pathfinder provides the standardized structure and methodology for companies to share LCA and carbon data at a product level, including data relevant to electronics, materials, and manufactured goods**.** It is aligned with GHG Protocol Product Standard, ISO 14067, and integrates with CDP and SBTi requirements.
    c. **Link:** Pathfinder
6. **TM65**
    a. **Overview:** TM65 is an internationally-applicable methodology for the estimation of embodied carbon in building services engineering. Developed by the Chartered Institution of Building Services Engineers (CIBSE), it intends to fill gaps for manufacturers to estimate the environmental impact of products when EPDs (Environmental Product Declarations) and/or LCAs are not readily available. It also provides much-needed guidance and consistency in embodied carbon calculations and reporting of products related to building services engineering systems.
    b. **Relevance:** The methodology estimates the life cycle of carbon emissions associated with a product including the raw materials in the product (e.g., how they are extracted and transported) based on the primary material composition of the equipment.
    c. **Link:** Embodied carbon in building services: a calculation methodology (TM65) | CIBSE

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Appendix C - OCP Base Specification Compliant Template

The following is a template reflecting the minimum data requirements outlined in the OCP Carbon Disclosure Base Specification 2025. It is based on the OCP-compliant Google Form which can be downloaded in PDF format on the OCP website.

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Carbon Disclosure Form

This form is a template for creating a standardized Embodied Carbon Disclosure that complies with the **OCP Carbon Disclosure Base Specification 2025**.

The primary purpose of the Carbon Disclosure Base Specification is to provide a consistent way to share embodied carbon data based on the minimum requirements defined in the specification. You can modify this template by adding fields to request further information specific to your needs.

Estimated Completion Time: ~5 minutes
Template Maintained by: OCP/iCA Carbon Disclosure Working Group
Contact for Questions: Sustainability-Embodied-Carbon@OCP-All.groups.io

* Indicates required question

1. Email *

2. Company Name *
   *Indicate the name of the company filling out the form
   *e.g. Data Center Products, LLC

3. Respondent Name & Job Title *
   *e.g. Jane Doe, LCA Specialist

4. Respondent Email Address *

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5. Type of Equipment / Material *

*You will be directed to the appropriate form based on the response below

Mark only one oval.

- ◯ ICT Equipment *Skip to question 6*
- ◯ Mechanical, Electrical, Plumbing (MEP) *Skip to question 13*
- ◯ Core and Shell Materials *Skip to question 20*

ICT Equipment

6. Product Category *

Mark only one oval.

- ◯ Chassis & Enclosures (Chassis, Rack Cabinet, Enclosure, Panel)
- ◯ Power Components (Power Amplifier, Power Distribution Unit, Power Supply Unit, Battery)
- ◯ Cooling & Thermal (Heat Sink, Fan, Thermal Interface Material)
- ◯ Networking (Network Assembly, Network Interface Card, Network Switch)
- ◯ Data Storage Devices, Semiconductors (Hard Disk Drive, Tape Drive, Solid State Drive, Memory Module, Programmable and Application specific ICs)
- ◯ Structural/Mechanical Components (Beam/Bars, Bracket, Duct, Frame, Housing, Insert, Plate, Standoff, Stiffener, Baffle, Latch, Lever, Magnet, Valve, Rail, Screw, Nut, Bolt, Rivet, Support, Washer)
- ◯ Electronic Components and Cables (Capacitor, Diode, Ferrite Bead, Fuse, Inductor, Resistor, Adapter, Connector, Transistors, Cables, Optical fibers)
- ◯ Assemblies & Modules (Servers, Printed Circuit Boards, Printed Circuit Board Assemblies, Display unit)
- ◯ Other: _____

7. Product Name *

*e.g. DC Products LLC - JJ8D Series K - 9.5 mm

_____

8. Product Description *

*Provide base specifications such as, form factor, interface speed, memory type, etc.
*If available, add hyperlink to product description

9. Part Number *

*Use the unique identifier assigned to this equipment (ie SKU, commercial reference, manufacturer part number, etc.)
*e.g. MPN #1234-5678

10. Embodied Carbon Footprint per functional unit (kg CO_2e) *

*Only include embodied carbon emissions for life cycle stages A1-A3 (Product Stage)
*A1: Raw Material Supply, A2: Transport, A3: Manufacturing
*e.g. 5.1 kg CO_2e per 1 meter of cable
*e.g. 700 kg CO_2e per 500 kW UPS

11. Hyperlink to Embodied Carbon Assessment *

*type N/A if not publicly available

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12. Measurement Methodology *

*Select the methodology used to calculate the embodied carbon footprint
*You will be directed to the appropriate section based on the response below

Mark only one oval.

- ◯ LCA / EPD *Skip to question 27*
- ◯ Product Carbon Footprint (PCF) *Skip to question 31*
- ◯ TM65 *Skip to question 32*
- ◯ EIO *Skip to question 33*
- ◯ Other: _____

Mechanical, Electrical, Plumbing (MEP)

13. Product Category *

Mark only one oval.

- ◯ Bus Ducts
- ◯ Cables, Conduit
- ◯ Cooling (Chillers, CRAHs, Condensers, Chillers)
- ◯ Fan Assembly
- ◯ Generators
- ◯ Lighting
- ◯ Load Banks
- ◯ Power Distribution Units
- ◯ Transfer Switches (Automatic Transfer Switches, Static Transfer Switches)
- ◯ Transformers
- ◯ Switchboards / Switchgear
- ◯ UPS Systems and Batteries
- ◯ Water Heaters
- ◯ Other: _____

14. Product Name *

*e.g. 500kw Super Safe UPS

15. Product Description *

*Provide base specifications such as, form factor, interface speed, memory type, etc.
*If available, add hyperlink to product description

16. Part Number *

*Use the unique identifier assigned to this equipment (ie SKU, commercial reference, manufacture part number, etc.)
*e.g. MPN #1234-5678

17. Embodied Carbon Footprint per functional unit (kg CO_2 eq.) *

*Only include embodied carbon emissions for life cycle stages A1-A3 (Product Stage)
*A1: Raw Material Supply, A2: Transport, A3: Manufacturing
*e.g. 5.1 kg CO2e per 1 meter of cable
*e.g. 700 kg CO2e per 500 kW UPS

18. Hyperlink to Embodied Carbon Assessment *

*type N/A if not publicly available

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19. Measurement Methodology *

*Select the methodology used to calculate the embodied carbon footprint
*You will be directed to the appropriate section based on the response below

Mark only one oval.

- ◯ LCA / EPD *Skip to question 27*
- ◯ Product Carbon Footprint (PCF) *Skip to question 31*
- ◯ TM65 *Skip to question 32*
- ◯ EIO *Skip to question 33*
- ◯ Other: _____

Core and Shell Materials

20. Product Category *

Mark only one oval.

- ◯ Concrete
- ◯ Metals
- ◯ Glass
- ◯ Wood
- ◯ Masonry
- ◯ Plastics
- ◯ Thermal and Moisture Protection
- ◯ Other: _____

21. Product Name *

*e.g. Stainless Steel Cold Rolled Coil Sheet

_____

22. Product Description *

*Provide base specifications such as thickness, gauge, material, alloy, dimensions
*e.g. .018" Stainless Sheet/Plate 316/316L 2B
*If available, add hyperlink to product description

23. Part Number *

*Use the unique identifier assigned to this equipment (ie SKU, commercial reference, manufacture part number, etc.)
*e.g. MPN #1234-5678 or SKU CS2048326

24. Embodied Carbon Footprint per functional unit (kg CO_2 eq.) *

*Only include embodied carbon emissions for life cycle stages A1-A3 (Product Stage)
*A1: Raw Material Supply, A2: Transport, A3: Manufacturing
*e.g. 18,009kg embodied CO2 per m3
*e.g. 552.22 kg CO2e per cubic meter (m3) mixture

25. Hyperlink to Embodied Carbon Assessment *

*type N/A if not publicly available

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26. Measurement Methodology *

*Select the methodology used to calculate the embodied carbon footprint
*You will be directed to the appropriate section based on the response below

Mark only one oval.

- ◯ LCA / EPD *Skip to question 27*
- ◯ Product Carbon Footprint (PCF) *Skip to question 31*
- ◯ TM65 *Skip to question 32*
- ◯ EIO *Skip to question 33*
- ◯ Other: _____

Lifecycle Assessment / Environmental Product Declaration Details

Please answer the following questions about the Lifecycle Assessment that informed the embodied carbon number provided in the previous section.

These details are being used to analyze the difference in carbon calculation outcomes among differing methodologies.

27. Is the LCA third-party verified? If yes, indicate the validating party (i.e. name of the auditing company).

*Type n/a if not third-party verified.

_____

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28. Lifecycle Assessment Software *

*Select all that apply

Check all that apply.

- [ ] SimaPro
- [ ] EIME
- [ ] GaBi (LCA for Experts)
- [ ] Spreadsheet (e.g. Excel, Google Sheets, etc.)
- [ ] One Click LCA
- [ ] Open LCA
- [ ] Makersite
- [ ] Other: _____

29. Lifecycle Assessment Database *

*Select all that apply

Check all that apply.

- [ ] Ecoinvent
- [ ] GaBi (LCA for Experts)
- [ ] IPCC Emissions Factor Database
- [ ] PLEX
- [ ] Other: _____

30. Which Product Category Rule (PCR) was used to conduct this Lifecycle Assessment?

*Type N/A if not available

_____

Product Carbon Footprint (PCF) Details

Please answer the following questions about the calculation methodology that informed the embodied carbon number provided in the previous section. These details are being used to analyze the difference in carbon calculation outcomes among differing methodologies.

31. Which framework did you use to calculate the PCF? *

Mark only one oval.

- ◯ Pathfinder Framework
- ◯ [tbd]
- ◯ Other: _____

TM65 Details

Please answer the following questions about the TM65 calculation methodology that informed the embodied carbon number provided in the previous section. These details are being used to analyze the difference in carbon calculation outcomes among differing methodologies.

32. Calculation Method * Dropdov

Mark only one oval.

- ◯ Basic Calculation
- ◯ Mid Level Calculation

EIO Details

Please answer the following questions about the EIO calculation methodology that informed the embodied carbon number provided in the previous section. These details are being used to analyze the difference in carbon calculation outcomes among differing methodologies.

33. What are the emissions factors used to calculate the carbon footprint? *

*For example, in the US, extended-input output models are governed by the USEEIO factors and modeling (US Environmentally-Extended Input-Output (USEEIO) Models, 2023). In the UK under th GHG protocol, DEFRA factors are used during spend-based calculations ('Table 13' Indirect Emissions From the Supply Chain, 2014).
*Type N/A if not available

_____