GLOBAL ELECTRONICS COUNCIL

Sustainability for a Connected Future

EPEAT-CCM-2023

Climate Change Mitigation Criteria

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GLOBAL ELECTRONICS COUNCIL
Sustainability for a Connected Future

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Foreword

The Global Electronics Council (GEC) is a mission driven non-profit working to create a more sustainable and just world, focused on supporting institutional purchasers in procuring only credible sustainable and circular technology products and services. GEC owns and operates EPEAT™, a comprehensive voluntary sustainability ecolabel. GEC ecolabel criteria address priority impacts throughout the life cycle of the product, based on an evaluation of scientific evidence and international best practices.

Criteria are developed in balanced, voluntary consensus processes consistent with:

a) ISO 14024: *Environmental labels and declarations – Type 1 environmental labelling – Principles and procedures*;[1] and
b) US Executive Office of the President, Office of Management and Budget, OMB Circular A-119: *Federal Participation in the Development and Use of Voluntary Consensus Standards and in Conformity Assessment Activities*.[2]

A summary of GEC's Criteria Development Process (P74) and procedures governing the process are publicly available on the EPEAT Registry.[3] Public stakeholder consultation occurs throughout the criteria development process. Stakeholder comments on criteria are considered by the Technical Committee as part of the Voluntary Consensus Process. Detailed policies for the EPEAT Program and criteria implementation are available in the EPEAT Policy Manual, also found on the EPEAT Registry).[3] The EPEAT Program may issue temporary policy addenda to this document, EPEAT Policy Manual (P65), to address unforeseeable and extraordinary circumstances that are beyond the control of manufacturers. Such circumstances include but are not limited to natural disasters, acts of war or terrorism, significant labor strikes, devastating accidents to a supplier facility, epidemics, or pandemics.

These criteria were developed in collaboration with NSF International. NSF facilitated the voluntary consensus process, in alignment with GEC's Criteria Development Process.

GEC Criteria are owned by GEC and, unless noted otherwise, their use is limited to the tools and resources developed by GEC as part of its mission activities. All GEC Criteria are publicly available.

[1] Available at: https://www.iso.org

[2] Available at: https://www.whitehouse.gov/wp-content/uploads/2020/07/revised_circular_a-119_as_of_1_22.pdf

[3] Available at: https://www.epeat.net

Participants

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Center for Resource Solutions
Dell Technologies
Fujitsu
GEC
Google
HP, Inc
Intel Corporation
50001 Strategies LLC
Lawrence Berkeley National Laboratory
Lenovo
Microsoft
National Renewable Energy Laboratory
Panasonic
Ricoh
TÜV Rheinland
US Department of Defense
US Department of Energy
US Environmental Protection Agency
World Wildlife Fund

1.0 Purpose

The purpose of this document is to establish performance-based criteria that address carbon and other greenhouse gas (GHG) emissions resulting from the manufacture and use of electronic products. State of Sustainability Research identifies the priority climate change impacts and mitigation strategies for the sector, providing the scientific, evidence-based foundation for criteria development.[4] Criteria address manufacturer programs and activities to assess and reduce lifecycle carbon emissions, sourcing electricity from renewable energy sources, energy efficient manufacturing, fluorinated greenhouse gases (F-GHG), and product energy consumption.

1.1 Scope

EPEAT applies these criteria to EPEAT product categories, providing an incentive for manufacturers to reduce climate change impacts and allowing purchasers to identify sustainable products. EPEAT policies and procedures govern the implementation of these criteria within the EPEAT program.

2.0 Normative References

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies. European Union (EU) Directives, which contain the adoption date in their title, are not to be treated as "dated references" (as described above). Unless explicitly indicated otherwise, when an EU Directive is referenced in this document, a new or updated EU Directive shall apply upon its enforcement date, unless otherwise noted in the criteria.

ANSI / MSE 50028-1[5]

CCWG Carbon Emissions Accounting Methodology[6]

EcoTransIT Information Tool Worldwide[7]

EU Product Environmental Footprint Guide[8]

ENERGY STAR® Program Specifications[9] EN 16258, *Methodology for calculation and declaration of energy*

[4] Available at: https://globalelectronicscouncil.org/resources/state-of-sustainability-research/climate-change/

[5] ANSI/MSE 50028-1-2019

[6] https://www.bsr.org/files/clean-cargo/BSR-CCWG-Carbon-Emissions-Methodology.pdf

[7] EcoTransIT World

[8] https://ec.europa.eu/environment/eussd/smgp/dev_methods.htm

[9] https://www.energystar.gov/products

consumption and GHG emissions of transport services[10]

EU Ports European Economic Interest Group Guidance for Greenhouse Gas Emission Footprinting for Container Terminal[11]

European LCA Platform Database[12]

Fraunhofer Institute for Material Flow and Logistics Guidance for Greenhouse Gas Emissions Accounting at Logistics Sites[13]

GLEC Framework Version 2.0 or later[14]

Hydropower Sustainability Council Standard[15]

IATA RP1678, *Air Cargo Carbon Footprint*[16]

IEC 62623, *Desktop and notebook computers – Measurement of energy consumption*, 2nd Ed., Section 5.4, Table 2[17]

IEC TR 62921, *Quantification methodology for greenhouse gas emissions for computers and monitors*[18]

IEEE 1680.1, *Standard for Environmental and Social Responsibility Assessment of Computers and Displays*[19]

IMO Energy Efficiency Design Index (EEDI)[20]

ISO 14025, *Environmental labels and declarations*[21]

ISO 14026, *Environmental labels and declarations – Principles, requirements and communications of footprint information*[22]

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[10] European Normative Standard, https://europa.eu/youreurope/business/product-requirements/standards/standards-in-europe/index_en.htm#shortcut-2; https://www.en-standard.eu/din-en-16258-methodology-for-calculation-and-declaration-of-energy-consumption-and-ghg-emissions-of-transport-services-freight-and-passengers/

[11] https://ec.europa.eu/clima/policies/transport/shipping_en

[12] https://eplca.jrc.ec.europa.eu.

[13] https://www.iml.fraunhofer.de/en/fields_of_activity/logistics--traffic--environment/environment_and_resource_logistics/resource_efficient_logistics_hubs_and_transport.html

[14] Global Logistics Emissions Council. Keizersgracht 560, Amsterdam, Netherlands. <www.smartfreightcentre.org>

[15] https://www.hydrosustainability.org/standard-overview

[16] International Air Transportation Association. IATA USA, 703 Waterford Way, Suite 600, Miami, FL 33126. <www.iata.org>; https://www.iata.org/en/programs/cargo/sustainability/carbon-footprint/

[17] https://webstore.iec.ch/publication/65120

[18] https://standards.iteh.ai/catalog/standards/iec/8ad77a7c-763d-4dad-94f2-f3d64329ad0a/iec-tr-62921-2016

[19] Institute for Electrical and Electronics Engineers (IEEE), Piscataway, NJ, https://standards.ieee.org/ieee/1680.1/7124/; https://www.epeat.net/about-epeat#accessing-epeat-criteria

[20] International Maritime Organization. 4, Albert Embankment, London SE1 7SR, United Kingdom. <www.imo.org>

[21] https://www.iso.org/standard/38131.html

[22] https://www.iso.org/standard/67401.html

ISO / TS 14027, *Environmental rules and declarations – Development of product category rules*[23]

ISO 14040, *Environmental management – Life cycle assessment – Principles and framework*[24]

ISO 14044, *Environmental management – Life cycle assessment – Requirements and guidelines*[25]

ISO 14064, *Greenhouse gas quantification and validation*[26]

ISO 14067, *Carbon footprint of products – Requirements and guidelines for quantification*[27]

ISO 50001, *Energy management system requirements*[28]

ISO / IEC 17025, *General requirements for the competence of testing and calibration laboratories*[29]

ISO / IEC 17065, *Conformity assessment – Requirements for bodies certifying products, processes and services*[30]

LCA Society of Japan Database[31]

Low Impact Hydropower Institute[32]

PAS 2050, *Specification for the assessment of the life cycle greenhouse gas emissions of goods and services*[33]

Science Based Targets initiative (SBTi)[34]

UL 2854, *EcoLogo Standard for Renewable Low-Impact Electricity Products*[35,36]

UNFCCC's Race to Zero partner program[37]

[23] https://www.iso.org/standard/66123.html

[24] https://www.iso.org/standard/37456.html

[25] https://www.iso.org/obp/ui/#iso:std:iso:14044:ed-1:v1:en

[26] ISO 14064-3

[27] https://www.iso.org/standard/71206.html

[28] https://www.iso.org/iso-50001-energy-management.html

[29] https://www.iso.org/ISO-IEC-17025-testing-and-calibration-laboratories.html

[30] https://www.iso.org/standard/46568.html

[31] LCA Society of Japan. LCA Development Office, 2-1, Kajicho 2-chome, Chiyoda-ku, Tokyo, 101-0044. <www.lca-forum.org>

[32] https://lowimpacthydro.org/

[33] https://shop.bsigroup.com/products/specification-for-the-assessment-of-the-life-cycle-greenhouse-gas-emissions-of-goods-and-services

[34] https://sciencebasedtargets.org/

[35] https://www.shopulstandards.com/ProductDetail.aspx?UniqueKey=33897

[36] https://www.ul.com/resources/ecologo-certification-program

[37] UNFCCC Race to Zero Partners

US Department of Energy Conservation Standards for Battery Chargers and External Power Supplies [38]

US Environmental Protection Agency SmartWay Performance Benchmarking Methodology [39]

US LCI Database [40]

WRI GHG Protocol: *Scope 2 Guidance* [41]

WRI GHG Protocol: *Product Life Cycle Accounting and Reporting Standard* [42]

WRI GHG Protocol: *Corporate Accounting and Reporting Standard* [43]

WRI GHG Protocol: *Corporate Value Chain (Scope 3) Accounting and Reporting Standard* [44]

3.0 Definitions and Acronyms

3.1 Definitions

battery charger: A device that charges batteries for consumer products, including battery chargers embedded in other consumer products. (10 CFR 430.2 Definitions)

biomass: The biodegradable fraction of products, waste, and residues from biological origin (Source: US Environmental Protection Agency. 2014. "Draft Framework for Assessing Biogenic CO_2 Emissions from Stationary Sources," Appendix D: Feedstock Categorization and Definitions).

component: The constituent part of a device which cannot be physically divided into smaller parts without losing its particular function. (Source: IEC 60050 – International Electrotechnical Vocabulary – Details for IEV number 151-11-21: "component").

corporation level: See Section 3.2, EPEAT Program Terms.

Energy Attribute Certificate (EAC): A category of contractual instruments used in the energy sector to convey information about energy generation to other entities involved in the sale, distribution, consumption, or regulation of electricity. This category includes instruments that may go by several different names, including certificates, tags, credits, etc. (Source: The glossary in the GHG Protocol Scope 2 Guidance – page 105 [41]).

[38] US DOE, 10 CFR Part 430.32

[39] US EPA, SmartWay Program. SmartWay Transport Partnership, 2000 Traverwood Drive, Ann Arbor, MI 48105. <www.epa.gov/smartway>

[40] https://www.nrel.gov/lci/

[41] https://ghgprotocol.org/scope_2_guidance

[42] https://ghgprotocol.org/product-standard

[43] https://ghgprotocol.org/corporate-standard

[44] https://ghgprotocol.org/standards/scope-3-standard

energy performance improvement: Improvement in measurable results of energy efficiency, or energy consumption related to energy use, compared to the energy baseline. (Source: ISO 50001: 2018, 3.4.6 [28]).

external power supply (EPS): An external power supply circuit that is used to convert household electric current into direct current (DC) or lower-voltage AC current to operate a consumer product. (10 CFR 430.2 Definitions)

key components: Key components for EPEAT registered products are either the priority components defined below, or the top five components by GHG emissions as identified for the product category of interest using the product carbon footprints (PCFs) or life cycle assessments (LCAs) created under 4.1.1 or 4.1.4. Priority components include the following:

a) main printed circuit board,
b) integrated circuits: central processing units (CPUs), solid state drives (SSDs), hard disk drives (HDDs), random access memory (RAM), graphic processing unit (GPUs),
c) power supply units, and
d) display panels.

manufacturer: See Section 3.2, EPEAT Program Terms.

micro, small and medium enterprises (MSMEs): MSMEs have less than 250 employees and are not considered a subsidiary of a larger enterprise. (Source: ITU, *A review of Micro, Small and Medium Enterprises in the ICT Sector*, 2016)

product: See Section 3.2, EPEAT Program Terms.

product category: See Section 3.2, EPEAT Program Terms.

product category level: See Section 3.2, EPEAT Program Terms.

product level: See Section 3.2, EPEAT Program Terms.

product type: See Section 3.2, EPEAT Program Terms.

production spend: Includes:

a) total annual spend by the manufacturer on production for EPEAT registered products, inclusive of spend on outsourced final assemblers, and
b) total annual spend by the manufacturer on components of EPEAT registered products that are directly sourced by the manufacturer and provided to outsourced final assemblers, and
c) total annual direct spend by the manufacturer on components of EPEAT registered products that are used by the manufacturer in final assembly.

production spend on key components: Includes:

a) total annual spend by the manufacturer on directly sourced key components of EPEAT registered products, and

b) total annual spend by the manufacturer on suppliers of key components and assemblies containing key components that are directly sourced for EPEAT registered products. Supplier spend may include both key components and assemblies containing key components, excluding any key components already accounted for in a), and
c) total annual spend by final assembler(s) (including the manufacturer as applicable) on key components and assemblies containing key components for EPEAT registered products (excluding key components purchased from the manufacturer).

NOTE — Estimated total annual spend by outsourced final assembler(s) on key components and assemblies containing key components, based on manufacturer's estimated production cost breakdowns, can be used when actual spend is not available from the assembler(s).

An illustration of the main elements of production spend on key components can be found in Annex C.

printed circuit board: A thin board made of fiberglass, composite epoxy, or other laminate material with conductive pathways etched or "printed" onto the board, with the purpose of, or to be used for, the connection of different components on the board, such as transistors, resistors, and integrated circuits.

publicly available: Obtainable by the public without restriction of access; for example, cannot require member-only access. A requirement to provide a name and / or organization to obtain access is not considered a "restriction of access."

supplier: Entity that provides goods or services to the manufacturer.

unique product identifier: See Section 3.2, EPEAT Program Terms.

3.2 EPEAT Program Terms

The terms below are important for the application of these criteria in the EPEAT Program. They are defined by the EPEAT Program for the purpose of assessment of conformance to the criteria in this document.

corporation level: Evidence provided to support conformance with the criterion addresses, at a minimum, all product categories in which the manufacturer has EPEAT registered products.

manufacturer: A brand owner that registers products to the EPEAT Ecolabel and is responsible for ensuring ongoing conformance of products to criteria; also referred to as "Participating Manufacturer" in EPEAT policy documents.

product: A marketing model and chassis type associated with a unique product registration, including accessories and peripherals, integral to the operation of the product and contained by default in the point of sale (POS) packaging associated with the unique product registration, excluding consumables in imaging equipment.

NOTE — "Integral" means the accessory or peripheral is fundamental or essential to product function. If the manufacturer does not include the peripheral or accessory in the POS packaging by default, it is not within scope. "By default" means that the peripheral or accessory is standard in the POS package(s). Manufacturer may offer choices for the "default" peripheral or accessory (e.g., different mouse options or output tray options.)

NOTE — Criteria may modify product scope (e.g., include or exclude an accessory, peripheral or component) or define a calculation methodology that accounts for variation in accessories and peripherals included in POS packaging (e.g., recycled content.)

NOTE — "Unique product registration" may have multiple unique product identifiers.

product category: A group of products identified by the EPEAT program for the purpose of product registration (e.g., computers and displays, servers, mobile phones, and imaging equipment).

product category level: Evidence provided to support conformance with the criterion covers all products registered by the manufacturer in the EPEAT product category. Manufacturers may indicate if the submitted evidence addresses multiple product categories.

product level: Evidence provided to support conformance with the criterion is for individual EPEAT-registered products.

product type: Sub-categories of products identified by the EPEAT program for the purpose of product registration and searching the EPEAT Registry.[3] For example, the following product types are included in the Computer and Display product category: desktop computer, monitor, integrated desktop computer, notebook computer, tablet / slate, thin client, workstation, signage display.

unique product identifier: A distinct code used to unambiguously identify and differentiate an individual sales unit on the marketplace, whether it be a specific version or model of a device, or a bundle or multi-pack of multiple products. Common unique product identifiers include Global Trade Item Numbers (GTIN) (e.g., Universal Product Code (UPC), European Article Number (EAN), and Manufacturer Part Number (MPN).

3.3 Acronyms

AEE:	Association of Energy Engineers
CCWG:	Clean Cargo Working Group
CDP:	carbon disclosure project
CFR:	Code of Federal Regulations
CMVP:	Certified Measurement and Verification Professional
CP:	Certified Practitioner
CPU:	central processing unit
CSR:	corporate sustainability report
DC:	direct current
DIN:	Deutsches Institut für Normung
DOE:	Department of Energy
EAC:	Energy Attribute Certificate
EEDI:	Energy Efficiency Design Index

EN:	European norm
EnMS:	energy management system
EPA:	Environmental Protection Agency
EU:	European Union
F-GHG:	fluorinated greenhouse gas
GHG:	greenhouse gas
GLEC:	Global Logistics Emissions Council
GO:	guarantee of origin
GPU:	graphic processing unit
HDD:	hard disk drive
IAF:	International Accreditation Forum
IATA:	International Air Transportation Association
IEC:	International Electrotechnical Commission
IEEE:	Institute of Electrical and Electronic Engineers
IMO:	International Maritime Organization
ISO:	International Standards Organization
ITU:	International Telecommunication Union (United Nations)
LCA:	life cycle assessment
LCI:	life cycle inventory
LIHI:	Low Impact Hydropower Institute
MLA:	Multilateral Recognition Arrangement
MSE:	Management System for Energy
MSMEs:	micro, small and medium enterprises
MWh:	megawatt-hour
PAS:	publicly available specification
PCF:	product carbon footprint
PPA:	power purchase agreement
PV:	performance verifier
RAM:	random access memory
REA:	renewable energy attribute
REC:	Renewable Energy Certificate
SBTi:	Science Based Targets initiative
SEP:	Superior Energy Performance
SSD:	solid state drive

UNFCCC: United Nations Framework Convention on Climate Change
URL: uniform resource locator
US: United States
WRI: World Resources Institute

4.0 Climate Change Mitigation

4.1 Life cycle GHG emissions and life cycle assessment

4.1.1 Required – Product carbon footprint disclosure and assurance

Manufacturer shall publicly disclose results of an assessment of life cycle GHG emissions or a "product carbon footprint (PCF)" for registered products, reported as global warming potential for a 100-year time horizon (GWP-100) in units of CO_2 equivalents. The manufacturer shall specify in the life cycle assessment (LCA) or PCF the model numbers or other unique identifiers, such as product name(s), for the products to which the LCA or PCF applies. Each product on the registry shall have an applicable LCA or PCF. The LCA or PCF shall include each stage of the product life cycle, from raw material extraction through end-of-life using PAS 2050, [33] the WRI GHG *Protocol Product Life Cycle Accounting and Reporting Standard,* [42] ISO 14025, [21] ISO 14067, [27] ISO 14040 [24] / 14044, [25] IEC TR 62921, [18] or equivalent PCF standard. LCA or PCF results shall be published within 2 months of registering products.

Manufacturer shall obtain a third-party critical review or verification of the PCF(s) or LCA(s) that cover all individual registered products, or the PCF methodology used for registered products in each product category that the manufacturer participates. Third-party verification of adherence with product category rules in accordance with ISO / TS 14027 [23] is an acceptable alternative. One third-party critical review statement(s) or verification per product category is acceptable. The third-party critical review or verification shall be updated every 3 years.

The public disclosure of the LCA or PCF results shall include at a minimum the following:

a) Statement on methodology or standard used,
b) Modeled product lifetime or range (to cover span of products covered by the LCA or PCF),
c) GHG emissions or carbon footprint of the product's life cycle stages (disaggregated, i.e., reported separately), including, at a minimum, production (raw material extraction and manufacturing, combined or separate), use, transport, and end-of-life, and the product's total life cycle carbon footprint, and
d) Disclaimer statement or explanation of assumptions and associated uncertainties.

Examples of acceptable public disclosure include any one of the following methods:

a) A Type III environmental declaration in accordance with ISO 14025, [21] ISO 14026, [22] or ISO 14067, [27]

b) Publishing the LCA or PCF results on any publicly accessible website, including the manufacturer's website, or
c) Publishing the LCA or PCF results in an open-access peer-reviewed journal.

The manufacturer shall disclose URL(s) of public disclosure(s) on the EPEAT Registry. [3]

Verification requirements:

This criterion is verified at the product level.

a) Third-party critical review statement(s) or verification that the methodology, PCF or LCA conforms with the standard(s) used to conduct the assessment of life cycle GHG emissions, including at a minimum the following: [45]
    i. Name of the company~~and contact information of company~~ and / or individual(s) performing the verification,
    ii. Include or be accompanied by contact information and~~third-party critical reviewer or verifier~~ qualifications (examples include education / training and experience in the LCA or carbon footprinting field) or accreditation related to LCA or carbon footprinting.
b) URL(s) for the public disclosure that includes all disclosure requirements in the criterion, including the list of methodology(ies) or standard(s) used to conduct the assessment of life cycle GHG emissions,
c) Evidence of third-party critical review or verification updated every 3 years.

References and details:

A published Type III environmental declaration in accordance with ISO 14025 [21] serves as sufficient evidence to demonstrate that verification requirements a) and b) have been met.[46]

Additional guidance for verification is available in the following standards:

a) ISO 14064-3, *Specification with guidance for the verification and validation of greenhouse gas statements*, [26]
b) ISO 14065, *Requirements for validation and verification bodies*,
c) ISO 14066, *Competence requirements for GHG validation teams and verification teams.*

4.1.2 Required – Corporate GHG inventory

Manufacturer shall annually conduct a corporate GHG inventory covering the manufacturer's Scope 1, Scope 2 (location and market-based), and Scope 3 emissions as defined by the GHG Protocol. Manufacturer may choose the initial 12-month period to conduct the GHG inventory. The manufacturer may change to a new 12-month period, and in that case, the manufacturer must provide the GHG inventory for a minimum of

[45] It is acceptable to provide evidence of third-party verification following the product category rules in accordance with ISO / TS14027.

[46] It is acceptable to reference the environmental declaration information provided by the product environmental labeling declaration program holder.

two consecutive 12-month periods.

Scope 3 in-scope GHG emissions shall include, at a minimum, GHG emissions for registered products in all product categories that the manufacturer participates.

Results of the GHG inventory, Scope 1, Scope 2, and at least 67% of total in-scope Scope 3 emissions shall be verified by a qualified third party against the GHG Protocol annually. Results of the full GHG inventory shall be publicly disclosed annually.

The manufacturer shall disclose URL(s) of public disclosure(s) on the EPEAT Registry. [3]

Exception: MSMEs are not required to calculate and report Scope 3 emissions.

Verification requirements:

This criterion is verified at the corporation level.

a) URL to the public disclosure of GHG inventory results,
b) Demonstration of the calculation for inclusion of at least 67% of total in-scope Scope 3 emissions,
c) Third-party assurance statement showing that results of the GHG inventory were in conformance with the GHG Protocol. The assurance statement shall include at a minimum the following:
    i. Name of the company and / or individual(s) performing the verification,
    ii. Include or be accompanied by contact information and qualifications (examples include education / training and experience in the carbon accounting field), or accreditation related to carbon accounting, and
    iii. Indication that the covered Scope 1, 2, and 3 GHG emissions, as required by the criterion, were included in the GHG inventory.

References and details:

Guidance for verification is available in the following standards:

a) ISO 14064-3, *Specification with guidance for the verification and validation of greenhouse gas statements*, [26]
b) ISO 14065, *Requirements for validation and verification bodies*,
c) ISO 14066, *Competence requirements for GHG validation teams and verification teams*.

4.1.3 Optional – Product transport carbon footprint and goal

Manufacturers shall annually conduct an assessment of GHG emissions from supply chain transportation activities for, at minimum, registered products from the point of final product assembly to the customer or transfer of product ownership.

The scope shall include transport for the applicable modes of freight movement for ground (includes road and rail), air, and sea (including inland waterways as applicable) for registered products. The manufacturer may include additional products in the scope. The manufacturer shall specify the scope of products for which the

assessment applies.

The assessment of supply chain GHG emissions shall include well-to-wheel or tank-to-wheel GHG emissions from all modes of freight movement utilized (road, rail, air, sea, and inland waterways) and shall be performed once per fiscal or calendar year using one or a combination of the following methodologies:

a) Global Logistics Emissions Council (GLEC) Framework for Logistics Emissions Methodologies (GLEC Framework Version 2.0 or later),[14]
b) The following mode-specific methodologies as geographically applicable (if well-to-tank emissions are not included in a mode-specific methodology, they shall be included by means of a scaling factor [such as that included in GLEC]):
    i. Road: US EPA SmartWay Performance Benchmarking Methodology[39] or EN 16258[10]
    ii. Rail: US EPA SmartWay Performance Benchmarking Methodology[39] or EcoTransIT Information Tool Worldwide[7]
    iii. Air: International Air Transportation Association (IATA) RP1678[16] or US EPA SmartWay Performance Benchmarking Methodology[39]
    iv. Sea: Clean Cargo Working Group (CCWG) Carbon Emissions Accounting Methodology[6] or International Maritime Organization (IMO) Energy Efficiency Design Index (EEDI)[20]
    v. Inland waterways: IMO EEDI[20] or US EPA SmartWay Performance Benchmarking Methodology[39]
c) A methodology which includes a well-to-wheel or tank-to-wheel performance-based assessment that uses fuel-based or activity-based metrics for each applicable mode (e.g., weight and / or volume of freight moved, and / or distance by mode). Data used may include fuel consumption and published emission factors by fuel type.

A summary of results for absolute freight GHG emissions (e.g., annual tonnes of CO_2e) and / or normalized GHG emissions (e.g., grams of CO_2e per tonne-km) for each mode (road, rail, air, sea, and inland waterways) shall be publicly disclosed annually, and shall indicate what methodologies were used, and whether the manufacturer used tank-to-wheel or well-to-wheel emissions.

Results of the transportation carbon footprint shall be third-party verified every three years, or in accordance with the methodology used.

Manufacturers shall also develop a transport supply chain GHG emission reduction goal and report progress towards meeting this goal annually.

Point value: 1 point

Verification requirements:

This criterion is verified at the product category level or corporation level.

a) Summary of results, including which methodologies were used and whether the manufacturer used tank-to-wheel or well-to-wheel emissions, are publicly posted (e.g., manufacturer URL, Corporate

Sustainability Report (CSR) report or program URL(s) or other publicly available website or document),

b) Identification of the scope of products for which the assessment applies,
c) Evidence of a transport supply chain GHG reduction emission goal and progress towards the goal are publicly posted annually (e.g., manufacturer URL, CSR report or program URL(s) or other publicly available website or document),
d) Evidence of third-party verification in conformance with the applicable modes in the GLEC Framework [14] or other mode-specific approaches described above. The manufacturer shall provide the credentials and contact information of third-party verifier.

References and details:

Well-to-wheel emissions: An accounting of the life cycle GHG emissions from transportation of products. Well-to-wheel analysis assesses the overall GHG impacts of a fuel, that include each stage of its production and use. GLEC defines this as an "approach to estimate the impact of the full fuel cycle including fuel production."

Well-to-tank emissions: An accounting of the GHG emissions from fuel production, including extraction, cultivation, refining, transformation, transport and distribution of fuels. This is the first stage of the life cycle GHG emissions, before the combustion "tank-to-wheel" or "operating phase." GLEC defines "well-to-tank" as "upstream phase of fuel production only."

4.1.4 Optional – Product LCA and 3rd party review, publicly available

Part A:

The manufacturer shall conduct a LCA on one registered product in each product category in which the manufacturer participates. The manufacturer shall specify in the assessment the model numbers or other unique identifiers for the products to which the assessment applies. The LCA shall be performed in accordance with *(1)* ISO 14040 [24] and ISO 14044, [25] excluding the reporting requirements (Section 6 of ISO 14040 [24] and Section 5 of ISO 14044 [25]), or *(2)* the EU Product Environmental Footprint Guide. [8] The LCA shall include all stages of the product life cycle, from extraction of raw materials through end-of-life. LCA results shall be published within 2 months of registering products.

To qualify under this criterion, the LCA must have been critically reviewed in accordance with *(1)* ISO 14044 [25] or ISO 14025, [21] or *(2)* the EU Product Environmental Footprint Guide [8] by an independent third party. The LCA shall not be more than 3-years-old. A new LCA will be required if the previously submitted LCA is greater than 3-years-old.

Part B:

The manufacturer shall make the full LCA report or a summary of the LCA publicly available.

The full LCA or summary shall include a summary of the impact categories considered and results of the impact assessment, by life cycle stage, for each of the covered categories. The assessment must include impact

categories that reflect global warming potential and at least three additional environmental impact categories related to the product being studied, for example:

a) Acidification,
b) Eutrophication,
c) Ozone depletion,
d) Photochemical oxidation,
e) Cumulative energy demand,
f) Ecotoxicity,
g) Human toxicity,
h) Water consumption,
i) Resource use, minerals and metals (i.e., mineral resource depletion impact category).

The summary or full LCA shall be published using one of the following options:

a) In a national public database (such as the US Life Cycle Inventory (LCI) Database, the European LCA Platform Database,[12] or the LCA Society of Japan Database, [31] or other public disclosure system),
b) In an open-access peer-reviewed journal, or
c) On the manufacturer's website as one or more of the following:
    i. The full LCA report,
    ii. A Type III environmental declaration in accordance with ISO 14025, [21]
    iii. A third-party report of the LCA as defined in the requirements and guidance for third-party reports section of ISO 14044, [25]
    iv. Another format that includes a summary of the LCA.

The manufacturer shall disclose URL(s) of public disclosure(s). The manufacturer may provide a link on its website to another publicly available website.

For publication in a peer reviewed journal, acceptance for publication is acceptable provided the prepublication (in press) paper is publicly available.

Optional points shall be awarded according to Table 4.1.4.

Table 4.1.4 – Optional point available

Performance	Total points
Completion of Part A	1
Completion of Parts A & B	2

Point value: 1-2 points (maximum of 2 points)

Verification requirements:

This criterion is verified at the product level, but only one product per product category must meet this criterion.

a) Copy of the LCA(s) used to meet the requirements of this criterion for verification purposes, not public disclosure,
b) Third-party critical review statement that the LCA was performed and reviewed in accordance with the requirements of this criterion, including at a minimum the following:
    i. Name of company and / or individual(s) performing the critical review,
    ii. Include or be accompanied by contact information and qualifications (examples include education / training and experience in the LCA field) or accreditation related to conducting LCAs.
c) For Part B, URL(s) for the public disclosure as per the requirements of this criterion.

References and details:

A published Type III environmental declaration in accordance with ISO 14025 [21] serves as sufficient evidence to demonstrate that verification requirements a) and b) have been met.

4.2 Carbon reduction goals aligned with climate science

4.2.1 Required – Manufacturer GHG reduction target aligned with climate science

Manufacturer shall have a publicly declared GHG emissions reduction target aligned with climate science:

a) Scope 1 and 2 target: Aligned with climate science means an absolute average annual reduction[47] of at least 4.2% of total combined Scope 1 and 2 GHG emissions from the baseline to the target year.[48]
b) Scope 3 target(s): Manufacturer shall have one or more targets that collectively cover a minimum of 67% of that manufacturers' total scope 3 GHG emissions during the baseline year of the described targets. These targets shall describe an absolute average annual reduction of 2.5% of Scope 3 GHG emissions from the baseline to the target year.[49]

The baseline year must be no earlier than 2015, and the average annual reduction target must extend to at least 2030. Targets may not exceed 15 years. Scope 1, 2, and 3 emissions must be calculated in accordance with Criterion 4.1.2, *Corporate GHG inventory*.

[47] Absolute average annual reduction is the average annual yearly reduction over the time period specified, recognizing that some years may be larger or smaller than others, but over the 10 years the annual average of 4.2% yields an absolute reduction of 42%. For example: If the target is to reduce emissions by 42% over 10 years, the annual average of 4.2% per year could result in reductions of the following: Year 1 was 4.2%, Year 2 was 3.2%, Year 3 was 5.2%, and so on. Some years of the 10 years (Year 2) was less than 4.2%, but the average over 10 years was at least 4.2% each year.

[48] This aligns with IPCC guidance for a 1.5 °C level of ambition.

[49] This aligns with IPCC guidance for a well below 2 °C level of ambition.

Once targets have been met, new targets must be set. In the establishment of targets, Scope 1, 2, and 3 emission reduction targets must represent continued forward ambition, i.e., emission reductions must occur throughout the time period of the target.

Alternatively, a manufacturer may demonstrate conformance to this criterion by having GHG emission reduction target(s) validated by the SBTi [34] for 1.5 °C ambition or the level of ambition required by SBTi for the manufacturer.[50,51]

Annual progress against target(s) shall be publicly disclosed.

Exception: MSMEs are not required to have a Scope 3 GHG emissions reduction target.

Verification requirements:

This criterion is verified at the corporation level.

Manufacturer must demonstrate conformance with verification requirement a) and b). Or alternatively, the manufacturer can demonstrate conformance with verification requirement c) and d).

a) URL(s) to manufacturer's GHG reduction target(s) including public reporting on average annual progress relative to the publicly disclosed baseline year,[52] and
b) Evidence of manufacturer's calculated corporate GHG inventory, in accordance with Criterion 4.1.2, inclusive of evidence demonstrating that target covers at least 67% of manufacturer's total baseline Scope 3 GHG emissions, as calculated in accordance with Criterion 4.1.2.

Or

c) URL(s) to listing of manufacturer's goal listed on the SBTi website (companies taking action)[53] or an SBTi validated document confirming or demonstrating the requirements of this criterion are met, and
d) URL(s) to manufacturer's public reporting on average annual progress.

References and details: None.

4.2.2 Optional – Manufacturer net zero GHG commitment and validated target

Part A – Race to Zero Commitment:

Manufacturer shall set a net-zero target by joining a United Nations Framework Convention on Climate Change (UNFCCC) Race to Zero recognized partner program. [37] Examples include Business Ambition for

[50] SBTi Criteria and Recommendations

[51] SBTI Companies Taking Action

[52] Conformance to this criterion means publishing progress towards targets, but not achieving the targets' described ambition.

[53] There is a difference on the SBTi website between those companies that have made a commitment (denoted in orange) versus those who have a target validated by the SBTi (denoted in green).

1.5 °C, [54,55] The Climate Pledge, [56] and Small and Medium Enterprise Climate Hub.[57] Manufacturer's net zero target must, at a minimum, meet the requirements of the ~~four key pillars of the~~ UNFCCC's Race to Zero partner program. [37]

Part B – SBTi Validated Net Zero GHG Target:

Manufacturer shall publish annual progress against a net zero target validated by the SBTi. [34]

Point value: 1-2 points (maximum of 2 points) as follows:

Part A: 1 point
Part B: 1 point

Verification requirements:

This criterion is verified at the corporation level.

Part A – Race to Zero Commitment:

a) Identification of the UNFCCC Race to Zero Partner organization that has been joined,
b) URL(s) to public target which meets the commitment targets of the UNFCCC Race to Zero Partner organization identified in verification requirement a).

Part B – SBTi Validated Net Zero GHG Target:

a) URL(s) to listing of manufacturer's validated net zero goal listed on the SBTi website,
b) URL(s) for manufacturer's annual progress against its validated net zero target.

4.2.3 Optional – Supplier GHG reduction targets aligned with climate science

Manufacturer shall ensure suppliers representing the percent of production spend identified in Table 4.2.3 for registered products have set publicly declared GHG emissions reduction target(s) aligned with climate science. "Aligned with climate science" means an absolute average annual linear reduction of at least 4.2% of Scope 1 and 2 emissions from the baseline to the target year.[58] The baseline year must be no earlier than 2015, and the average annual linear reduction target must extend to at least 2030. Targets may not exceed 15 years. Scope 1 and 2 emissions must be calculated in accordance with the GHG Protocol.

Alternatively, a supplier may meet this criterion by having a publicly declared GHG emissions reduction target validated by the SBTi. [34]

Annual progress against the target shall be publicly disclosed.

[54] Science Based Targets, Business Ambition for 1.5 degrees C

[55] Science Based Targets initiative Net Zero Standard

[56] The Climate Pledge

[57] SME Climate Hub

[58] This aligns with IPCC 2018 guidance for a 1.5 °C level of ambition.

Table 4.2.3

Suppliers representing 50% of production spend	1 point
Suppliers representing 75% of production spend	2 points

Point value: 1-2 (maximum of 2 points)

Verification requirements:

This criterion is verified at the product category level.

a) Annual list of suppliers which make up 50% or 75% of production spend,
b) URL(s) for publicly posted corporate target for each supplier identified in verification requirement a). Examples of acceptable URL(s) include a publicly available carbon disclosure project (CDP) response, SBTi website, or supplier website,
c) For each supplier identified in verification requirement a), evidence that the supplier's corporate GHG emission reduction targets for at least Scope 1 and Scope 2 emissions are aligned with climate science. Evidence must be one of the following:
    i. Documentation of a calculation for how each supplier's goal includes, at minimum, 4.2% average annual linear reduction to 2030, and that the supplier publishes degree of annual progress, or
    ii. URL to the SBTi website showing the supplier is identified as a company taking action.[59]

References and details: None.

4.3 Manufacturing energy efficiency

4.3.1 Required – Communication of energy management requirements for key component facilities

Manufacturer shall request that its suppliers, which produce any of the key components or assemblies, achieve third-party certification to a nationally adopted version of ISO 50001 [28] or demonstrated ongoing energy performance improvements in accordance with Criterion 4.3.3. Manufacturer shall make this request either directly to its key component suppliers or by requesting that final assembly facilities make the request.

Verification requirements:

This criterion is verified at the product category level.

[59] SBTi Companies Taking Action

a) List of manufacturer's key component supplier facilities for manufacturer's EPEAT-registered products,
b) For each key component facility identified in verification requirement a), evidence that the manufacturer has communicated the request that in-scope suppliers of key components achieve third-party certification to a nationally adopted version of ISO 50001.[28] Examples of evidence include but are not limited to a supplier code of conduct, policy, contract language or other communication to their suppliers (e.g., email communications, scorecards, etc.).

References and details: None.

4.3.2 Optional – Energy management system for final assembly and key component facilities

The manufacturer shall demonstrate that final assembly facilities, whether owned or outsourced, identified in Table 4.3.2 for registered products have achieved third-party certification to a nationally adopted version of ISO 50001[28,60] or demonstrated energy efficiency performance improvement in accordance with Criterion 4.3.3. Additionally, manufacturer shall demonstrate that for the percent of production spend on key component facilities identified in Table 4.3.2 for registered products have achieved third-party certification to a nationally adopted version of ISO 50001.[28,60]

Certification(s) shall be obtained from a certification body accredited by a body that is a signatory to the International Accreditation Forum (IAF) Multilateral Recognition Arrangement (MLA) with a scope of accreditation that includes the standard applicable to this criterion. A supplier facility may be certified as a standalone facility, or as part of a multi-site organization certification to the applicable standard.

Where a corporate certification is achieved in accordance with a multi-site certification, the certificate shall include the applicable facility(ies) used towards achievement of this criterion.

Table 4.3.2 – Optional points for final assembly and percent of production spend on key components

Final assembly whether owned or outsourced	1 point
25% of production spend on key components	1 point

Point value: 1-2 points (maximum of 2 points)

Verification requirements:

This criterion is verified at the product category level.

a) List of manufacturer's final assembly facilities for manufacturer's EPEAT-registered products, whether owned by the manufacturer or contracted to a supplier,

[60] Examples of nationally adopted versions of ISO 50001 include ANSI/ MSE 50028-1, China's Green Factory Certification program (GB/T 23331), and Japan Industrial Standard, JIS Q 50001:2019.

b) List of key component manufacturing facilities and evidence of having met production spend / supplier inclusion threshold identified in Table 4.3.2,
c) For each final assembly facility identified in verification requirement a) and each key component facility identified in b):

   i. Evidence of third-party certification to a nationally adopted version of ISO 50001, [28] where the certification was granted by a body that meets the accreditation requirements of this criterion,

   Or

   ii. Evidence of energy performance improvement in accordance with Criterion 4.3.3.

References and details: None.

4.3.3 Optional – Energy efficiency performance improvement for key component supplier facilities

For the percent of production spend on key components identified in Table 4.3.3, the manufacturer shall demonstrate that supplier facilities which produce any of the key components or assemblies have demonstrated energy performance improvement that meets, at minimum, either Option 1, 2, or 3 below:

a) Option 1: Annual past facility energy performance improvement of at least 2.5% calculated as the change in average annual facility energy performance[61] over a period of the most recent 3 to 5 years. Energy performance improvement shall be demonstrated by providing an ENERGY STAR Challenge for Industry Statement of Energy Improvement using the measurement and verification method per Annex A.1, A.2.a, and that is verified by a Qualified Auditor per Annex A.3.

b) Option 2: Annual past facility energy performance improvement of at least 2.5% calculated as the change in average annual facility energy performance over a period of the most recent 3 to 5 years. Energy performance improvement shall be demonstrated by documentation of energy performance improvement showing energy savings calculations, using an Accepted Measurement and Verification Method per Annex A.1, A.2.b.i, or Annex A.2.b.ii, and that is verified by a Qualified Auditor per Annex A.3.

   Where the supplier has data indicating that relevant variables significantly affect energy performance (e.g., production, weather), the organization is required to normalize energy performance to those relevant variables.

[61] "Average annual energy performance" is the average yearly energy performance over the time period specified.

Example 1: Energy performance improvement of 8% over 3 years and average of 2.67% per year; Year 1 was 4%, Year 2 was 3%, and Year 3 was 1%. One year of the 3 years (Year 3) was less than 2.5% but the average over 3 years was greater than 2.5%;

Example 2: Energy performance improvement of 15% over 5 years and average of 3% per year. Year 1 was 4%, year 2 was 2% and year 3 was 1%, years 4 and 5 was 4%. Two of the 5 years were less than 2.5% (years 2 and 3) but the average over 5 years was greater than 2.5%.

c) Option 3: Third-party certification to ANSI / MSE 50028-1: *Superior Energy Performance 50001 Program – Additional Requirements for Energy Management System* [5,62] or a nationally adopted equivalent program,[63] and average annual facility energy performance improvement of at least 1.0% per year over a period of 12 to 36 months, achievement periods in monthly increments between 12 and 36 months are allowable.[64]

Energy performance improvement shall be demonstrated using the measurement and verification method per Annex A.1, A.2.c and that is verified by a Qualified Auditor per Annex A.3.

Where a corporate SEP certification is achieved by a supplier in accordance with a multi-site certification, the certificate shall include the applicable facility(ies) used towards achievement of this criterion.

The verification of energy performance improvement shall be valid for 3 years from the date of certification for Options 1, 2, and 3.

Table 4.3.3 – Optional points for percent of production spend on key components

25% of production spend on key components	1 point
50% of production spend on key components	2 points

Point value: 1-2 points (maximum of 2 points)

Verification requirements:

This criterion is verified at the product category level.

a) List of manufacturer's supplier facilities used to meet this criterion and evidence of having met production spend / supplier inclusion threshold identified in Table 4.3.3,

b) For each supplier facility identified in verification requirement a), on a per-facility basis:

   i. If claiming Option 1:

      a. Calculations demonstrating energy performance improvement in accordance with the requirements of the criterion using ENERGY STAR Challenge for Industry Statement of Energy Improvement,

[62] SEP 50001 program equivalency: https://betterbuildingssolutioncenter.energy.gov/iso-50001/sep-50001/sep-50001-equivalency

[63] DOE Superior Energy Performance (SEP) 50001 Equivalency guidance - https://betterbuildingssolutioncenter.energy.gov/iso-50001/sep-50001/sep-50001-equivalency

[64] The criterion specifies a minimum commitment improvement of 1% per year to incentivize the actions necessary to implement a full Energy Management System and realize subsequent sustained performance over time. (GEC State of Sustainability Research for Climate Change Mitigation, data provided by U.S. DOE Staff).

b. Evidence of independent verification of the energy performance improvement as per the requirements of the criterion, and
c. Qualified auditor credentials.

ii. If claiming Option 2:

a. Calculations demonstrating energy performance improvement in accordance with the requirements of the criterion,
b. Evidence of independent verification of the energy performance improvement as per the requirements of the criterion, and
c. Qualified auditor credentials.

iii. If claiming Option 3:

a. Evidence of third-party certification to ANSI / MSE 50028-1 or to a nationally adopted equivalent program,
b. Calculation or documentation demonstrating the average annual facility energy performance improvement is ≥1.0% per year over a period of 12 to 36 months using SEP 50001 energy performance improvement report verified by an accredited SEP 50001 Verification Body, and
c. If a nationally adopted program is being used, documentation demonstrating the standard is equivalent to ANSI / MSE 50028-1.

References and details: None.

4.3.4 Optional – Facility energy reporting

The manufacturer shall publicly disclose facilities accounted for in 4.3.2. The facilities identified shall include final assembly and / or constitute at least 25% of production spend on key components.

The manufacturer shall publicly disclose, at minimum, the following for the final assembly facilities included in scope for this criterion:

a) Number of facilities by country, and
b) Aggregate of total annual energy consumption by country of all facilities in scope with a breakdown of the types of primary fuels and electricity (e.g., gigajoules per year) used. Only significant fuels (i.e., those making up to 95% of total supplier facility energy consumption) need to be included).

The manufacturer shall publicly disclose, at minimum, the following for the facilities constituting at least 25% of production spend on key components included in scope for this criterion:

a) Number of supplier facilities by country and by key component, and
b) Aggregate of total annual energy consumption by country of all facilities in scope with a breakdown of the types of primary fuels and electricity (e.g., gigajoules per year) used. Only significant fuels (i.e., those making up to 95% of total supplier facility energy consumption) need to be included.

Table 4.3.4 – Optional points for facility energy reporting

Final assembly facilities	1 point
Facilities constituting 25% of production spend on key components	1 point

Point value: 1-2 points (maximum of 2 points, additive)

Verification requirements:

This criterion is verified at the product category level.

For final assembly facilities:

a) List of final assembly facilities used to meet this criterion, by company name, city, and country,
b) Evidence that the final assembly facilities identified in verification requirement a) are those accounted for in Criterion 4.3.2, and
c) URL(s) for annual public disclosure of energy consumption of final assembly facilities within the scope of this criterion.[65]

For facilities constituting 25% of production spend on key components:

a) List of facilities used to meet this criterion, by key component, company name, city and country,
b) Evidence that the supplier facilities identified in verification requirement a) are a subset of those accounted for in Criterion 4.3.2,
c) Annual calculation demonstrating that the supplier facilities identified in verification requirement a) meet the percentage of production spend on key components threshold,
d) URL(s) for annual public disclosure of energy consumption of these facilities.[65]

References and details: None.

4.4 Renewable electricity sourcing

4.4.1 Required – Manufacturer use of renewable electricity

The manufacturer shall demonstrate 12.5% renewable electricity generation and / or procurement not including what is delivered as part of the standard default electricity service as a percentage of total electricity consumption for facilities in scope.

Manufacturer operations may be exempted from meeting this criterion when located in electricity markets that

[65] For facilities utilizing ISO 50001, the ISO 50001 Impact Estimator Tool (IET 50001) can be used to calculate avoided energy consumption, energy cost savings, and associated emissions reductions by an organization or a country.

meet RE100 Technical Criterion 5.2. [66]

Standard default service is the mix of energy resource types used to generate the electricity that a consumer is allocated by their electricity service provider, or the undifferentiated mix of energy resources used to generate electricity that is available to all consumers who otherwise do not proactively choose a differentiated resource mix from an alternative electricity supplier.[67]

Scope:

The scope for this criterion shall be the annual electricity consumed at manufacturer facilities with significant responsibility for the design and manufacture, as determined and documented by the manufacturer, for registered products. The facilities included in the scope of this criterion shall be a subset of the facilities included in the GHG accounting and/or reporting practices used by the manufacturer. These facilities may be owned, leased, or operated by the manufacturer.

The manufacturer may include additional facilities that are owned, leased, or operated by the manufacturer.

To demonstrate conformance with this criterion, the percentage of total electricity consumption for facilities in scope, as required by this criterion shall be calculated once annually for a 12-month reporting period and across the portfolio of in-scope facilities. Manufacturer may choose the initial 12-month reporting period and must use the same 12-month period every year to calculate the percentage of renewable electricity generation and resource procurement to ensure on-going tracking and verification. The manufacturer may change to a new 12-month period, and in that case, the manufacturer must provide a calculation of the percentage of renewable electricity generation and resource procurement for a minimum of two consecutive 12-month periods.

Generation and project vintage requirements:

The renewable electricity has been generated in the same 12-month period as consumed by the manufacturer facility, during the six months immediately preceding the 12-month consumption period, or in the the three months immediately following the 12-month consumption period. All generation must originate from projects or generators that have been commissioned [68] in the past 15 years. Renewable energy generation sourced through long-term direct supply contracts with newly developed projects at time of contract initiation will be recognized throughout the term of the original contract or commitment, as long as the project otherwise meets the requirements of this criterion at the time when the project was commissioned.

[66] Criterion 5.2 in RE100's technical criteria provides guidance when corporate buyers are procuring renewables in a highly renewable grid where no market-based instruments exist. It is to be used when the default delivered renewable electricity from the grid is in a market with at least a 95% renewable generation mix, and where there is no mechanism for specifically allocating renewable electricity.

[67] "Standard default electricity service" may come from privatized or public sources, and the manufacturer may or may not have a choice of provider.

[68] Commissioned date is the date the generator began providing electricity to the grid.

Supply option and market boundary requirements:

The renewable electricity used to meet this criterion shall be of the same market and be one or more of following supply options:

a) Self-generated renewable electricity from an owned or operated generator or project from the same electricity market or country where the manufacturer's facility(ies) are located, and the energy attributes or energy attribute certificates (EACs) claimed towards this criterion are either retained or retired by the manufacturer and not transferred to, or claimed, or counted by other parties to avoid double-counting and double-claims by other parties, and / or
b) Purchased renewable electricity from an on-site or off-site generator or project that is not owned or operated by the manufacturer, where all energy attributes or EACs are sourced from the same electricity market or country [41] as the manufacturer's facility(ies) are located. The energy attributes or EACs claimed towards this criterion are retained or retired by or on behalf of the manufacturer and not transferred to or claimed or counted by other parties to avoid double-counting and double-claims by other parties.

   Examples include but are not limited to:

   i. Power Purchase Agreements (PPAs),
   ii. Lease agreements for Renewable Electricity Generation Projects,
   iii. Financial contracts (e.g., contract for differences or virtual PPAs),
   iv. Green Tariffs or Green Riders,
   v. Utility Green Pricing Program or Products,
   vi. Retail or unbundled EAC products, including Renewable Energy Certificates (RECs), Guarantees of Origin (GOs), or similar.

Acceptable renewable energy sources:

Renewable electricity must be generated from one or more of the following sources:

a) Wind,
b) Solar,
c) Geothermal,
d) Biomass: woody waste,
e) Biomass: agricultural non-food crop,
f) Biomass: agricultural waste,
g) Biomass: energy crops,
h) Biomass: landfill gas and wastewater methane,
i) Biomass: black liquor,
j) Biomass: municipal solid waste where only the biogenic portion of the resource is used,
k) Hydropower: low-impact in accordance with Annex B,

l) Hydropower: in-pipe.[69]

Only the renewable portion of a mixed electricity source (i.e., where more than one resource is used to generate the electricity) shall be used towards conformance to this criterion. Electricity generated by a source other than those identified in this criterion as a renewable electricity source are not eligible.

Carbon offsets may not be used towards the achievement of this criterion.

Purchased renewable electricity to meet this criterion shall be one of the following:

a) Third-party verified or certified, in accordance and compliance with the governing rules and requirements for the standard being used, to a standard that meets the Accepted Renewable Electricity Standard requirements.[70]

The Accepted Renewable Electricity Standard requirements are:

i. The standard was developed using an open process that involved stakeholder consultation,
ii. The standard is intended for use in the market(s) in which it is being applied,
iii. The standard requires that:

a. The EACs have full aggregation of environmental attributes,
b. The renewable electricity attribute is surplus to what is required by legal mandate or to what is otherwise available as part of the standard default electricity service,
c. All renewable energy generation must come from generators commissioned within the last 15 years,
d. There is exclusive and unique ownership of renewable energy attributes (REAs), such that the purchaser of renewable electricity can validate having a clear exclusive (or sole) claim to the consumption of purchased renewable energy. Ownership shall be substantiated through the conveyance of energy attributes or EACs / instruments (e.g., contracts that convey energy generation attributes to the buyer of RECs) to ensure there is exclusive and unique ownership of the REA or energy attribute instrument,
e. The seller of the renewable electricity discloses the fuel mix (energy sources used to generate the electricity), the geographic location of the facility used to generate the renewable electricity, and the vintage of generation as indicated by the date range (month and year for both start and end) of energy attributes or EACs of the delivered renewable electricity for confirmation of vintage requirements.

b) In markets where third-party verification to a standard meeting the requirements of a) is not available:

i. Be generated from an acceptable renewable energy source as identified in this criterion,

[69] Hydropower facility consists of a turbine in a pipeline or a turbine in an irrigation canal.

[70] A list of Accepted Renewable Electricity Standards ~~(e.g., Green-e® Renewable Energy Standards)~~ are available on EPEAT / GEC's website. Note that some standards (e.g., Green-e®) require "certification" as defined by their governing rules and requirements; "verification" alone is not sufficient.

ii. Achieve the market boundary requirement by demonstrating renewable electricity generation is within the same electricity market or country where generated, or meets the WRI GHG Protocol: *Scope 2 Guidance*[41] market boundary requirements,
iii. Be generated in accordance with both project and generation vintage requirements in this criterion,
iv. Be substantiated with energy attributes or EACs that are owned, retained or retired by or on behalf of the manufacturer,
v. Be commissioned within 15 years of the contractual start date with the manufacturer. Renewable energy sourced from long-term supply contracts will be recognized throughout the term of the original contract or commitment as long as the project otherwise meets the requirements of this criterion at the time when the project was commissioned.

Verification requirements:

This criterion is verified at the product category level.

a) Identification of 12-month reporting period used to calculate the percentage of renewable electricity generation procured and used on an annual basis,
b) List of manufacturer facilities whose electricity is claimed towards this criterion, including the location (country) or electricity market.
c) Scoping:

    i. Description of methodology used to determine which manufacturer facilities with significant responsibility for registered products have been included in scope,
    ii. A manufacturer declaration that claimed facilities are a subset of the facilities included in GHG accounting and / or reporting practices used by the manufacturer.

d) Calculation used to determine:

    i. The percentage of renewable electricity generation that is generated or procured, and
    ii. The use of renewable energy as a percentage of total electricity consumption across facility(ies) used to meet this criterion, including the following:

        a. Total renewable electricity generation and consumption claimed towards this criterion in megawatt-hours (MWh), and
        b. Total electricity consumption in MWh.

e) For each renewable electricity supply used across manufacturer facility(ies) and claimed towards this criterion:

    i. Identification of the renewable electricity source(s) (e.g., wind, solar), including whether a mixed electricity source is used and if so, the quantity of eligible renewable and non-renewable electricity in the source mix,
    ii. Identification of the quantity of renewable electricity being applied towards the criterion, in MWh.

iii. Identification of date range (month and year for both the start and end) of generation of the renewable electricity for confirmation of both project and generation vintage requirements in this criterion,
iv. Identification of the location (country) or electricity market of the renewable electricity project from which eligible generation is consumed,
v. For self-generated renewable electricity:

a. Evidence showing the ownership or operational control of the renewable electricity generation project,
b. Manufacturer or renewable electricity generator declaration that the renewable electricity attributes are exclusively owned and are not transferred to or claimed by other parties,[71] and
c. Evidence of achievement of market boundary requirements.

vi. For purchased renewable electricity:

a. Proof of purchase (e.g., PPA, contract, EAC, invoice from generator).

f) For each third-party verified or certified renewable electricity supply claimed:

i. The name of the standard to which the renewable electricity supply is verified or certified,
ii. Proof of certification (e.g., certificate, screenshot from registry system, account statement),[72] and
iii. Direct demonstration that the standard meets the Accepted Renewable Electricity Standard requirements, ***and*** declaration of conformity by the certification program regarding the achievement of the Accepted Renewable Electricity Standard requirements.

g) For each non-third-party verified or certified renewable electricity supply claimed, evidence supporting the following:

i. Achievement of market boundary requirements,
ii. Achievement of project and generation vintage requirements of this criterion, including dates of renewable electricity generation (month and year for both the start and end) and consumption (month and year for both the start and end),
iii. Eligibility of purchased renewable electricity resources per Section b.i of the criterion,
iv. Proof that energy attributes or EACs are exclusively owned by the manufacturer or have been permanently retained by the manufacturer (i.e., have not been sold) or have been retired by or on behalf of the manufacturer. This documentation may be provided at the end of the first 12-month period that this criterion is claimed. In such cases, the evidence must show that the project and generation vintage requirements of this criterion are met.

[71] Use of a third-party verified tracking mechanism such that a unique identification number is reported for each MWh / REA is recommended.

[72] "Eligibility to be certified" is not the same as being certified.

h) For instances where renewable electricity is generated in the US and is from a low-impact hydropower source (per Annex B), documentation of LIHI certification for the hydropower generation project(s). For instances where renewable electricity is generated outside the US and is from a low-impact hydropower source (per Annex B), evidence of meeting the requirement in Annex B, which may include certification to one of the following organizations as available:

   i. Low Impact Hydropower Institute,[32]
   ii. UL 2854 EcoLogo Standard for Renewable Low-Impact Electricity Products, [35,36,73] and
   iii. Hydropower Sustainability Council.[15]

References and details: None.

4.4.2 Optional – Manufacturer increased use of renewable electricity

Manufacturer shall meet the requirements of Criterion 4.4.1 for facilities in scope for the renewable electricity generation and procurement percentages specified in Table 4.4.2.

Table 4.4.2 – Optional points based on percent of manufacturer use of renewable electricity relative to total electricity consumption

Percent use of renewable electricity	Points awarded
40%	1 point
85%	2 points

Point value: 1-2 points (maximum of 2 points)

Verification requirements:

This criterion is verified at the product category level.

a) Demonstrate conformance with verification requirements in Criterion 4.4.1.

4.4.3 Optional – Supplier use of renewable electricity

The manufacturer shall demonstrate that their supplier facilities that produce key components and assemblies ~~(as defined below)~~ for registered products use renewable electricity sources, not including what is delivered as part of the standard default electricity service, as defined in this criterion.

[73] https://www.shopulstandards.com/ProductDetail.aspx?UniqueKey=33897

~~Key components for EPEAT registered products are either the priority components defined below, or the top five components by GHG emissions as identified for the product category of interest using the PCFs or LCAs created under Criterion 4.1.1.~~

~~Key components include the following:~~

~~a) Main printed circuit board,~~
~~b) Integrated circuits: CPUs, SSDs, HDDs, RAM, GPUs,~~
~~c) Power supply units, and~~
~~d) Display panels.~~

Scope:

Optional points shall be awarded based on the percentage of manufacturer's production spend on key components and assemblies, and the percentage of the supplier's electricity consumption from renewable sources, according to Table 4.4.3.

To demonstrate conformance with this criterion, the percentages in Table 4.4.3 shall be calculated once annually for a 12-month reporting period and across the portfolio of in-scope facilities. Supplier may choose the initial 12-month reporting period and must use the same 12-month period every year to calculate the percentage of renewable electricity generation and procurement to ensure on-going tracking and verification. Manufacturer shall report the supplier's 12-month reporting period for verification purposes.

The renewable electricity generation and procurement may be achieved for a portion of a supplier's facility(ies) in the scope of this criterion, if both of the following are achieved:

a) Total electricity consumption must at least include all operations that are involved in the manufacturing for all products covered by the criterion across applicable facility(ies),[74] and
b) The portion of electricity and renewable electricity consumption for each facility must either be:
    i. Delineated through metering or submetering, or
    ii. Calculated as a percent of revenue or production for the facility, on a per unit of production or per mass of material basis.

The manufacturer may include additional supplier facilities, beyond what's required to fulfill this criterion, in the scope.

Generation and project vintage requirements:

The renewable electricity has been generated in the same 12-month period as consumed by the supplier facility, during the six months immediately preceding the 12-month consumption period, or in the the three months immediately following the 12-month consumption period. All generation must originate from projects

[74] In conformance with the GHG Protocol, total electricity consumption should be calculated across all operations of the supplier's facility including the electricity use related to the manufacturing, administration, sales, marketing, shipping, and warehousing of components and assemblies.

or generators that have been commissioned [75] in the past 15 years. Renewable energy generation sourced through long-term direct supply contracts with newly developed projects at time of contract initiation will be recognized throughout the term of the original contract or commitment, as long as the project otherwise meets the requirements of this criterion at the time when the project was commissioned.

Supply option and market boundary requirements:

The renewable electricity used to meet this criterion shall be of the same market and be one or more of following supply options:

a) Self-generated renewable electricity from an owned or operated generator or project from the same electricity market or country where the manufacturer's suppliers' facility(ies) are located and the energy attributes or EACs claimed towards this criterion are either retained or retired by the supplier and not transferred to, or claimed, or counted by other parties to avoid double-counting and double-claims by other parties, and / or

b) Purchased renewable electricity from an on-site or off-site generator or project that is not owned or operated by the supplier, where all contractual instruments energy attributes or EACs are sourced from the same electricity market or country [41] as the supplier's facility(ies) are located, and the energy attributes or EACs claimed towards this criterion are retained or retired by or on behalf of the supplier and not transferred to, or claimed, or counted by other parties to avoid double-counting and double-claims by other parties.

   Examples include, but are not limited to:

   i. Power Purchase Agreements (PPAs),
   ii. Lease agreements for Renewable Electricity Generation Projects,
   iii. Financial contracts (e.g., contract for differences or virtual PPAs),
   iv. Green Tariffs or Green Riders,
   v. Utility Green Pricing Program or Products,
   vi. Retail or unbundled EAC products, including Renewable Energy Certificates (RECs), Guarantees of Origin (GOs), or similar.

Acceptable renewable energy sources:

Renewable electricity must be generated from one or more of the following sources:

a) Wind,
b) Solar,
c) Geothermal,
d) Biomass: woody waste,
e) Biomass: agricultural non-food crop,
f) Biomass: agricultural waste,
g) Biomass: energy crops,

[75] Commissioned date is the date the generator began providing electricity to the grid.

h) Biomass: landfill gas and wastewater methane,
i) Biomass: black liquor,
j) Biomass: municipal solid waste where only the biogenic portion of the resource is used,
k) Hydropower: low impact in accordance with Annex B,
l) Hydropower: in-pipe.[76]

Only the renewable portion of a mixed electricity source (i.e., where more than one resource is used to generate the electricity) shall be used towards conformance to this criterion. Electricity generated by a source other than those identified in this criterion as a renewable electricity source are not eligible.

Carbon offsets may not be used towards the achievement of this criterion.

Purchased renewable electricity to meet this criterion shall be one of the following:

a) Third-party verified or certified, in accordance and compliance with the governing rules and requirements for the standard being used, to a standard that meets the following requirements. [70]

   Accepted renewable electricity standard requirements are:

   i. The standard was developed using an open process that involved stakeholder consultation,
   ii. The standard is intended for use in the market(s) in which it is being applied,
   iii. The standard requires that:

      a. The RECs have full aggregation of environmental attributes,
      b. The renewable electricity attribute is surplus to what is required by legal mandate or to what is otherwise available as part of the standard default electricity service,
      c. All renewable energy generation must come from generators commissioned [77] within the last 15 years,
      d. There is exclusive and unique ownership of the REAs such that the purchaser of renewable electricity can validate having a clear exclusive (or sole) claim to the consumption of purchased renewable energy. Ownership shall be substantiated through the conveyance of energy attributes or EACs / instruments (e.g., contracts that convey energy generation attributes to the buyer of RECs) to ensure there is exclusive and unique ownership of the REA or energy attribute instrument,
      e. The seller of the renewable electricity discloses the fuel mix (energy sources used to generate the electricity), the geographic location of the facility used to generate the renewable electricity, and the vintage of generation as indicated by the date range (month and year for both start and end) of energy attributes or EACs of the delivered renewable electricity for confirmation of vintage requirements.

[76] Hydropower facility consists of a turbine in a pipeline or a turbine in an irrigation canal.

[77] Commissioned date is the date the generator began providing electricity to the grid.

b) In markets where third-party verification to a standard meeting the requirements of a) is not available, the renewable electricity shall:

i. Be generated from an acceptable energy source, as identified in this criterion,
ii. Achieve the market boundary requirement by demonstrating renewable electricity generation is within the same electricity market or country where generated, or meets the WRI GHG Protocol: *Scope 2 Guidance*[41] market boundary requirements,
iii. Be generated in accordance with both project and generation vintage requirements in this criterion,
iv. Be substantiated with energy attributes or EACs that are owned, retained, or retired by or on behalf of the supplier,
v. Be commissioned within 15 years of the contractual start date with the manufacturer's supplier. Renewable energy sourced from long-term supply contracts will be recognized throughout the term of the original contract or commitment as long as the project otherwise meets the requirements of this criterion at the time when the project was commissioned.

Table 4.4.3 – Optional points based on percent of production spend on key components and associated level of electricity consumption from renewable electricity sources

Suppliers constituting 50% of production spend on key components demonstrate renewable electricity generation and procurement meeting the generation and project vintage requirements constitutes at least 40% of total electricity consumption across in-scope supplier facilities.[78]	1st point
Suppliers constituting 50% of production spend on key components demonstrate renewable electricity generation and procurement meeting the generation and project vintage requirements constitutes at least 65% of total electricity consumption across in-scope supplier facilities.	2nd point
Suppliers constituting 75% of production spend on key components demonstrate RE generation and procurement meeting the generation and project vintage requirements constitutes at least 40% of total electricity consumption across in-scope supplier facilities.	3rd point
Suppliers constituting 75% of production spend on key components demonstrate RE generation and procurement meeting the generation and project vintage requirements constitutes at least 65% total electricity consumption across in-scope supplier facilities.	4th point

Point value: 1-4 points (maximum of 4 points)

Verification requirements:

This criterion is verified at the product category level.

[78] Percent of total electricity consumption across in-scope supplier facilities is calculated by dividing the renewable energy consumed across all in-scope facilities by the total energy consumed across all in-scope facilities. Some suppliers included in the calculation may be under the required percent threshold for renewal energy sourcing if others are above.

a) Identification of 12-month reporting period used to calculate the percentage of renewable electricity generation procured and used on an annual basis, as per Table 4.4.3,
b) List of supplier facilities whose electricity is claimed towards this criterion, including the location (country) or electricity market,
c) Scoping:

    i. Methodology used to determine which supplier facilities are in scope,
    ii. For each supplier facility(ies) where renewable electricity generation procurement and use was achieved for a portion of the facility(ies) operations, methodology used to determine the portion of electricity and renewable electricity consumption for the facility.

d) Calculation used to determine the percentage of renewable electricity generation that is procured and used as a percentage of total electricity consumption across facility(ies) used to meet this criterion, including the following across facility(ies):

    i. Total renewable electricity generation and consumption claimed towards this criterion in MWh, and
    ii. Total electricity consumption in MWh.

e) For each renewable electricity supply used across supplier facility(ies) and claimed towards this criterion:

    i. Identification of the renewable electricity source(s) (e.g., wind, solar), including whether a mixed electricity source is used and if so, the quantity of eligible renewable and of non-renewable electricity in the source mix,
    ii. Identification of the quantity of renewable electricity being applied towards the criterion, in MWh.
    iii. Identification of date range (month and year for both the start and end) of generation of the renewable electricity for confirmation of both project and generation vintage requirements in this criterion,
    iv. Identification of the location (country) or electricity market of the renewable electricity project from which eligible generation is consumed,
    v. For self-generated renewable electricity:

        a. Evidence showing the ownership or operational control of the renewable electricity generation project;
        b. Supplier or renewable electricity generator declaration that the renewable electricity attributes are exclusively owned and are not transferred to or claimed by other parties[79] and
        c. Evidence of achievement of market boundary requirements.

[79] Use of a third-party verified tracking mechanism such that a unique identification number is reported for each MWh / REC is a considered a best practice (non-normative reference).

vi. For purchased renewable electricity, proof of purchase (e.g., PPA, contract, EAC, invoice from generator).

f) For each third-party verified or certified renewable electricity supply claimed:

i. The name of the standard to which the renewable electricity supply is certified,
ii. Proof of certification (e.g., certificate, screenshot from registry system, account statement), and
iii. Direct demonstration that the standard meets the accepted renewable electricity standard requirements, *and* declaration of conformity by the certification program regarding the achievement of the accepted renewable electricity standard requirements.

g) For each non-third-party verified or certified renewable electricity supply claimed, evidence supporting the following:

i. Achievement of market boundary requirements,
ii. Achievement of project and generation vintage requirements of this criterion, including dates of renewable electricity generation (month and year for both the start and end) and consumption (month and year for both the start and end),
iii. Eligibility of purchased renewable electricity resources per Section b.i of the criterion,
iv. Proof that energy attributes or EACs are exclusively owned by the supplier or have been permanently retained by the supplier (i.e., have not been sold) or have been retired by or on behalf of the supplier. This documentation may be provided at the end of the first 12-month period that this criterion is claimed. In such cases, the evidence must show that the project and generation vintage requirements of this criterion are met.

h) For instances where renewable electricity is generated in the US and is from a low-impact hydropower source (per Annex B), documentation of LIHI certification for the hydropower generation project(s). For instances where renewable electricity is generated outside the US and is from a low-impact hydropower source (per Annex B), evidence of meeting the requirements in Annex B, which may include certification to one of the following organizations as available:

i. Low Impact Hydropower Institute,[32]
ii. UL 2854 *EcoLogo Standard for Renewable Low-Impact Electricity Products*,[35,36]
iii. Hydropower Sustainability Council.[15]

References and details: None.

4.5 High global warming potential chemicals in manufacturing (F-GHGs)

4.5.1 Optional - Reduce F-GHG emissions from flat panel display manufacturing

Manufacturer shall meet Criterion 4.1.10.1 in IEEE 1680.1a,[19] *Standard for Environmental and Social Responsibility Assessment of Computers and Displays*.

This criterion is applicable to all registered products; it is not limited to computers and displays. If the product does not contain a flat panel display, the manufacturer shall declare the criterion not applicable.

Point value:1-2 points (maximum of 2 points) as defined in IEEE 1680.1a.[19]

Verification requirements:

This criterion is verified at the product category level and manufacturers must identify which product types for which this criterion does not apply. Criterion is not applicable to products without a flat panel display.

a) Demonstration of verification requirements per IEEE 1680.1a, Criterion 4.1.10.1.[19]

References and details: None.

4.5.2 Optional - Reduce F-GHG emissions from 300 mm semiconductor manufacturing

Manufacturer shall meet Criterion 4.1.10.2 in IEEE 1680.1a.[19]

This criterion is applicable to all registered products, it is not limited to computers and displays. If the product does not contain semiconductor components produced from 300 mm process semiconductor manufacturing facilities, the manufacturer shall declare the criterion not applicable.

Point value: 1-2 points (maximum of 2 points) as defined in IEEE 1680.1a.[19]

Verification requirements:

This criterion is verified at the product category level and manufacturers must identify which product types for which this criterion does not apply. Criterion is not applicable if the product does not contain semiconductor components produced from 300 mm process semiconductor manufacturing facilities.

a) Demonstration of verification requirements per IEEE 1680.1a, Criterion 4.1.10.2.[19]

References and details: None.

4.6 Product energy efficiency

4.6.1 Required – Conformance with applicable ENERGY STAR product eligibility criteria

The product shall conform with the most current version of the applicable ENERGY STAR specification in effect. For countries where ENERGY STAR certification is available, manufacturer shall provide URL(s) to the product's valid listing on the ENERGY STAR certified product listing or international partner website. If there is a delay between product testing and publication of certification of the ENERGY STAR certified product listing, for up to one month, the manufacturer can provide a test report or certification report demonstrating conformance instead of URL(s). For countries where ENERGY STAR certification is not available, manufacturer shall provide a test report demonstrating the product conforms with the "energy requirements" of the current version of the US EPA ENERGY STAR eligibility criteria, where "energy requirements" means all requirements related to energy including energy consumption, power supplies (where applicable), power demand, and power management.

The test report must be from one of the following:

a) US EPA recognized laboratory for ENERGY STAR testing,[80] or

b) Laboratory that is accredited to ISO / IEC 17025, [29] where the laboratory's scope of accreditation includes the standard or test method for which it is supplying data, or

c) Laboratory in which the testing is witnessed or supervised by a certification body accredited to ISO / IEC 17065. [30] Manufacturer must provide evidence of the testing laboratory enrollment in the witnessed testing program, and evidence that the certification body accredited to ISO / IEC 17065 [30] has the testing method in its scope of accreditation.

This criterion is not applicable if there is no ENERGY STAR specification available for the product type.

> NOTE — The voltage and frequency combinations listed in the ENERGY STAR product specification for the standard are the only voltage and frequencies covered by this criterion. This criterion shall not be misinterpreted to mean that testing is required at all voltages and frequencies in the "country of use."

Verification requirements:

This criterion is verified at the product level.

a) For countries where ENERGY STAR certification is available, URL to the product's valid listing on the US ENERGY STAR or international partner ENERGY STAR certified product listing website or a valid test report or certificate report for one-month following product testing, or

b) In countries where ENERGY STAR certification is not available, test report demonstrating that the product conforms with the "energy requirements" of the current version of the US ENERGY STAR eligibility criteria, where "energy requirements" means all requirements related to energy including energy consumption, power supplies (where applicable), power demand, and power management, and

c) Evidence testing was done by a US EPA approved laboratory or an accredited ISO / IEC 17025 [29] laboratory or witnessed or supervised by a certification body accredited to ISO 17065, [30] per the requirements of this criterion.

References and details: None.

4.6.2 Required – External power supply energy efficiency

The external power supply shipped with the product shall meet, at a minimum, the requirements of US Department of Energy (DOE) Conservation Standards or equivalent [81] for External Power Supplies Level VI average efficiency levels, for the applicable external power supply product class.

[80] https: / / www.energystar.gov / partner_resources / products_partner_resources / third_party_cert

[81] Commission Regulation (EU) 2019 / 1782 of 1 October 2019 laying down ecodesign requirements for external power supplies pursuant to Directive 2009 / 125 / EC of the European Parliament and of the Council; Natural Resources Canada CSA-C381.1 and Australia and New Zealand AS / NZS 4665 have been identified as equivalent.

"Shipped with the product" means that the criterion applies to all external power supplies with which the product may be shipped.

External power supplies shall be tested at the ENERGY STAR voltage combination, either 115 V / 60 Hz and / or 230 V / 50 Hz, as specified in IEC 62623 2nd Ed., Section 5.4, Table 2, [17] that is most relevant to the countries or regions where the products are EPEAT registered.

> NOTE — Testing is required only once at each relevant voltage regardless of the number of countries or regions where the product is EPEAT registered. For example, if a product is only registered in five countries where the most relevant voltage is 115 V, testing at 115 V is only required once and testing at 230V is not required. If a product is registered in three countries where the most relevant voltage is 115 V and two countries where the most relevant voltage is 230 V, testing at 115 V is only required once and testing at 230 V is only required once.

This criterion is not applicable if the product does not ship with an external power supply, if the external power supply is DC, or if a DIN rail power supply is used.

Verification requirements:

This criterion is verified at the product level.

a) Bill of material, or other comparable documentation, identifying the tested power supply is shipped with the product,
b) Test report conducted according to US 10 CFR Appendix Z to Subpart B of Part 430: *Uniform Test Method for Measuring the Energy Consumption of External Power Supplies*, and demonstrating conformance with the efficiency performance standards of 10 CFR Part 430.32(w) and certification requirements pursuant to 429.37(b); Energy Conservation Standards for External Power Supplies or equivalent.[82]

References and details: None.

4.6.3 Required – Battery charger system energy efficiency

The battery charger system shipped with the product shall meet the unit energy consumption requirements of US 10 CFR Part 430.32 subparagraph (z), *Energy Conservation Standards for Battery Chargers*, or equivalent. [38,83]

"Shipped with the product" means that the criterion applies to all battery charger systems that the product may be shipped with.

Battery charger systems shall be tested at the relevant voltage used in the country or region where a product is EPEAT registered (either 115 V / 60 Hz and / or 230 V / 50 Hz).

[82] EN50563-2011 / A1:2013 and Natural Resources Canada CSA-C381.1 have been identified as equivalent.

[83] Natural Resources Canada CSA C381.2-17 has been identified as equivalent.

NOTE — Testing is required only once at each relevant voltage regardless of the number of countries or regions where the product is EPEAT registered. For example, if a product is only registered in five countries where the most relevant voltage is 115 V, testing at 115 V is only required once and testing at 230 V is not required. If a product is registered in three countries where the most relevant voltage is 115 V and two countries where the most relevant voltage is 230 V, testing at 115 V is only required once and testing at 230 V is only required once.

This criterion is not applicable if the product does not have a battery charger system or if the product uses an inductive (wireless) charging system.

If the product is not a mobile phone, N / A may be selected.

Verification requirements:

This criterion is verified at the product level.

a) Bill of material, or other comparable documentation, identifying that the battery charger system is shipped with the product,
b) Test report conducted according to US 10 CFR Part 430 Appendix Y to Subpart B; *Uniform Test Method for Measuring the Energy Consumption of Battery Chargers, demonstrating conformance with US 10 CFR Part 429.39 Energy Conservation Standards for Battery* Chargers, or equivalent. [83]

References and details: Federal Energy Conservation Standards for Battery Chargers; Final Rule

Annex A (Normative): Manufacturing energy efficiency

1. Energy performance improvement metrics

Energy performance improvement must, at a minimum, be based on whole supplier facility energy consumption. Facility energy shall be reported at minimum as site energy (e.g., gigajoules per year) for all types of energy that represent 95% or more of the whole facility's energy consumption (e.g., electric and thermal fuels). It is required to calculate energy performance improvement based on product energy intensity (Options 1 or 2) or normalization to relevant variables (Options 2 or 3) for the whole facility. In all cases (Options 1, 2 or 3) for the whole facility, energy performance is based on the most recent 3 to 5 years of data available for Options 1 and 2, and 12 to 36 months of data available for Option 3.

2. Accepted Measurement and Verification (M&V) Methods

Energy performance improvement calculation shall include verification performed by a Qualified Auditor per Annex A, item 3, using the following M&V method for each Option:

a) Option 1: ENERGY STAR

US EPA ENERGY STAR Challenge for Industry ENERGY STAR Challenge for Industry: Professional Engineers' Guide for Validating Statements of Energy Improvement[84]

b) Option 2: IPMVP or SEP Protocol

i. Efficiency Valuation Organization (EVO) International Performance Measurement and Verification Protocol (IPMVP) method C, or nationally adopted version of IPMVP;
ii. US DOE SEP 50001 Measurement and Verification Protocol, or nationally adopted version of SEP 50001.

For this option (2), where the organization has data indicating that relevant variables significantly affect energy performance (e.g., production volume, building occupancy, weather), the organization shall apply normalization to the energy performance improvement calculation and the corresponding energy baseline.

c) Option 3: US DOE SEP 50001 Measurement and Verification Protocol, or nationally adopted version of SEP 50001. [85]

[84] https://www.energystar.gov/buildings/tools-and-resources/energy-star-challenge-industry-professional-engineers-guide-validating

[85] ISO 50003:2021 - *Energy management systems — Requirements for bodies providing audit and certification of energy management systems* (https://www.iso.org/standard/77575.html)

3. Qualified Auditor

a) Shall be a third party, and
b) Shall hold one of the following:

i. Credential 1 or 2, or
ii. An equivalent competency that meets the requirements as described in the auditor qualifications section of credential 1 or 2.

Credentials:

1. Association of Energy Engineers (AEE):

    a. AEE Certified Measurement and Verification Professional (CMVP) Auditor, or
    b. AEE SEP Performance Verifier (SEP PV), or
    c. AEE 50001 Certified Practitioner in Energy Management Systems (CP EnMS).

2. Licensed professional engineer.

Annex B (Normative): Requirements for low-impact hydropower electricity

Hydropower, low-impact electricity shall be generated by hydroelectric projects that are not pumped storage and have met, at a minimum, the following:

a) During project development:

   i. Environmental and social impact assessment has been performed,
   ii. Consultation with stakeholders and local communities has occurred and concerns reasonably addressed,
   iii. Negative environmental and social impacts have been reasonably mitigated, including aquatic, riparian and terrestrial ecosystems, and
   iv. Land use, biodiversity and scenic, historical, recreational, and cultural resources are not unreasonably impacted.

b) During project operations:

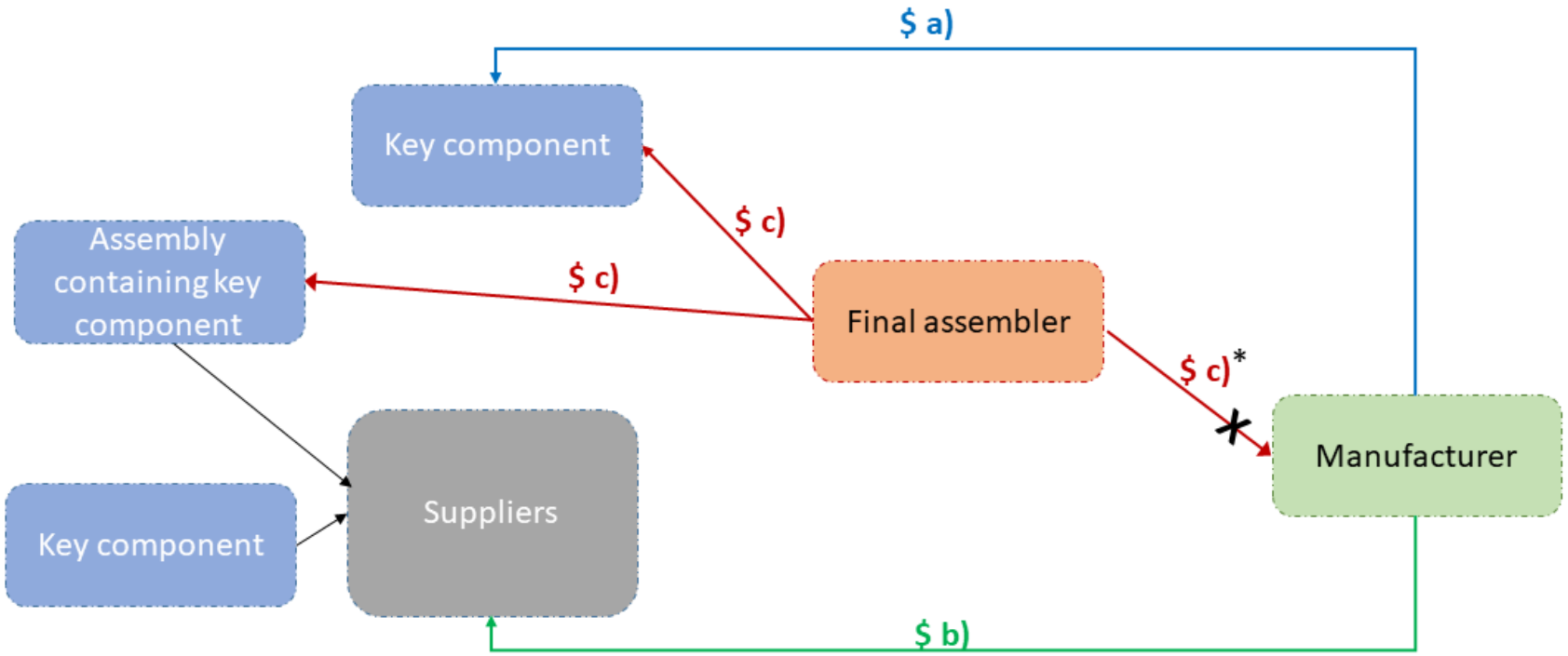
   i. Provides sufficient upstream and downstream migratory fish passage,
   ii. Includes measures to minimize fish mortality through impingement and entrainment,
   iii. Does not impact or jeopardize any endangered or threatened species, and
   iv. Operates such that:

      1. Where applicable, operations are coordinated with any other water-control facilities,
      2. Changes in water flows (downstream, bypassed and other reaches, instream) are not detrimental to and support aquatic, riparian and wildlife aquatic species, and
      3. Changes in water quality (including but not limited to temperature, sediment, and other chemical and biotic characteristics) are not detrimental to aquatic species.

Renewable electricity generated at a hydropower generation facility located in the US shall be certified by LIHI. [32]

Hydropower projects may be certified to be low-impact through one of the following organizations: LIHI,[32] UL 2854 *EcoLogo Standard for Sustainability for Renewable Low-Impact Electricity Products*, [35,36] Hydropower Sustainability Council.[15]

Annex C (Informative): Elements of production spend on key components



a) total annual spend by the manufacturer on directly sourced key components of EPEAT registered products
b) total annual spend by the manufacturer on suppliers of key components and assemblies containing key components that are directly sourced for EPEAT registered products
c) total annual spend by final assembler(s) (including the manufacturer as applicable) on key components and assemblies containing key components for EPEAT registered products (excluding key components purchased from the manufacturer*)

* Spend for components purchased from the manufacturer are counted under a)

Annex D (Informative): Table of criteria and optional points for Section 4.0 Climate Change Mitigation

Subtopic	Criterion	Optional Points
4.1 Life cycle GHG emissions and life cycle assessment	4.1.1 Required – Product carbon footprint disclosure and assurance	N / A
	4.1.2 Required – Corporate GHG inventory	N / A
	4.1.3 Optional – Product transport carbon footprint and goal	1 point
	4.1.4 Optional – Product LCA and 3rd party review, publicly available	1-2 points
4.2 Carbon reduction goals aligned with climate science	4.2.1 Required – Manufacturer GHG reduction target aligned with climate science	N / A
	4.2.2 Optional – Manufacturer net zero GHG commitment and validated target	1-2 points
	4.2.3 Optional – Supplier GHG reduction targets aligned with climate science	1-2 points
4.3 Manufacturing energy efficiency	4.3.1 Required – Communication of energy management requirements for key component facilities	N / A
	4.3.2 Optional – Energy management system for final assembly and key component facilities	1-2 points
	4.3.3 Optional – Energy efficiency performance improvement for key component supplier facilities	1-2 points
	4.3.4 Optional – Facility energy reporting	1-2 points
4.4 Renewable electricity sourcing	4.4.1 Required – Manufacturer use of renewable electricity	N / A
	4.4.2 Optional – Manufacturer increased use of renewable electricity	1-2 points
	4.4.3 Optional – Supplier use of renewable electricity	1-4 points
4.5 High global warming potential chemicals in manufacturing (F-GHGs)	4.5.1 Optional – Reduce F-GHG emissions from flat panel display manufacturing	1-2 points
	4.5.2 Optional – Reduce F-GHG emissions from 300 mm semiconductor manufacturing	1-2 points
4.6 Product energy efficiency	4.6.1 Required – Conformance with applicable ENERGY STAR product eligibility criteria	N / A
	4.6.2 Required – External power supply energy efficiency	N / A
	4.6.3 Required – Battery charger system energy efficiency	N / A

Annex E (Informative): Bibliography

While not explicitly cited in the criteria section of this document, the following references are provided as non-normative useful guides for the application of this document.

Life cycle GHG emissions:

ISO 14064-3, *Specification with guidance for the verification and validation of greenhouse gas statements* [26]

ISO 14065, *Requirements for validation and verification bodies*

ISO 14066, *Competence requirements for GHG validation teams and verification teams*

Manufacturing Energy Efficiency:

For facilities utilizing ISO 50001, [28] the ISO 50001 Impact Estimator Tool (IET 50001) can be used to calculate avoided energy consumption, energy cost savings, and associated emissions reductions by an organization or a country.

For countries seeking to develop national programs equivalent to ANSI / MSE 50028-1, [5] the US DOE provides the following "Superior Energy Performance (SEP) 50001 Equivalency resource site: https: / / betterbuildingssolutioncenter.energy.gov / iso-50001 / sep-50001 / sep-50001-equivalency.

Document Change History

Issue	Revision	Author	Description of Change	Approver	Approval Date	Effective Date
1	0	Vice President, Category and Criteria Development	Initial release	CEO	May 11, 2023	May 16, 2023