GEC – CCM – 2021

Climate Change Mitigation Sustainability Assessment Criteria DRAFT

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Draft for Technical Committee and public consultation

Contents

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, as presented in State of Sustainability Research for each criteria development process.

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

- ISO 14024 *Environmental labels and declarations – Type 1 environmental labelling – Principles and procedures*[1], and

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

- U.S. 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 and procedures governing the process are publicly available.[3]

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.

[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://globalelectronicscouncil.org/ecolabels/

Participants

The following stakeholders were members of the Technical Committee:

[insert alphabetical list by name, organization]

Stakeholders from the following organizations participated in criteria drafting as participants in Expert Ad Hoc Groups:

Canon USA, Inc
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
U.S. Department of Defense
U.S. Department of Energy
U.S. Environmental Protection Agency
World Wildlife Foundation

1.0 Purpose

The purpose of this document is to establish performance-based criteria that address carbon and other greenhouse gas emissions resulting from the manufacturer 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, and product energy consumption.

1.1 Scope

EPEAT applies these criteria to its 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 Directives, which contain the adoption date in their title, are not be treated as "dated references" (as described above). Unless explicitly indicated otherwise, when a European Union Directive is referenced in this document, a new or updated European Union Directive shall apply upon its enforcement date unless otherwise noted in the criteria.

ANSI/Management System for Energy (MSE) 50028-1[5]

CCWG Carbon Emissions Accounting Methodology[6]

EcoTransIT Information Tool Worldwide[7]

European Union Product Environmental Footprint Guide[8]

ENERGY STAR® Program Specifications[9]

[4] Available at: https://globalelectronicscouncil.org/climate-change/
[5] ANSI/MSE 50028-1-2019
[6] http://globalgreenfreight.org/content/clean-cargo-working-group-carbon-emissions-accounting-methodology
[7] EcoTransIT World
[8] https://ec.europa.eu/environment/eussd/smgp/dev_methods.htm
[9] https://www.energystar.gov/products

EN 16258 Methodology for calculation and declaration of energy 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[14]

Hydropower Sustainability Council Standard[15]

IATA RP1678 Air Cargo Carbon Footprint[16]

IEC TR 62921Quantification methodology for greenhouse gas emissions for computers and monitors[17]

IEEE 1680.1 Standard for Environmental and Social Responsibility Assessment of Computers and Displays[18]

IMO Energy Efficiency Design Index (EEDI)[19]

[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/#:~:text=The%20EPLCA%20is%20the%20EU's,%2Dof%2Dlife%20waste%20management.

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

[18] Institute for Electrical and Electronics Engineers (IEEE), Piscataway, NJ, https://standards.ieee.org/; https://standards.ieee.org/standard/1874-2013.html; https://www.epeat.net/about-epeat#accessing-epeat-criteria

[19] International Maritime Organization. 4, Albert Embankment, London SE1 7SR, United Kingdom. <www.imo.org>; https://www.imo.org/en/OurWork/Environment/Pages/Technical-and-Operational-Measures.aspx

ISO 14025 Environmental labels and declarations[20]

ISO 14067 Greenhouse gases – Carbon footprint of products – Requirements and guidelines for quantification[21]

ISO 14040 Environmental management – Life cycle assessment – Principles and framework[22]

ISO 14044 Environmental management – Life cycle assessment – Requirements and guidelines[23]

ISO 14064 Greenhouse gas quantification and validation[24]

ISO 14067 Carbon footprint of products – Requirements and guidelines for quantification[25]

ISO 50001Energy management system requirements[26]

ISO/IEC 17025 General requirements for the competence of testing and calibration laboratories[27]

ISO/IEC 17065 Conformity assessment – Requirements for bodies certifying products, processes and services[28]

IEC TR 62921 Quantification methodology for GHG emissions for computers and monitors[29]

ITU L. 1410 Methodology for environmental life cycle assessments of information and communication technology goods, networks and services[30]

LCA Society of Japan Database[31]

Low-Impact Hydropower Institute[32]

[20] International Organization for Standardization. Chemin de Blandonnet 8, Case Postale 401, 1214 Vernier, Geneva, Switzerland. <www.iso.org>
[21] https://www.iso.org/standard/71206.html
[22] https://www.iso.org/standard/37456.html
[23] https://www.iso.org/obp/ui/#iso:std:iso:14044:ed-1:v1:en
[24] ISO 14064-1; ISO 14064-2; ISO 14064-3
[25] https://www.iso.org/standard/71206.html
[26] https://www.iso.org/iso-50001-energy-management.html
[27] https://www.iso.org/ISO-IEC-17025-testing-and-calibration-laboratories.html
[28] https://www.iso.org/standard/46568.html
[29] https://webstore.iec.ch/publication/25994
[30] https://www.itu.int/rec/T-REC-L.1410
[31] LCA Society of Japan. LCA Development Office, 2-1, Kajicho 2-chome, Chiyoda-ku, Tokyo, 101-0044. <lca-forum.org/english>
[32] https://lowimpacthydro.org/

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

Science Based Targets Initiative[34]

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

UNFCCC's Race to Zero partner program[36]

U.S. EPA SmartWay Performance Benchmarking Methodology[37]

U.S. LCI Database[38]

WRI GHG Protocol Product Life Cycle Accounting and Reporting Standard[39]

WRI GHG Protocol: Corporate Accounting and Reporting Standard[40]

WRI GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard[41]

3.0 Definitions and Acronyms

3.1 Definitions

adaptive external power supply (EPS): means an external power supply that can alter its output voltage during active-mode based on an established digital communication protocol with the end-use application without any user-generated action. (10 CFR 430.2 Definitions)

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

biomass: means the biodegradable fraction of products, waste and residues from biological origin

[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://unfccc.int/climate-action/race-to-zero-campaign#:~:text=Race%20To%20Zero%20is%20a,and%20unlocks%20inclusive%2C%20sustainable%20growth.
[37] US EPA, SmartWay Program. SmartWay Transport Partnership, 2000 Traverwood Drive, Ann Arbor, MI 48105. <www.epa.gov/smartway>
[38] https://www.nrel.gov/lci/
[39] https://ghgprotocol.org/product-standard
[40] https://ghgprotocol.org/corporate-standard
[41] https://ghgprotocol.org/standards/scope-3-standard

category level: means that evidence provided to support conformance with the criterion shall be at the individual product category level. Manufacturers may indicate if the submitted evidence addresses multiple product categories.

corporation level: means that evidence provided to support conformance with the criterion shall be at the organizational level and must address all product categories in which the manufacturer has EPEAT-registered products.

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)

manufacturer: refers to any natural, legal person or entity who:

- manufactures a product;
- has a product designed or manufactured; or
- places a brand label on a ready-made product; and
- places it on the market under their own name or trademark.

product level: means that evidence provided to support conformance with the criterion shall be for individual EPEAT-registered products.

production spend: a manufacturer's annual spend on physical production for EPEAT registered products, inclusive of spend on final assembly, Original Design Manufacturer (ODM) or contract manufacturer operations, and their direct inputs. Examples of direct inputs include printed circuit boards, printed circuit board assemblies, printed circuit components such as integrated circuits, dynamic random access memory (DRAM), hard disk drives (HDDs), solid state drives (SSDs), power supplies and LCD display panels.

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.

3.2 Acronyms

AEE: Association of Energy Engineers

CCF: Corporate carbon footprint

CCWG: Clean Cargo Working Group

CDP: Carbon disclosure project

CFR: Code of Federal Regulations

CMVP: Certified Measurement and Verification Professional

CP: Certified Practitioner

CSR: Corporate Sustainability Report

DC: Direct current

DIN: Deutsche Institut fur Normung

DOE: Department of Energy

DRAM: Dynamic random access memory

EAC: Energy Attribute Certificate

EEDI: Energy Efficiency Design Index

EN: European norm

EU: European Union

EnMS: Energy management system

EPA: Environmental Protection Agency

F-GHG: Fluorinated greenhouse gas

GHG: Greenhouse gas

GLEC: Global Logistics Emissions Council

GO: Guarantee of Origin

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

LCD: Liquid crystal display

LCI: Life cycle inventory

LIHI: Low Impact Hydro Institute

MLA: Multilateral Recognition Arrangement

MSE: Management System for Energy

MWh: Megawatt-hour

ODM: Original Design Manufacturer

PAS: Publicly available specification

PCF: Product carbon footprint

PPA: Power Purchase Agreement

REC: Renewable Energy Certificate

PV: Performance verifier

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 publish life cycle greenhouse gas (GHG) emissions for registered products. The manufacturer shall specify in the assessment the model numbers or other unique identifiers for the products to which the assessment applies. Each product on the registry shall have an identifiable applicable assessment. The assessment shall include each stage of the product life cycle, from raw material extraction through end-of-life using PAS 2050, the WRI GHG Protocol Product Life Cycle Accounting and Reporting Standard, ISO 14067, ISO 14040/14044, IEC TR 62921 or equivalent product carbon footprint (PCF) standard. Assessment(s) shall be published within 2-months of registering products and updated at least once every 3 years.

Manufacturer shall obtain a third-party critical review of the PCF methodology used for registered products in each product category that the manufacturer participates. 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 or when significant changes are made to the methodology. The manufacturer determines what constitutes a significant change to the methodology.

Publicly disclosed data shall include at a minimum the following:

- Statement on methodology or standard used;
- Modeled product lifetime;
- Product use phase electricity consumption per year;
- Carbon footprint of the product's life cycle stages, including, at a minimum, production (raw material extraction and manufacturing), use, transport, and end-of-life, and the product's total life cycle carbon footprint; and
- Disclaimer statement or explanation of assumptions and associated uncertainties.

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

- A Type III environmental declaration in accordance with ISO 14025;
- Publishing the PCF results on any publicly accessible website, including the manufacturer's website; or
- Publishing the PCF results in a peer-reviewed journal.

The manufacturer shall disclose URL(s) of public disclosure(s) on the EPEAT registry.

Verification requirements:

This criterion is verified at the product level.

a) List of the standard(s) used to conduct the PCF.
b) Third-party critical review statement(s) that the methodology conforms with the standard(s) used to conduct the PCF, including at a minimum the following:
    i. Name and contact information of company and/or individual(s) performing verification.
    ii. Third-party critical reviewer qualifications (examples include education/training and experience in the carbon footprinting field) or accreditation related to carbon footprinting.
c) If third-party critical review statement(s) or verification was updated because significant changes were made to the methodology used, a description of why the changes were determined to be significant.
d) URL(s) for the public disclosure that includes all disclosure requirements in the criterion.

References and details:

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

Additional guidance for verification is available in the following standards:

– ISO 14064-3 Specification with guidance for the verification and validation of greenhouse gas statements
– ISO 14065 Requirements for validation and verification bodies
– ISO 14066 Competence requirements for GHG validation teams and verification teams

4.1.2 Optional - Corporate carbon footprint

Manufacturer shall annually conduct a corporate carbon footprint (CCF) covering the manufacturer's Scope 1, Scope 2, and Scope 3 emissions. Manufacturer may choose the initial 12-month period to conduct the CCF and must use the same 12-month period every year. The CCF shall include at a minimum:

a. Scope 1 and Scope 2 greenhouse gas (GHG) emissions from manufacturer-owned and leased facilities with significant responsibility, as determined by the manufacturer, for the manufacture or assembly of registered products in all product categories that the manufacturer participates. Scope 2 GHG emissions shall include location and market-based indirect emissions from purchased energy sources.

b. Scope 3 GHG emissions for registered products in all product categories that the manufacturer participates, at a minimum, for:
    - Category 1 – Purchased Goods & Services processes throughout the supply chain
    - Category 4 – Upstream Transportation and Distribution
    - Category 11 – Product Use
    - Category 12 - Product End of Life

Manufacturer shall report their Scope 1, 2 and 3 emissions annually. Manufacturer shall report their Scope 1, 2 and 3 emissions separately. Manufacturer may choose the initial timeframe to report their Scope 1, 2 and 3 emissions and must use that same timeframe every year.

Manufacturer may include additional manufacturer-owned and/or leased facilities, additional processes, and/or additional product categories in the scope of the CCF.

Manufacturer shall document the exclusion of GHG emissions in scope, if applicable. Manufacturer may choose to exclude Scope 3, category 4 and 12 emissions, if less than 3% of total annual life cycle emissions.

Manufacturer shall use one or a combination of the following standards to conduct the CCF:

- PAS 2050
- WRI GHG Protocol Product Life Cycle Accounting and Reporting Standard
- WRI GHG Protocol: Corporate Accounting and Reporting Standard
- WRI GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard
- ISO 14067
- ISO 14040
- ISO 14044
- ISO 14064
- IEC TR 62921
- ITU L. 1410

A publicly available standard not listed above may be used if the following is achieved by such standard:

- Was either developed by a government, or by a standard development organization using a voluntary consensus-based process;
- Applicable to the scope and location of operations or activities to which it is being applied; and
- Includes methods for inventorying GHG emissions throughout the product supply chain, inclusive of raw material extraction through final manufacture of the product, product use, and final disposition of the product at end of life.

Results of the CCF shall be verified by a qualified third party against the standard(s) used to calculate the CCF annually. Results of the full CCF shall be publicly disclosed annually.

The manufacturer shall disclose URL(s) of public disclosure(s) on the EPEAT registry.

Point value: 1 point

Verification requirements:

This criterion is verified at the category level.

a) Explanation of how the manufacturer defined "significant responsibility" for including facilities in the scope.
b) Identification of the GHG emissions excluded from the scope, if any and explanation for their exclusion.
c) List of the standard(s) used to conduct the CCF.
d) The URL to the public disclosure of CCF results.
e) Third party assurance statement showing that results of the CCF were in conformance with the standard(s) used to conduct the CCF. 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 footprinting field), or accreditation related to carbon footprinting.
    iii. Indication that the covered Scope 1, 2, and 3 GHG emissions, as required by the criterion, were included in the CCF.
f) Demonstration that any non-listed standard that was used to conduct the CCF meets the requirements of this criterion, if such a standard was used.

References and details:

Guidance for verification is available in the following standards:

- ISO 14064-3 Specification with guidance for the verification and validation of greenhouse gas statements
- ISO 14065 Requirements for validation and verification bodies
- ISO 14066 Competence requirements for GHG validation teams and verification teams

4.1.3 Optional - Carbon footprint of product transport

Manufacturers shall annually conduct an assessment of greenhouse gas (GHG) emissions from supply chain transportation activities on a corporate basis for 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 nodes and modes of freight movement for road, air, sea, inland waterways and rail 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, air, sea, inland waterways and rail), as well as nodes (logistics sites, ports, warehouses and terminals where modal transfers occur), and shall be performed once per fiscal or calendar year using one or a combination of the following methodologies:

- Global Logistics Emissions Council Framework for Logistics Emissions Methodologies (GLEC Framework Version 2.0)
- The following mode-specific and node-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)):
    - Road—U.S. EPA SmartWay Performance Benchmarking Methodology or EN 16258
    - Air—International Air Transportation Association (IATA) RP1678 or U.S. EPA SmartWay Performance Benchmarking Methodology
    - Sea—Clean Cargo Working Group (CCWG) Carbon Emissions Accounting Methodology or International Maritime Organization (IMO) Energy Efficiency Design Index (EEDI)
    - Inland waterways—IMO EEDI or U.S. EPA SmartWay Performance Benchmarking Methodology
    - Rail—U.S. EPA SmartWay Performance Benchmarking Methodology or EcoTransIT Information Tool Worldwide (EcoTransIT World)
    - Nodes (Logistics Sites) – Fraunhofer Institute for Material Flow and Logistics Guidance for Greenhouse Gas Emissions Accounting at Logistics Sites or EU Ports European Economic Interest Group Guidance for Greenhouse Gas Emission Footprinting for Container Terminals.
- 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), and node (e.g., energy or fuel use and weight or volume of freight transferred). Data used shall include fuel consumption and published emission factors by fuel type.

A summary of results for absolute freight GHG emissions (e.g., annual tonnes of CO2e) and/or normalized GHG emissions (e.g., grams of CO2e per tonne-km) for each mode (road, air, rail, inland waterways and sea) and node 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 greenhouse gas emission reduction goal and report progress towards meeting this goal annually.

Point value: 1 point

Verification requirements:

This criterion is verified at the category level.

a) Copy of the full transportation carbon footprint used to meet the requirements of this criterion for verification purposes, not public disclosure.
b) 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.)
c) Identification of the scope of products for which the assessment applies.
d) Evidence of a transport supply chain greenhouse gas reduction emission goal and progress towards the goal are publicly posted (e.g., manufacturer URL, Corporate Sustainability Report (CSR) report or program URL(s) or other publicly available website or document).
e) Evidence of third-party verification in conformance with the applicable modes in the GLEC Framework 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 greenhouse gas 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 life cycle assessment (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 (i) ISO 14040 and ISO 14044, excluding the reporting requirements (Section 6 of ISO 14040 and Section 5 of ISO 14044), or (ii) the European Union Product Environmental Footprint Guide. The LCA shall include all stages of the product life cycle, from extraction of raw materials through end-of-life.

To qualify under this criterion, the LCA must have been critically reviewed in accordance with (i) ISO 14044, or ISO 14025 or (ii) the European Union Product Environmental Footprint Guide by an independent third- party and must have been conducted no more than 3 years prior to product registration or certification.

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 a comprehensive set of environmental issues related to the product system being studied. Potential impact categories may include, for example:

- Global warming potential
- Acidification
- Eutrophication
- Ozone depletion
- Photochemical oxidation
- Cumulative energy demand
- Ecotoxicity
- Human toxicity
- Water consumption.

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

a) In a national database (such as the U.S. LCI Database, the European LCA Platform Database, or the LCA Society of Japan Database, or other public disclosure system);
b) In a 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;
    iii. A third-party report of the LCA as defined in the requirements and guidance for third-party reports section of ISO 14044;
    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 or 2 points (maximum of 2 points)

Verification requirements:

This criterion is verified at the product level.

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 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 (goal) aligned with climate science

Manufacturer shall have a publicly declared GHG emissions reduction target or goal validated by the Science Based Targets initiative (SBTi) to meet 1.5 degree C ambition or the level of ambition required by SBTi for the manufacturer.[42],[43]

Verification requirements:

This criterion is verified at the category level.

a) URL(s) to public GHG emissions reduction target
b) URL(s) to listing of manufacturer's goal listed on the SBTi website (companies taking action).

References and details: None

4.2.2 Optional - Manufacturer net zero GHG target (goal) aligned with climate science

Manufacturer shall set a net-zero target (goal) by joining a United Nations Framework Convention on Climate Change (UNFCCC) Race to Zero recognized partner program.[44] Examples include Business Ambition for 1.5 C[45], The Climate Pledge[46], and Small and Medium Enterprise Climate Hub[47]. Manufacturer's net zero target (goal) must, at minimum, meet the four key pillars of the UNFCCC's Race to Zero partner program.[48]

Point value: 1 point

Verification requirements:

[42] SBTi Criteria and Recommendations
[43] SBTI Companies Taking Action
[44] UNFCCC Race to Zero Partners
[45] Science Based Targets, Business Ambition for 1.5 degrees C
[46] The Climate Pledge
[47] SME Climate Hub
[48] UNFCCC Race to Zero Meta Criteria known as 4P's for Pledge, Plan, Proceed, Publish

This criterion is verified at the category level.

a) Identification of the UNFCCC Race to Zero Partner organization that has been joined or published SBTi approved net zero goal.
b) URL(s) to public goal which meets the commitment goals of the UNFCCC Race to Zero Partner organization identified in verification requirement a) for Part B. This shall include:
    i. Pledge: Pledge to reach (net) zero GHG emissions as soon as possible and by midcentury at the latest, and identification of interim targets to be achieved in the next decade;
    ii. Plan: Identification of actions to be taken to achieve both interim and longer-term goals, provided to the UNFCCC Race to Zero Partner organization within 12-months of joining;
    iii. Proceed: Identification of actions being taken towards (net) zero GHG emissions goal; and
    iv. Publish: Annual public reporting of progress towards interim and longer-term goals and actions being taken to achieve these goals.

4.2.3 Optional - Supplier GHG reduction targets (goals) aligned with climate science

Manufacturer shall ensure suppliers representing 75% of production spend set public corporate GHG emission reduction goals aligned with climate science for at least their Scope 1 & 2 emissions.

"Aligned with climate science" means:
- goal meets, at minimum, the SBTi criteria[49] Scope 1 & 2 ambition level; or
- goal is validated by SBTi (listed as such on SBTi website)

Production spend is defined as the manufacturer's annual spend on physical production for EPEAT registered products, inclusive of spend on final assembly, Original Design Manufacturer (ODM) or contract manufacturer operations, and their direct inputs. Examples of direct inputs include printed circuit boards, printed circuit board assemblies, printed circuit components such as integrated circuits, dynamic random access memory (DRAM), hard disk drives (HDDs), solid state drives (SSDs), power supplies and LCD display panels.

Point value: 1 point

Verification requirements:

This criterion is verified at the category level.

[49] SBTi Criteria and Recommendations

a) List of suppliers which make up 75% of production spend.
b) URL(s) for publicly posted corporate goal for each supplier identified in verification requirement a). Examples of acceptable URL(s) include a publicly available CDP response and SBTi website.
c) For each supplier identified in verification requirement a), evidence that the supplier's corporate GHG emission reduction goals for at least Scope 1 and Scope 2 emissions are aligned with climate science. Evidence must be one of the following:
    i. URL to the SBTi website showing the supplier is identified as a company taking action[50]; or
    ii. URL(s) of annual public disclosure of supplier's goal, actions taken towards goal, degree of progress, and evidence of a calculation for how each supplier's goal achieves, at minimum, the SBTi criteria Scope 1 & 2 ambition level.

References and details: None

4.3 Manufacturing energy efficiency

4.3.1 Required - Energy management system for final assembly facilities

Part A

The manufacturer shall demonstrate that facilities performing final assembly for registered products, whether owned by the manufacturer or contracted to a supplier, have achieved ISO 50001 or a national equivalent.

Part B

Manufacturer shall request that final assembly facilities request their suppliers, which produce any of the priority components or assemblies listed below, similarly achieve third-party certification to ISO 50001 or a national equivalent.

Priority components or assemblies include:

- printed circuit board;
- printed circuit board assembly;
- printed circuit board components such as integrated circuits, transistor diodes, light emitting diodes, etc;
- power supplies, and

[50] SBTi Companies Taking Action

– LCD panels

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.

Verification requirements:

This criterion is verified at the category level.

a) List of manufacturer's final assembly facilities, whether owned by the manufacturer or contracted to a supplier.
b) For each final assembly facility identified in verification requirement a):

    i. Evidence of third-party certification to ISO 50001 or a national equivalent, where the certification was granted by a body that meets the accreditation requirements of this criterion; and
    ii. Evidence that the manufacturer has requested that in-scope suppliers of priority components achieve third-party certification to ISO 50001 or a national equivalent. Examples of evidence include but are not limited to a supplier code of conduct, policy, or contract language and evidence of subsequent communication to their suppliers (examples include e-mail communications, scorecards, etc.)

4.3.2 Optional - Energy management system for supplier facilities

For the percent of production spend on priority components identified in Table 4.3.2, the manufacturer shall demonstrate that supplier facilities which produce any of the priority components or assemblies listed below have achieved third-party certification to ISO 50001 or a national equivalent.

Priority components or assemblies include:

– printed circuit board;
– printed circuit board assembly;

- printed circuit board components such as integrated circuits, transistor diodes, light emitting diodes, etc;
- power supplies, and
- LCD panels

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 by a supplier 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 percent of production spend on priority components

50% of priority component production spend	1 point
75% of priority component production spend	2 points

Production spend is defined as the manufacturer's annual spend on physical production for EPEAT registered products, inclusive of spend on final assembly, Original Design Manufacturer (ODM) or contract manufacturer operations, and their direct inputs. Examples of direct inputs include printed circuit boards, printed circuit board assemblies, printed circuit components such as integrated circuits, dynamic random access memory (DRAM), hard disk drives (HDDs), solid state drives (SSDs), power supplies and LCD display panels.

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

Verification requirements:

This criterion is verified at the category level.

a) List of manufacturer's supplier facilities used to meet this criterion.
b) Calculation demonstrating that the supplier facilities identified in verification requirement a) meet the percentage of production spend on priority components threshold(s) identified in Table 4.3.2.

c) For each supplier facility identified in verification requirement a), evidence of third-party certification to ISO 50001 or a national equivalent, where the certification was granted by a body that meets the accreditation requirements of this criterion.

References and details: None

4.3.3 Optional - Energy performance improvement for supplier facilities

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

Priority components or assemblies include:

- printed circuit board;
- printed circuit board assembly;
- printed circuit board components such as integrated circuits, transistor diodes, light emitting diodes, etc;
- power supplies, and
- LCD panels

Option 1: Annual past facility energy performance improvement of at least 2.5% calculated as the change in average annual energy performance[51] 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.2a and that is verified by a Qualified Auditor per Annex A.3.

Option 2: Annual past facility energy performance improvement of at least 2.5% calculated as the change in average annual 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

[51] "Average annual energy performance" is the average yearly energy performance over the time period specified, e.g.: 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%.

and Verification Method per Annex A.2b(i) or Annex A.2b(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.

Option 3: Third-party certification to ANSI/Management System for Energy (MSE) 50028-1: Superior Energy Performance 50001 Program - Additional Requirements for Energy Management System[52] or a nationally adopted equivalent program[53], and annual facility energy performance improvement of 1.0% per year over a period of 12 to 36 months. 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.

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

Table 4.3.3. Optional points for percent of production spend on priority components

25% of priority component production spend	1 point
50% of priority component production spend	2 points

Production spend is defined as the manufacturer's annual spend on physical production for EPEAT registered products, inclusive of spend on final assembly, Original Design Manufacturer (ODM) or contract manufacturer operations, and their direct inputs. Examples of direct inputs include printed circuit boards, printed circuit board assemblies, printed circuit components such as integrated circuits, dynamic random-access memory (DRAM), hard disk drives (HDDs), solid state drives (SSDs), power supplies and LCD display panels.

[52] ANSI/MSE 50028-1: Superior Energy Performance 50001 Program - Additional Requirements for Energy Management System; SEP 50001 program equivalency: https://betterbuildingssolutioncenter.energy.gov/iso-50001/sep-50001/sep-50001-equivalency

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

Verification requirements:

This criterion is verified at the category level.

a) List of manufacturer's supplier facilities used to meet this criterion.
b) Calculation demonstrating that the supplier facilities identified in verification requirement a) meet the percentage of production spend on priority components threshold(s) identified in Table 4.3.3.
c) For each supplier facility identified in verification requirement a), on a per-facility basis:
    i. If claiming Option 1:
        - Calculations demonstrating energy performance improvement in accordance with the requirements of the criterion using ENERGY STAR Challenge for Industry Statement of Energy Improvement;
        - Evidence of independent verification of the energy performance improvement as per the requirements of the criterion; and
        - Qualified auditor credentials.
    ii. If claiming Option 2:
        - Calculations demonstrating energy performance improvement in accordance with the requirements of the criterion;
        - Evidence of independent verification of the energy performance improvement as per the requirements of the criterion; and
        - Qualified auditor credentials.
    iii. If claiming Option 3:
        - Evidence of third-party certification to ANSI/MSE 50028-1 or to a nationally adopted equivalent program;
        - Calculation or documentation demonstrating the 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,
        - 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 - Energy reporting for supplier facilities

The manufacturer shall publicly disclose a subset of the supplier facilities accounted for in 4.3.1 and 4.3.2 as ISO 50001 certified. The facilities identified shall constitute at least 25% of production spend on the following priority components:

- printed circuit board;
- printed circuit board assembly;
- printed circuit board components such as integrated circuits, transistor diodes, light emitting diodes; etc.,
- power supplies, and
- LCD panels

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

a) Supplier names and their facility location(s) (city and country); and
b) Total facility energy consumption in aggregate with a breakdown of the types of fuels (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).

Production spend is defined as the manufacturer's annual spend on physical production for EPEAT registered products, inclusive of spend on final assembly, Original Design Manufacturer (ODM) or contract manufacturer operations, and their direct inputs. Examples of direct inputs include printed circuit boards, printed circuit board assemblies, printed circuit components such as integrated circuits, dynamic random access memory (DRAM), hard disk drives (HDDs), solid state drives (SSDs), power supplies and LCD display panels.

Point value: 1 point

Verification requirements:

This criterion is verified at the category level.

a) List of manufacturer's supplier facilities used to meet this criterion, by company name, city and country.
b) Evidence that the manufacturer's supplier facilities identified in verification requirement a) are a subset of those accounted for in criterion 4.3.1 or 4.3.2.
c) Calculation demonstrating that the supplier facilities identified in verification requirement a) meet the percentage of production spend on priority components threshold.

d) URL(s) for public disclosure of energy consumption of supplier facilities within the scope of this criterion.[54]

References and details: None

4.4 Renewable electricity sourcing

4.4.1 Required – Manufacturer renewable electricity generation and procurement

The manufacturer shall demonstrate 25% renewable electricity generation and procurement as a percentage of total electricity consumption for facilities in scope.

Scope: The scope for this criterion shall be the annual electricity consumed at the manufacturer facilities with significant responsibility, 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, if GHG accounting and/or reporting is performed by the manufacturer.

The manufacturer may include additional facilities that are owned, operated, or managed by the manufacturer in the scope.

To demonstrate conformance with this criterion, the percentage noted in the scope shall be achieved once annually for a 12-month reporting period and for each manufacturer facility. Manufacturer may choose the initial 12-month reporting period and 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.

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.

The renewable electricity used to meet this criterion shall be one or more of the following:

a) Self-generated renewable electricity from an on-site or off-site generator or project that is owned or operated by the manufacturer where all generated electricity is distributed to the

[54] For facilities utilizing ISO50001, 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.

manufacturer's facility(ies) within the same electricity market or country[55], and the energy attribute certificates claimed towards this criterion are either retained or retired by the manufacturer and not transferred to, or claimed or counted 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 generated electricity is distributed to the manufacturer's facility(ies) within the same electricity market or country[56], and the energy attribute certificates claimed towards this criterion are retained or retired by or on behalf of the manufacturer 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 Power Purchase Agreements)
iv. Green Tariffs or Green Riders
v. Competitive Green Power Products[57]
vi. Utility Green Pricing Program or Products
vii. Retail or Unbundled Energy Attribute Certificate Products, including Renewable Energy Certificates (REC), Guarantees of Origin (GOs), or similar

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 certified to a standard that meets the Accepted Renewable Electricity Standard requirements.

The Accepted Renewable Electricity Standard requirements are:

i. The standard was developed using an open process that involved stakeholder consultation or is mandated by law or regulation,

[55] GHG Protocol Scope 2 guidance requirements
[56] GHG Protocol Scope 2 guidance requirements
[57] https://www.epa.gov/greenpower/green-power-supply-options

ii. The standard is intended for use in the market(s) in which it is being applied,
iii. The standard requires that:
    1. The renewable electricity attributes have full aggregation of environmental benefits.
    2. The renewable electricity attributes are surplus to what is required by legal mandate or to what is otherwise available as part of the standard default electricity service.
    3. There is exclusive and unique ownership of the renewable electricity attributes or renewable electricity attribute instruments such that the purchaser of renewable electricity can validate having a clear claim to the energy attributes and energy attributes certificates that represent the delivery and consumption of renewable electricity.
    4. The seller of the renewable electricity discloses the fuel mix (energy sources used to generate the electricity), the geographic location of facility used to generate the renewable electricity, and the vintage date of the generation.

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

i. Be generated from one or more of the following renewable electricity sources:

    1. Wind
    2. Solar
    3. Geothermal
    4. Biomass: woody waste
    5. Biomass: agricultural non-food crop
    6. Biomass: agricultural waste
    7. Biomass: energy crops
    8. Biomass: landfill gas and wastewater methane
    9. Biomass: black liquor
    10. Biomass: municipal solid waste where only the biogenic portion of the resource is used
    11. Hydropower: low-impact in accordance with Annex B
    12. Hydropower: in-pipe[58]

ii. Achieve the market boundary requirement by demonstrating renewable electricity generation is within the same electirity market or country where generated, or

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

meets the World Resources Institute's GHG Protocol Scope 2 Guidance market boundary requirements.

iii. Be generated in accordance with the vintage requirements in this criterion.

iv. Be substantiated with energy attributed certificates that are retained by or retired by or on behalf of the manufacturer or retired on behalf of the manufacturer.

Verification requirements:

This criterion is verified at the 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. If GHG accounting and/or reporting is performed by the manufacturer, a manufacturer attestation 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 the percentage of renewable electricity generation that is procured and used as a percentage of total electricity consumption for each facility(ies) used to meet this criterion, including the following for each facility:
   ii. Total renewable electricity generation and consumption claimed towards this criterion (MWh), and
   iii. Total electricity consumption (MWh).

e) For each renewable electricity supply used by each 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 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 the vintage date range (month and year for both the start and end) of generation of the renewable electricity.
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:
    1. Evidence showing the ownership or operational control of the renewable electricity generation project;
    2. Manufacturer or renewable electricity generator attestation that the renewable electricity attributes are exclusively owned and are not transferred to or claimed by other parties[59]; and
    3. Evidence of achievement of market boundary requirements.
vi. For purchased renewable electricity:
    1. Proof of purchase (e.g., PPA, contract, energy attribute certificate, invoice from generator); and
    2. Evidence showing the renewable electricity attributes were exclusively owned and have either been permanently retained (i.e., have not been sold) or were retired 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 vintage requirements of this criterion are met.

f) For each non-certified renewable electricity supply claimed, evidence supporting the following:
    i. Achievement of market boundary requirements.
    ii. Achievement of 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 renewable electricity resources per section b) i of the criterion.
    iv. Proof that energy attributes or energy attribute certificates have been retained by the manufacturer or retired on behalf of the manufacturer.

g) For each third-party 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 (as identified in 7a) meets the Accepted Renewable Electricity Standard requirements. AND Attestation by certification program regarding the achievement of the Accepted Renewable Electricity Standard requirements.

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

h) For instances where renewable electricity is generated in the U.S. 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 U.S. and is from a low-impact hydropower source (per Annex B), and evidence of meeting the requirement in Annex B, which may include certification to one of the following organizations as available: Low-Impact Hydropower Institute[60], UL-2854 EcoLogo[61] Standard for Renewable Low-Impact Electricity Products[62], Hydropower Sustainability Council[63].

References and details: None

4.4.2 Optional - Manufacturer renewable electricity generation and procurement

Manufacturer shall meet the requirements of criterion 4.4.1 for facilities in scope for the following renewable electricity generation and procurement percentages:

- 50% renewable electricity generation and procurement as a percentage of total electricity consumption for facilities in scope: 1 point
- 95% renewable electricity generation and procurement as a percentage of total electricity consumption for facilities in scope: 2 points

Verification requirements:

a) Demonstrate conformance with verification requirements in criterion 4.4.1

4.4.3 Optional – Supplier renewable electricity generation and procurement

The manufacturer shall demonstrate that their supplier facilities that produce priority components and assemblies, as defined below, for registered products use renewable electricity sources as defined in this criterion.

Priority components and assemblies include:

- printed circuit board;
- printed circuit board assembly;

[60] https://lowimpacthydro.org/
[61] https://www.ul.com/resources/ecologo-certification-program
[62] https://www.shopulstandards.com/ProductDetail.aspx?UniqueKey=33897
[63] https://www.hydrosustainability.org/standard

- printed circuit board components such as integrated circuits, transistor diodes, light emitting diodes, etc;
- power supplies, and
- LCD display panels.

Scope: Optional points shall be awarded based on the percentage of manufacturer's production spend on priority 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 achieved once annually for a 12-month reporting period and for each supplier facility. Supplier may choose the initial 12-month reporting period and 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 in the scope of this criterion, if both of the following are achieved:

a) Total electricity consumption must at least include operations for all products covered by the criterion within that facility[64]; and

b) The portion of electricity and renewable electricity consumption for the 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.

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.

The renewable electricity used to meet this criterion shall be one or more of the following:

[64] 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.

a) Self-generated renewable electricity from an on-site or off-site generator or project that is owned or operated by the supplier where all generated electricity is distributed to the supplier's facility(ies) within the same electricity market or country [65], and the energy attribute certificates claimed towards this criterion are either retained or retired by the supplier and not transferred to, or claimed by, or counted 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 generated electricity is distributed to the supplier's facility(ies) within the same electricity market or country [66], and the energy attribute certificates claimed towards this criterion are retained or retired by or on behalf of the supplier 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 Power Purchase Agreements)
iv. Green Tariffs or Green Riders
v. Competitive Green Power Products[67]
vi. Utility Green Pricing Program or Products
vii. Retail or Unbundled Energy Attribute Certificate Products, including Renewable Energy Certificates (REC), Guarantees of Origin (GOs), or similar

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 certified to a standard that meets the Accepted Renewable Electricity Standard requirements.

[65] GHG Protocol Scope 2 guidance requirements
[66] GHG Protocol Scope 2 guidance requirements
[67] https://www.epa.gov/greenpower/green-power-supply-options

The Accepted Renewable Electricity Standard requirements are:

i. The standard was developed using an open process that involved stakeholder consultation or is mandated by law or regulation,
ii. The standard is intended for use in the market(s) in which it is being applied,
iii. The standard requires that:
    1. The renewable electricity attributes have full aggregation of environmental benefits.
    2. The renewable electricity attributes are surplus to what is required by legal mandate or to what is otherwise available as part of the standard default electricity service.
    3. There is exclusive and unique ownership of the renewable electricity attributes or renewable electricity attribute instruments such that purchasers of renewable electricity can validate having a clear claim to the energy attributes and energy attributes certificates that represent the delivery and consumption of renewable electricity.
    4. The seller of the renewable electricity discloses the fuel mix (energy sources used to generate the electricity), the geographic location of facility used to generate the renewable electricity, and the vintage date of the generation.

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

i. Be generated from one or more of the following renewable electricity sources:

1. Wind
2. Solar
3. Geothermal
4. Biomass: woody waste
5. Biomass: agricultural non-food crop
6. Biomass: agricultural waste
7. Biomass: energy crops
8. Biomass: landfill gas and wastewater methane
9. Biomass: black liquor
10. Biomass: municipal solid waste where only the biogenic portion of the resource is used
11. Hydropower: low-impact in accordance with Annex B
12. Hydropower: in-pipe[68]

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

ii. Achieve the market boundary requirement by demonstrating renewable electricity generation is within the same electirity market or country where generated, or meets the World Resources Institute's GHG Protocol Scope 2 Guidance market boundary requirements.

iii. Be generated in accordance with the vintage requirements in this criterion.

iv. Be substantiated with energy attributed certificates that are retained by or retired by or on behalf of the supplier or retired on behalf of the supplier.

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

Suppliers constituting 50% of priority component production spend demonstrate renewable electricity generation and procurement constitutes at least 50% of each supplier's electricity consumption	1 point
Suppliers constituting 50% of priority component production spend demonstrate renewable electricity generation and procurement constitutes at least 75% of each supplier's electricity consumption	2nd point
Suppliers constituting 75% of priority component production spend demonstrate RE generation and procurement constitutes at least 50% of each supplier's electricity consumption	3rd point
Suppliers constituting 75% of priority component production spend demonstrate RE generation and procurement constitutes at least 75% of each supplier's electricity consumption	4th point

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

Production spend is defined as the manufacturer's annual spend on physical production for EPEAT registered products, inclusive of spend on final assembly, Original Design Manufacturer (ODM) or contract manufacturer operations, and their direct inputs. Examples of direct inputs include printed circuit boards, printed circuit board assemblies, printed circuit components such as integrated circuits, dynamic random-access memory (DRAM), hard disk drives (HDDs), solid state drives (SSDs), power supplies and LCD display panels.

Verification requirements:

This criterion is verified at the 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, 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 for each facility(ies) used to meet this criterion, including the following for each facility:
   i. total renewable electricity generation and consumption claimed towards this criterion (MWh), and
   ii. total electricity consumption (MWh).

e) For each renewable electricity supply used by each 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 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 the vintage date range (month and year for both the start and end) of generation of the renewable electricity.
   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:
      1. Evidence showing the ownership or operational control of the renewable electricity generation project;
      2. Supplier or renewable electricity generator attestation that the renewable electricity attributes are exclusively owned and are not transferred to or claimed by other parties[69]; and
      3. Evidence of achievement of market boundary requirements.

[69] 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:
    1. Proof of purchase (e.g., PPA, contract, energy attribute certificate, invoice from generator); and
    2. Evidence showing the renewable electricity attributes were exclusively owned and have either been permanently retained (i.e., have not been sold) or were retired 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 vintage requirements of this criterion are met.

f) For each non-certified renewable electricity supply claimed, evidence supporting the following:

   i. Achievement of market boundary requirements.
   ii. Achievement of 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 renewable electricity resources per section b) i of the criterion.
   iv. Proof that energy attributes or energy attribute certificates have been retained by the supplier or retired on behalf of the supplier.

g) For each third-party 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 (as identified in 7a) meets the Accepted Renewable Electricity Standard requirements. AND Attestation by certification program regarding the achievement of the Accepted Renewable Electricity Standard requirements.

h) For instances where renewable electricity is generated in the U.S. 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 U.S. 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: Low-Impact Hydropower Institute[70], UL-2854

[70] https://lowimpacthydro.org/

EcoLogo[71] Standard for Renewable Low-Impact Electricity Products[72], Hydropower Sustainability Council[73].

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

4.5.1 Optional - Reduce fluorinated greenhouse gas emissions from flat panel display manufacturing

Manufacturer shall meet criterion 4.1.10.1 in IEEE 1680.1a Standard for Environmental and Social Responsibility Assessment of Computers and Displays.

Verification requirements:

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

References and details: None

4.5.2 Optional - Reduce fluorinated greenhouse gas emissions from 300mm semiconductor manufacturing

Manufacturer shall meet criterion 4.1.10.2 in IEEE 1680.1a Standard for Environmental and Social Responsibility Assessment of Computers and Displays.

Verification requirements:

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

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 at the time of product registration. Manufacturer shall provide evidence of

[71] https://www.ul.com/resources/ecologo-certification-program
[72] https://www.shopulstandards.com/ProductDetail.aspx?UniqueKey=33897
[73] https://www.hydrosustainability.org/standard

ENERGY STAR certification. 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 U.S. 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:

- EPA recognized laboratory for ENERGY STAR testing[74], or
- Laboratory that is accredited to ISO/IEC 17025, where the laboratory's scope of accreditation includes the standard or test method for which it is supplying data, or
- Laboratory in which the testing is witnessed or supervised by a certification body accredited to ISO/IEC 17065. 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 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.

Verification requirements:

This criterion is verified at the product level.

a) URL to the product's valid listing on the U.S. ENERGY STAR or international partner ENERGY STAR certified product listing; or
b) Test report demonstrating that the product conforms with the "energy requirements" of the current version of the U.S. 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 an EPA approved laboratory or an accredited ISO/IEC 17025 laboratory or witnessed or supervised by a certification body accredited to ISO 17065, per the requirements of this criterion.

References and details: ENERGY STAR® program specifications

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

4.6.2 Required - External power supply energy efficiency

The adaptive external power supply shipped with the product shall meet, at minimum the requirements of U.S. Department of Energy Conservation Standards or equivalent[75] for Adaptive External Power Supplies Level VI average efficiency levels, for the applicable external power supply product class.

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

Adaptive external power supplies shall be tested at the voltages used in countries or regions where the registered products are used.

This criterion is Not Applicable if the product does not ship with an adaptive external power supply, if the adaptive external power supply is direct current (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 U.S. 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.[76]

References and details: None

[75] COMMISSION REGULATION (EU) 2019/1782 and Implementing Measure (IM) no. EC278/2009 for External Power Supply EN50563-2011/A1:2013, External a.c. - d.c. and a.c. - a.c. power supplies – Determination of no load power and average efficiency of active modes; Natural Resources Canada CSA-C381.1 and Australia and New Zealand AS/NZS 4665 have been identified as equivalent.
[76] EN50563-2011/A1:2013 and Natural Resources Canada CSA-C381.1 have been identified as equivalent.

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 U.S. 10 CFR Part 430.32 subparagraph (z), Energy Conservation Standards for Battery Chargers or equivalent.[77]

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

Battery charger systems shall be tested at the voltages used in countries or regions where the registered products are used.

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.

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 U.S. 10 CFR Part 430 Appendix Y to Subpart B; Uniform Test Method for Measuring the Energy Consumption of Battery Chargers, demonstrating conformance with U.S. 10 CFR Part 429.39 Energy Conservation Standards for Battery Chargers or equivalent.[3]

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

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

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 Environmental Protection Agency ENERGY STAR Challenge for Industry ENERGY STAR Challenge for Industry: Professional Engineers' Guide for Validating Statements of Energy Improvement[78]

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, or equivalent;
ii. U.S. Department of Energy (DOE) SEP 50001 Measurement and Verification Protocol, or nationally adopted version of SEP 50001, or equivalent

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: U.S. Department of Energy (DOE) SEP 50001 Measurement and Verification Protocol, or nationally adopted version of SEP 50001[79], or equivalent.

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

[79] 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:
      - Credential 1 or 2; or
      - 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)
         - AEE Certified Measurement and Verification Professional (CMVP) Auditor, or
         - AEE SEP Performance Verifier (SEP PV), or
         - AEE 50001 Certified Practitioner in Energy Management Systems (CP EnMS)
      2. Licensed professional engineer

Annex B (Normative): Renewable electricity sourcing

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

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

- During project operations:
  - Provides sufficient upstream and downstream migratory fish passage,
  - Includes measures to minimize fish mortality through impingement and entrainment,
  - Does not impact or jeopardize any endangered or threatened species, and
  - Operates such that:
    - Where applicable, operations are coordinated with any other water-control facilities,
    - Changes in water flows (downstream, bypassed and other reaches, instream) are not detrimental to and support aquatic, riparian and wildlife aquatic species, and
    - 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 United States shall be certified by the Low Impact Hydro Institute.[80]

Hydropower projects may be certified to be low-impact through one of the following organizations: Low-Impact Hydropower Institute[81], UL-2854 EcoLogo[82] Standard for Renewable Low-Impact Electricity Products[83], Hydropower Sustainability Council[84].

[80] https://lowimpacthydro.org/
[81] https://lowimpacthydro.org/
[82] https://www.ul.com/resources/ecologo-certification-program
[83] https://www.shopulstandards.com/ProductDetail.aspx?UniqueKey=33897
[84] https://www.hydrosustainability.org/standard

Annex C (Informative): Table of criteria and optional points

Annex D (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
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 ISO50001, 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, the U.S. 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	Senior Director, Category and Criteria Development	Initial release	CEO	XX	XX