CONSTRUCTION INDUSTRY COUNCIL

CIC GREEN PRODUCT CERTIFICATION

Assessment Standard

Technical Requirements

Photovoltaic Module

(Version 2)

Photovoltaic Module

Summary of Assessment Criteria

CORE CRITERIA

<table>
<tr><th rowspan="2">Criteria</th><th rowspan="2">Requirements</th><th rowspan="2">Verification</th><th colspan="2">Points</th><th rowspan="2">Index</th></tr>
<tr><th>Basic</th><th>+Bonus</th></tr>
<tr><td>Product Information</td><td>Provide the following product information on the packaging of the product and/or company website:
• Country of origin
• Basic product specifications
• Installation method
• Instructions for consumer product disposal
• Operation & Maintenance Manual</td><td>Documentation including, but not limited to, product catalogue, technical datasheet, webpages</td><td>5</td><td>-</td><td>4.1.1</td></tr>
<tr><td colspan="6">RESOURCE</td></tr>
<tr><td>Waste Management</td><td>Waste Management Plan:
Implement effective Waste Management Plan detailing the policies, procedures and/or a waste management program covering manufacturing operations.</td><td>Waste management plan</td><td>5</td><td>-</td><td>4.3.3.1</td></tr>
<tr><td>Water Management</td><td>Water Consumption Reporting:
Report both potable and non-potable water usage in the production process of the past year.</td><td>Water consumption report</td><td>5</td><td>-</td><td>4.3.4.1</td></tr>
<tr><td>Energy Management</td><td>Energy Management Plan:
Manufacturer shall implement energy management policies, procedures, and/or an energy management programme.</td><td>Energy management plan</td><td>5</td><td>-</td><td>4.3.5.1</td></tr>
<tr><td colspan="6">PERFORMANCE</td></tr>
<tr><td>Efficiency Metrics</td><td>Photoelectric Conversion Efficiency:
Achieve required efficiency as below
i) For Polycrystalline silicon PV Module
<table>
<tr><th>Points</th><th>Efficiency</th></tr>
<tr><td>10 Basic Points</td><td>≥ 18.0%</td></tr>
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ii) For Monocrystalline silicon PV Module
<table>
<tr><th>Points</th><th>Efficiency</th></tr>
<tr><td>10 Basic Points</td><td>≥ 21.0%</td></tr>
<tr><td>10 Basic Points + 5 Bonus Points</td><td>≥ 21.5%</td></tr>
<tr><td>10 Basic Points + 10 Bonus Points</td><td>≥ 23.0%</td></tr>
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<tr><th></th><th></th><th></th><th>Basic</th><th>+Bonus</th><th></th></tr>
<tr><td></td><td>iii) For Thin-film PV Module
<table>
<tr><th rowspan="2">Points</th><th colspan="2">Efficiency</th></tr>
<tr><th>CdTe</th><th>CIGS</th></tr>
<tr><td>10 Basic Points</td><td>≥ 12.0%</td><td>≥13.0%</td></tr>
<tr><td>10 Basic Points + 5 Bonus Points</td><td>≥ 13.0%</td><td>≥13.8%</td></tr>
<tr><td>10 Basic Points + 10 Bonus Points</td><td>≥ 14.0%</td><td>≥14.5%</td></tr>
</table>
<table>
<tr><th rowspan="2">Points</th><th colspan="2">Efficiency</th></tr>
<tr><th>Silicon-based</th><th>Other</th></tr>
<tr><td>10 Basic Points</td><td>≥ 8.0%</td><td>≥ 10.0%</td></tr>
<tr><td>10 Basic Points + 5 Bonus Points</td><td>≥ 12.0%</td><td>≥ 12.0%</td></tr>
<tr><td>10 Basic Points + 10 Bonus Points</td><td>≥ 13.0%</td><td>≥ 13.0%</td></tr>
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<tr><td>Product Life</td><td>Degradation Rate:
Maintain degradation rate below or equal to the threshold as below
i) For Polycrystalline silicon PV Module
<table>
<tr><th>Points</th><th>1st Year</th><th>25th Year</th><th>% / Year</th></tr>
<tr><td>10 Basic Points</td><td>≤ 3.0%</td><td>≤ 20%</td><td>≤ 0.8%</td></tr>
<tr><td>10 Basic Points + 5 Bonus Points</td><td>≤ 2.5%</td><td>≤ 20%</td><td>≤ 0.7%</td></tr>
<tr><td>10 Basic Points + 10 Bonus Points</td><td>≤ 2.0%</td><td>≤ 20%</td><td>≤ 0.5%</td></tr>
</table>
ii) For Monocrystalline silicon PV Module
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<tr><th>Points</th><th>1st Year</th><th>25th Year</th><th>% / Year</th></tr>
<tr><td>10 Basic Points</td><td>≤ 2.0%</td><td>≤ 20%</td><td>≤ 0.8%</td></tr>
<tr><td>10 Basic Points + 5 Bonus Points</td><td>≤ 1.5%</td><td>≤ 20%</td><td>≤ 0.6%</td></tr>
<tr><td>10 Basic Points + 10 Bonus Points</td><td>≤ 1.0%</td><td>≤ 20%</td><td>≤ 0.4%</td></tr>
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iii) For Thin-film PV Module
<table>
<tr><th>Points</th><th>1st Year</th><th>25th Year</th><th>% / Year</th></tr>
<tr><td>10 Basic Points</td><td>≤ 6.0%</td><td>≤ 15%</td><td>≤ 0.8%</td></tr>
<tr><td>10 Basic Points + 5 Bonus Points</td><td>≤ 5.0%</td><td>≤ 15%</td><td>≤ 0.4%</td></tr>
<tr><td>10 Basic Points + 10 Bonus Points</td><td>≤ 4.0%</td><td>≤ 15%</td><td>≤ 0.4%</td></tr>
</table></td><td>Documentation including, but not limited to test reports, product catalogues, technical datasheet, or written declaration</td><td>10</td><td>+5/+10</td><td>4.5.2.1</td></tr>
</table>

Criteria	Requirements	Verification	Points		Index
			Basic	+Bonus	
	Durability: Conduct at least TWO types of durability tests in accordance with IEC 61215:2021, IEC 63202:2019, IEC TS 62804:2020, or other equivalent international/national standards.	Laboratory test report(s)	**10**	-	4.5.2.2
		Subtotal:	**50**	+20	

NON-CORE CRITERIA

Criteria	Requirements	Verification	Points +Bonus	Index
CARBON				
CFP Quantification	Provide a 3rd party endorsed life cycle assessment report with the carbon footprint of products (CFP), covering at least A1 to A3 OR a product level Environmental Product Declaration (EPD).	CFP quantification report OR Environmental Product Declaration (EPD)	+10	4.2.1
RESOURCE				
Material Optimization	Raw Materials: Use recycled raw materials, including, but not limited to, recycled photovoltaic glass, aluminium frame, silicon ingot, etc.	Material summary	+5	4.3.1.1
Circularity	Recyclability: Develop a recycling plan for the product and declared options for reuse, recycling, recovery, and disposal.	Recycling plan	+5	4.3.2.1
	Packaging Requirement: The packaging materials shall not contain halogenated plastics; *OR* Shall be comprised of 100% recycled materials, readily recyclable materials, or decomposable materials; *OR* Shall not be impregnated, labelled, coated, or otherwise treated in a manner which would prevent or significantly limit recycling.	Documentation on packaging materials used	+5	4.3.2.2
Water Management	Option A: Water Recycling Program: Develop and implement a water recycling program during the manufacturing process.	Documentation on water recycling	+5/+10	4.3.4.2
	Option B: Water Management System: Process valid certificate under ISO 14046: Water Footprint Assessment.	ISO 14046 Certificate issued by accredited certification body		4.3.4.3
Energy Management	Energy Management System: Possess valid certificate under ISO 50001: Energy management systems.	ISO 50001 Certificate issued by accredited certification body	+10	4.3.5.2

<table>
<tr><th>Criteria</th><th>Requirements</th><th>Verification</th><th>Points
+Bonus</th><th>Index</th></tr>
<tr><td></td><td>Energy Consumption Limits:
The energy consumption per unit product (kWh/MWp) should meet the following benchmarks:
<table><tr><th>Type of PV Module</th><th>Energy Consumption (kWh/MWp)</th></tr><tr><td>Crystalline Silicon</td><td>≤ 60,000</td></tr><tr><td>Thin-film</td><td>≤ 500,000</td></tr></table></td><td>Calculation report with energy consumption data and production data</td><td>+5</td><td>4.3.5.3</td></tr>
<tr><td colspan="5">ENVIRONMENT</td></tr>
<tr><td>Environmental Management</td><td>Environmental Management System:
Possess valid certificate under ISO 14001: Environmental management systems or EU Eco-Management and Audit Scheme (EMAS).</td><td>ISO 14001 or EMAS Certificate issued by accredited certification body</td><td>+5</td><td>4.4.1.1</td></tr>
<tr><td>Regional Product</td><td>Regional Manufactured Equipment:
Products that are manufactured within 800km radius of HKSAR by road transportation; within a 1,600km radius by rail transportation; or within a 4,000km radius by sea transportation.</td><td>Location map with distance between manufacturer and HKSAR</td><td>+5</td><td>4.4.2.1</td></tr>
<tr><td colspan="5">PERFORMANCE</td></tr>
<tr><td>Efficiency Metrics</td><td>Solar Transmittance of PV Glass:
Achieve the required solar transmittance as listed below
i) PV Glass with Coating<table><tr><th>Glass Thickness</th><th>2.0mm – 3.2mm</th><th>≥ 4.0mm</th></tr><tr><td>Solar Transmittance</td><td>≥ 93.0%</td><td>≥ 92.5%</td></tr></table>ii) PV Glass without Coating<table><tr><th>Glass Thickness</th><th>2.0mm – 3.2mm</th><th>≥ 4.0mm</th></tr><tr><td>Solar Transmittance</td><td>≥ 91.5%</td><td>≥ 91.3%</td></tr></table></td><td>Documentation including, but not limited to test reports, product catalogue, technical datasheet on the glass solar transmittance.</td><td>+5</td><td>4.5.1.2</td></tr>
<tr><td>Product Life</td><td>Service Life:
Provide performance warranty for at least 25 years.</td><td>Product catalogue, technical datasheet, webpages</td><td>+5</td><td>4.5.2.3</td></tr>
<tr><td colspan="5">INNOSMART</td></tr>
<tr><td>Innovations & Additions</td><td>Achieving significant, measurable environmental performance using new practices, technology, and strategy not addressed in this Standard.
OR</td><td>Narrative with supporting documents</td><td>+5</td><td>4.6.1</td></tr>
</table>

Criteria	Requirements	Verification	Points +Bonus	Index
	Incorporating various smart technologies to reduce resource consumption, leverage automation, enhance data analytics, and optimize performance.			
		Subtotal:	+75	

TABLE OF CONTENTS

1. INTRODUCTION

1.1 PURPOSE

The CIC Green Product Certification (the "Scheme") is a green product labelling scheme, owned by the Construction Industry Council (CIC) and implemented by the Hong Kong Green Building Council (HKGBC). The primary goal of the scheme is to support Hong Kong's transition to a low-carbon economy by encouraging the adoption of environmentally friendly construction practices.

With the Green Product Certification, various stakeholders, including consumers, building professionals, construction practitioners, and policymakers, can easily and unequivocally identify environmentally preferable construction materials and building products. This certification serves as a reliable indicator of a product's sustainability, helping to drive market demand for greener options.

To ensure the credibility and effectiveness of the certification, the CIC and the HKGBC has jointly developed this Technical Assessment Standards (the "Standard"), which sets out the assessment criteria and their benchmarks to govern the application and award of a grade under the Scheme. The comprehensive assessment evaluates the overall sustainability of construction materials and building products across multiple dimensions. These dimensions include environmental impact, resource efficiency, technical performance, and the use of smart manufacturing technologies.

The Standard is divided into two main parts:

- General Requirements (Refer to General Requirements provided in separate document). This part introduces Scheme's framework, outlines the application procedure, and details the grades.

- Technical Requirements (This document refers). This part defines the principles, requirements and guides for quantifying and reporting the products' carbon footprint (CFP), along with other sustainability assessment criteria and scoring standards.

This Standard neither modifies nor supersedes laws and regulations. Compliance with this Standard is not a substitute for, and does not assure, compliance with any applicable laws or regulations. Compliance with all applicable laws and regulations is a prerequisite for the manufacturing and marketing of the product.

The Scheme is owned by the Construction Industry Council (CIC), 38/F, COS Centre, 56 Tsun Yip Street, Kwun Tong, Kowloon, Hong Kong; and operated by Hong Kong Green Building Council (HKGBC), 1/F, Jockey Club Environmental Building, 77 Tat Chee Avenue, Kowloon Tong, Hong Kong, Phone: +852 3994 8888, Email: cicgpc@hkgbc.org.hk

1.2 BACKGROUND

As climate change and energy security challenges grow, renewable energy is vigorously developing in recent years. PV electricity generation has multiple competitive advantages, including the wide distribution of solar energy, strong geographical adaptability, high technological maturity, and low levelized cost of electricity. Solar PV will become the largest source of electricity generation by 2050, accounting for 36.4% of global electricity generation. In the context of Hong Kong, the government aims to increase the share of renewable energy in the fuel mix for electricity generation to 7.5% - 10% by 2035, as stated in Hong Kong's Climate Action Plan 2050.

While producing renewable energy, photovoltaic modules can place a burden on the environment – from raw material extraction to potential health hazards in the use phase. With increasing environmental claims of photovoltaic module in the market, a more comprehensive and systematic approach to assess the impacts of the photovoltaic module shall be developed. The aim of this Standard is to help designers and end-users choose greener products by conserving resources, increasing performance, reducing the amount of waste disposal in landfills, and reducing the impact to human health throughout the life cycle of photovoltaic module. The development of the assessment criteria in this Standard has made references to worldwide relevant eco-labelling schemes and some existing life cycle assessment (LCA) studies.

2. SCOPE

The scope of this Standard is applicable to all photovoltaic modules, which are complete, environmentally protected, internally connected, and indivisible assembly of the smallest combination of photovoltaic cells.

The standard applies to crystalline silicon photovoltaic modules and thin-film photovoltaic modules. Photovoltaic product types may include:

- Polycrystalline silicon module
- Monocrystalline silicon module
- Cadmium telluride (CdTe) thin-film photovoltaic module
- Copper indium gallium selenide (CIGS) thin-film photovoltaic module
- Silicon-based thin-film photovoltaic module
- Other thin-film modules

Note:

ONE application is only eligible for **ONE** product series. All the related products have to be listed on the submitted documents. Each application should specify the product code / serial number.

3. DEFINITIONS

Applicant:	Organisation which applies for the label under the CIC Green Product Certification of the Construction Industry Council
ASTM:	American Society for Testing and Materials
BS:	British Standards
Biological Cycle:	The cycle by which materials or parts are released to, and ideally reprocessed in, the environment via composting, biodegradation, nutrient extraction, or other biological metabolic pathways
CIC:	Construction Industry Council
CdTe	Cadmium telluride (CdTe) is a semiconductor material composed of cadmium and tellurium used in a thin-film photovoltaic (PV) technology. In CdTe solar cells, a very thin layer of cadmium telluride absorbs sunlight and converts it into electricity
CIGS	CIGS is a thin-film semiconductor material composed of copper (Cu), indium (In), gallium (Ga), and selenium (Se), used primarily as the light-absorbing layer in thin-film solar cells.
CNAS:	China National Accreditation Service for Conformity Assessment
EVA:	Ethylene Vinyl Acetate, which helps protect the solar cells within the PV module
HKAS:	Hong Kong Accreditation Service
HKGBC:	The Hong Kong Green Building Council Limited
HOKLAS:	The Hong Kong Laboratory Accreditation Scheme
ISO:	International Organisation for Standardisation
Monocrystalline silicon	Made from a single continuous crystal, offering higher purity and efficiency.
MSDS:	Material safety data sheet. To qualify as suitable, MSDS and information therein must not be more than 5-years old
PVB:	Polyvinyl Butyral
Polycrystalline silicon	Composed of multiple small silicon crystals, generally less expensive but with slightly lower efficiency.

Thin-film	Solar cells made by depositing one or more thin layers of semiconductor material onto surfaces such as glass, plastic, or metal.
US EPA	United States Environmental Protection Agency
Technical Cycle:	The cycle by which a product's materials or parts are reprocessed for a new product use cycle via recycling, repair, refurbishment, remanufacturing, or reuse
Third-party:	An entity without any financial interest or stake in the sales of the product or service being evaluated or other conflict of interest

4. EVALUATION CRITERIA

A product to be assessed shall meet all the minimum requirements of the "Core Criteria" in order to be awarded a "Green" (i.e. a "pass" grade) grade under the Scheme. Bonus points may be awarded if the product meets the "Non-core Criteria" and a "Bronze", "Silver", "Gold", or "Platinum" grade will be awarded according to the total points accumulated, as shown in Table 1.

Table 1: Benchmarks for grading

Points achieved	Grade to be awarded
90 or above	Platinum
80 – 89	Gold
70 – 79	Silver
60 – 69	Bronze
50 – 59	Green
Below 50	No grade

All submissions and documentations shall be endorsed by the Chief Executive Officer or other authorised persons of the Applicant to demonstrate conformance to the assessment criteria. All certification, laboratory reports, and documentation must be valid during the assessment process and labelling period. The date of issue of all laboratory reports and documentation shall be within 5 years from the first application submission date.

If the certification expires during the labelling period or upon renewal, the applicant is required to provide an updated and valid certification. Failure to resubmit the required certification will result in the revocation of CIC Green Product Certificate without compensation.

The chemical tests should be conducted by either a third party or the manufacturer, providing that they have obtained ISO 17025 certification or relevant national accreditations, such as HOKLAS or CNAS.

4.1 BASIC INFORMATION

4.1.1 Product Information - Core Criteria

The Applicant is required to achieve 5 Basic Points under this section.

Requirements

5 Basic Points for providing the following product information the following product information for compliance:

- Country of origin
- Basic product specifications
- Installation method
- Instructions for consumer product disposal
- Operation & Maintenance Manual

Verification

Documentation showing the product information and instructions, including but not limited to, product catalogue, technical datasheet, webpages, and/or any other information freely accessible by customers.

4.2 CARBON

4.2.1 CFP Quantification – Non-core Criteria

The Applicant can achieve maximum 10 Bonus Points under this section.

Requirements

10 Bonus Points for providing life cycle assessment report for quantifying and reporting the carbon footprint of products (CFP), covering at least A1 (raw material supply), A2 (transport) and A3 (manufacturing process). This can be achieved by either of the following:

Conduct CFP study report in accordance with ISO 14067:2018, GB/T 24067-2024, CIBSE TM 65, or equivalent.

OR

10 Bonus Points for providing the product's CFP value from a product level EPD issued in accordance with ISO 14067:2018, ISO 21930:2017, GB/T 24067-2024, GB/T 24025-2009 or BS EN 15804:2012.

Verification

CFP quantification report or Environmental Product Declaration endorsed by a third-party fulfilling the above requirements.

4.3 RESOURCE

4.3.1 Material Optimization

The Applicant can achieve maximum 5 Bonus Points under this section.

4.3.1.1 Raw Materials – Non-core Criteria

Requirements

5 Bonus Points for using recycled raw materials, including but not limited to recycled photovoltaic glass, aluminium frame and silicon ingot etc.

Verification

Material summary with detailed breakdown of materials used in the manufacturing process. The summary shall include at least the following information:

- Material type with quantity; and
- Source of recycled content, support by purchase order, declaration letter from suppliers, or other equivalent documents.

4.3.2 Circularity

The Applicant can achieve maximum 10 Bonus Points under this section.

4.3.2.1 Recyclability – Non-core Criteria

Requirements

5 Bonus Points for demonstrating that the manufacturer has developed a recycling plan for the product and declared options for reuse, recycling, recovery, and disposal. The plan shall include the following and made available to public:

- Designate all homogeneous materials in the product as being intended for technical and/or biological cycles and define the intended cycling pathway(s) for each material; and
- Identify potential partners for product reuse, recycling, and/or recovery in accordance with the intended cycling pathway(s); and
- For products and materials intended for municipal recycling, the product and/or material must be compatible for municipal cycling systems (e.g., painted plastics and plastic laminated paper are not currently compatible for municipal recycling); and
- Instructions for how to cycle the product shall be made publicly available.

Verification

Documentation of recycling plan, including, but not limited to product catalogue, MSDS, and written declaration.

4.3.2.2 Packaging Requirement – Non-core Criteria

Requirements

5 Bonus Points for minimizing the wastage from all primary packaging materials. The packaging materials shall achieve either of the following:

The packaging materials shall not contain halogenated plastics

OR

The packaging materials shall be comprised of 100% recycled materials, readily recyclable materials, or decomposable materials

OR

The packaging shall not be impregnated, labelled, coated, or otherwise treated in a manner which would prevent or significantly limit recycling.

The packaging requirements are relevant to all primary packaging materials, i.e. those being used to envelop the product and hold it. The primary packaging materials are usually in direct contact with the contents and shall be in the minimal amount of distribution and/or use as they may eventually be disposed by the consumers.

Verification

Documentation describing the packaging materials used as well as their chemical composition (if any and where applicable), treatment process and recyclability.

4.3.3 Waste Management

The Applicant is required to achieve 5 Basic Points under this section.

4.3.3.1 Waste Management Plan – Core Criteria

Requirements

5 Basic Points for implementing effective waste management plan detailing the policies, procedures and/or a waste management program covering manufacturing operations. The waste management plan should include, but should not be limited to, the following information:

- Initiatives taken to reduce waste generation and improve recovery/recycling of waste; and
- Initiatives implemented for recovery of post-consumer and/or pre-consumer waste that can be re-introduced into the manufacturing process; and
- Other environmental benefits or constraints associated with waste minimisation objectives and processes.

Verification

Documentation of waste management plan detailing the above, supported by organizational policy or other equivalent documents.

4.3.4 Water Management

The Applicant is required to achieve 5 Basic Points under this section. Additionally, the Applicant can achieve maximum 10 Bonus Points under this section.

4.3.4.1 Water Consumption Reporting – Core Criteria

Requirements

5 Basic Points for reporting both potable and non-potable water usage in the production process of the past year.

Verification

Water consumption report, supported by water usage data acquired from water meter, water sub-meter, water bill, or other equivalent documents.

The Applicants can select one of the options below and comply with any or all the requirements under that option to achieve associated points.

Option A:

4.3.4.2 Water Recycling Program – Non-Core Criteria

Requirements

5 Bonus Points for developing and implementing a water recycling program during the manufacturing process.

Verification

Documentation demonstrating the implementation of water recycling program, supported by drawings, water usage data acquired from water sub-meter, or other equivalent documents.

Option B:

4.3.4.3 Water Management System – Non-Core Criteria

Requirements

10 Bonus Points for possessing valid certificate under ISO 14046: Environmental management – Water footprint – Principles, requirements and guidelines.

ISO 14046 is a framework for assessing the water footprint of products, processes, and organizations. It provides principles, requirements, and guidelines for conducting and reporting water footprint assessments. It helps organizations evaluate and improve their water management practices.

Verification

A valid ISO 14046 certificate issued by accredited certification body.

4.3.5 Energy Management

The Applicant is required to achieve 5 Basic Points under this section. Additionally, the Applicant can achieve maximum 15 Bonus Points under this section.

4.3.5.1 Energy Management Plan – Core Criteria

Requirements

5 Basic Points for implementing effective energy management policies and procedures and/or an energy management programme, including, but not limited to, the following items:

- Energy efficiency initiatives: Manufacturer should undertake specific initiatives to reduce energy use and improve energy efficiency throughout their operations. This could include upgrading to more efficient equipment, optimizing production processes, or implementing energy-saving technologies; and
- Supplier requirements: Manufacturers should extend their energy management efforts to their supply chain by establishing requirements or initiatives for suppliers and contract manufacturers to improve their energy performance where possible.

Verification

Documentation of Energy Management Plan detailing the above, supported by organizational policy or other equivalent documents.

4.3.5.2 Energy Management System – Non-core Criteria

Requirements

10 Bonus Points for possessing valid certificate under ISO 50001: Energy management systems — Requirements with guidance for use.

ISO 50001 provides a framework for organizations to establish, implement, maintain, and improve an Energy Management System. The goal is to help organizations improve their energy performance, increase energy efficiency, and reduce energy costs and greenhouse gas emissions. By achieving ISO 50001 certification, manufacturers can demonstrate their commitment to energy efficiency and sustainability

Verification

A valid ISO 50001 certificate issued by accredited certification body.

4.3.5.3 Energy Consumption Limits – Non-core Criteria

Requirements

5 Bonus Points for meeting the requirements of energy consumption per unit product, as listed in Table 2.

Table 2: Benchmark for Energy Consumption per Unit Product

Type of PV Module	Energy Consumption (kWh/MWp)
Crystalline Silicon	≤ 60,000
Thin-film	≤ 500,000

The energy consumption per unit product is calculated according to equation below:

$$\frac{Energy\ Consumption\ during\ Production\ (kWh)}{Total\ Capacity\ of\ PV\ Produced\ (MWp)}$$

Verification

Calculation report with at least the following information:

- Energy consumption data, supported by energy bill or other equivalent information; and
- Production data, including quantity and generation capacity of the products.

4.4 ENVIRONMENT

4.4.1 Environmental Management

The Applicant can achieve maximum 5 Bonus Points under this section.

4.4.1.1 Environmental Management System – Non-core Criteria

Requirements

5 Bonus Points for possessing valid certificate under ISO 14001: Environmental management systems — Requirements with guidance for use or EU Eco-Management and Audit Scheme (EMAS).

The target of the environmental management system shall be set to reduce the environmental impacts during the manufacturing process which include but are not limited to the reduction of hazardous substance emissions, energy consumption, CO_2 emissions, secondary environmental load, waste management, water management, etc.

ISO 14001 is the international standard which provides an outline of how to meet the environmental policy and objectives for the business of the Applicant.

Eco-Management and Audit Scheme (EMAS) is an environmental management tool which enables organisations to assess, manage, and continuously improve their environmental performance.

Verification

A valid ISO 14001 or EMAS certificate issued by accredited certification body.

4.4.2 Regional Products

The Applicant can achieve maximum 5 Bonus Points under this section.

4.4.2.1 Regional Manufactured Equipment – Non-core Criteria

Requirements

5 Bonus Points for products that are manufactured within 800km radius of HKSAR by road transportation; within a 1,600km radius by rail transportation; or within a 4,000km radius by sea transportation. The distance is measured by the direct distance, not by actual travel distance.

Verification

Documents demonstrating the location of the manufacturer and a map showing the distance between the manufacturer and HKSAR.

4.5 PERFORMANCE

4.5.1 Efficiency Metrics

The Applicant is required to achieve 10 Basic Points under this section. Additionally, the Applicant can achieve maximum 15 Bonus Points under this section.

4.5.1.1 Photoelectric Conversion Efficiency – Core Criteria

Requirements

Points are awarded for achieving the required efficiency as listed below.

i) For Polycrystalline Silicon PV Module

Table 3: Scoring criteria for efficiency of Polycrystalline Silicon PV Modules.

Points	Efficiency
10 Basic Points	≥ 18.0%
10 Basic Points + 5 Bonus Points	≥ 19.0%
10 Basic Points+ 10 Bonus Points	≥ 20.0%

ii) For Monocrystalline Silicon PV Module

Table 4: Scoring criteria for efficiency of Monocrystalline Silicon PV Module.

Points	Efficiency
10 Basic Points	≥ 21.0%
10 Basic Points + 5 Bonus Points	≥ 21.5%
10 Basic Points + 10 Bonus Points	≥ 23.0%

iii) For Thin-film PV Module

Table 5: Scoring criteria for efficiency of Thin-film PV Module.

Points	Efficiency			
	CdTe	CIGS	Silicon-based	Other
10 Basic Points	≥ 12.0%	≥ 13.0%	≥ 8.0%	≥ 10.0%
10 Basic Points + 5 Bonus Points	≥ 13.0%	≥ 13.8%	≥ 12.0%	≥ 12.0%
10 Basic Points + 10 Bonus Points	≥ 14.0%	≥ 14.5%	≥ 13.0%	≥ 13.0%

Verification

Documentation including, but not limited to test reports, product catalogues, technical datasheet.

4.5.1.2 Solar Transmittance of PV Glass – Non-Core Criteria

Requirements

5 Bonus Points for achieving the required solar transmittance as listed below.

Table 6: Criteria for solar transmittance.

	PV Glass with Coating		PV Glass without Coating	
Glass Thickness	2.0mm – 3.2mm	≥ 4.0mm	2.0mm – 3.2mm	≥ 4.0mm
Solar Transmittance	≥ 93.0%	≥ 92.5%	≥ 91.5%	≥ 91.3%

Verification

Documentation including, but not limited to test reports, product catalogues, technical datasheet.

4.5.2 Product Life

The Applicant is required to achieve 20 Basic Points under this section. Additionally, the Applicant can achieve maximum 15 Bonus Points under this section.

4.5.2.1 Degradation Rate – Core Criteria

Requirements

Points are awarded for achieving the degradation rate below or equal to the threshold as listed below:

i) For Polycrystalline Silicon PV Module

Table 7: Degradation rate requirements for polycrystalline silicon PV modules.

Points	1st Year	25th Year	% / Year
10 Basic Points	≤ 3.0%	≤ 20%	≤ 0.8%
10 Basic Points + 5 Bonus Points	≤ 2.5%	≤ 20%	≤ 0.7%
10 Basic Points+ 10 Bonus Points	≤ 2.0%	≤ 20%	≤ 0.5%

ii) For Monocrystalline Silicon PV Module

Table 8: Degradation rate requirements for monocrystalline silicon PV modules.

Points	1st Year	25th Year	% / Year
10 Basic Points	≤ 2.0%	≤ 20%	≤ 0.8%
10 Basic Points + 5 Bonus Points	≤ 1.5%	≤ 20%	≤ 0.6%
10 Basic Points + 10 Bonus Points	≤ 1.0%	≤ 20%	≤ 0.4%

iii) For Thin-film PV Module

Table 9: Degradation rate requirements for thin-film PV module.

Points	1st Year	25th Year	% / Year
10 Basic Points	≤ 6.0%	≤ 15%	≤ 0.8%
10 Basic Points + 5 Bonus Points	≤ 5.0%	≤ 15%	≤ 0.4%
10 Basic Points + 10 Bonus Points	≤ 4.0%	≤ 15%	≤ 0.4%

Verification

Documentation including, but not limited to test reports, product catalogues, technical datasheet, or written declaration.

4.5.2.2 Durability – Core Criteria

Requirements

10 Basic Points for products conducting at least TWO types of tests on durability or other functional requirements according to the International Electrotechnical Commission (IEC), China National Standard (GB), or other equivalent international/national standards.

Tests qualified under this requirement include, but are not limited to, the following:

- Thermal Cycling Test in accordance with IEC 61215:2021
- Damp Heat Test in accordance with IEC 61215:2021
- UV Exposure Test in accordance with IEC 63202-1:2019, IEC 61215:2021
- Mechanical Load Test in accordance with IEC 61215:2021

- Potential induced degradation in accordance with IEC TS 62804:2020

Verification

Laboratory test report(s) in accordance with the methodology stated under relevant standards.

4.5.2.3 Service Life – Non-Core Criteria

Requirements

5 Bonus Points for providing 25 years guarantee covering functions and quality through performance warranty.

Verification

Product catalogue, technical datasheet, webpages, and/or any other information freely accessible by customers.

4.6 INNOSMART

4.6.1 Innovations & Additions – Non-core Criteria

The Applicant can achieve maximum 5 Bonus Points under this section.

Requirements

5 Bonus Points for achieving significant, measurable environmental performance using new practices, technology, and strategy not addressed in this Standard.

OR

Demonstrating exemplary performance in any of the existing assessment criteria:

- Eco-friendly materials
- Smart Technology
- Enhanced functionality

Verification

Report with a maximum length of 1,000 words, outline the objectives, solution and evaluation of the performance achieved by proposed Smart and Innovative Technologies.

AND

Include attachments that provide evidence of implementation, along with relevant technical specifications that support the claims made in the report.

5. SCORING

The points for meeting each criterion stated in Section 4 are summarised.

Table 10: Points to be awarded under the assessment criteria of this Standard

Label	Evaluation Criteria		Points		Related BEAM Plus Credits
			Basic	+Bonus	
	Product Information [CORE]		5	-	
Carbon	CFP Quantification		-	+10	
Resource	Material Optimization	Raw Materials	-	+5	
	Circularity	Recyclability	-	+5	
		Package Requirements	-	+5	
	Waste Management	Waste Management Plan [CORE]	5	-	
	Water Management	Water Consumption Reporting [CORE]	5	-	
		Water Recycling Program	-	+5 / +10	
		Water Management System	-		
	Energy Management	Energy Management Plan [CORE]	5	-	
		Energy Management System	-	+10	
		Energy Consumption Limits	-	+5	
Environment	Environmental Management	Environmental Management System	-	+5	
	Regional Product	Regional Manufactured Equipment	-	+5	MW 8
Performance	Efficiency Metrics	Photoelectric Conversion Efficiency [CORE]	10	+5/+10	EU 2 / EU 5
		Solar Transmittance of PV Glass	-	+5	
	Product Life	Degradation Rate [CORE]	10	+5/+10	
		Durability [CORE]	10	-	
		Service Life	-	+5	
InnoSmart	Innovations & Additions		-	+5	IA
		Total:	**50**	**+95**	

Related BEAM Plus Credits refer to these relevant credits under BEAM Plus New Buildings Version 2.0, as listed below:

- MW 8: Regional Materials
- MW 9: Use of Green Products
- EU 2: Reduction of CO_2 Emissions
- EU 5: Renewable and Alternative Energy Systems
- Innovations and Additions