



Confederation of Indian Industry



GreenPro Ecolabelling Standard for

# ROOFTOP SOLAR PHOTOVOLTAIC MODULES

*Pilot Version*

*Supporting Councils and Programmes*





Confederation of Indian Industry



**GreenPro Ecolabelling Standard for  
“Rooftop Solar Photovoltaic Modules”  
Pilot Version**

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The GreenPro Ecolabel standard is applicable only for solar photovoltaic modules and not for any other equipment of solar photovoltaic system.

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## 1. GreenPro Certification – Life Cycle Approach

The Green Products Rating adopts a holistic approach based on the 'Life Cycle' of the product. The rating system encourages the product manufacturers to implement measures that would result in environmental, health and wellbeing benefits at the following stages of the life cycle of the products.

1. Product Design
2. Raw Materials
3. Manufacturing Process
4. Product Performance during use
5. Disposal / Recycling



## 2. Benefits

GreenPro certification benefits both the product manufacturers and the users. The benefits are both tangible and intangible.

### For Product Manufacturers

Some of the benefits of GreenPro Certification for the product manufacturers are highlighted below:

1. GreenPro Certification differentiates the Green Product from the competition
2. Increases the market reach out with credible and precise information on the Green features of the products
3. Enables Green Product innovation
4. Increases resources conservation through enhanced energy efficiency, water efficiency, use of renewable energy, minimization waste etc., during the manufacturing process and hence increase in profitability
5. Acts as a driver for achieving environment excellence
6. Complements National & International Green Building and Green Company Certification systems

### For Users

Use of GreenPro certified solar photovoltaic module leads to significant tangible and intangible benefits for the end users (Developers, Contractors and System Integrators).

Some of the benefits for the users are highlighted as below:

1. Recognition and credits for achieving national and international Certification for the Green Buildings
2. Improved product performance during use to increase power generation and environmental impacts
3. Time and effort in carrying out due diligence in selecting a green product is saved

4. Ensures Toxic and hazardous substances free products which in turn decrease “health and wellbeing” risks of the users

### **3. National Priorities addressed in Certification**

GreenPro Certification addresses the following which are priorities of the Government at the National level:

*Water:*

Water is a major concern in most part of the country. Implementation of water efficiency measures and “zero Liquid Discharge” are being encouraged to address the water related issues.

*Land:*

Availability of land and increase in land pollution are major areas of concern. The certification system promotes circular economy by increasing recycling rate which would result in reduction in landfills and hence reduction in land pollution.

*Energy Efficiency:*

The certification system encourages the product manufacturers to adopt energy efficiency improvement measures and reduce their energy consumption which is in line with the National Mission on Enhanced Energy Efficiency. This provides an opportunity to users to choose more energy-efficient and sustainable products from the product basket of the producer.

*Renewable Energy:*

The Certification advocates compliance with Renewable Purchase Obligation (RPO) and encourages product manufacturers to invest in renewable power generation. This is in line with Government of India’s objective of increasing the contribution of renewable power sources.

A combination of improving energy efficiency and the use of renewable energy leads to support the government’s efforts on Climate Change issues.

### **4. Development of GreenPro Certification Standards**

GreenPro Certification applies product specific ‘**Certification Standards**’ for evaluating the products. The certification standards are developed with the support of respective product committees formed under the aegis of Green products and services council.

The product committee involves all major stakeholders related to the respective product category including product manufacturers, standard setters, conformity agencies, consultants, user’s *et al*. The product committee is led by an expert who is also an unbiased specifier.

Key findings of pilot projects are incorporated in certification standard with consent from the product committee.

## 4.1 Features of GreenPro Certification

The certification system follows prescriptive as well as performance based approach for evaluating a product. The certification calls for demonstration of product performance through testing as per specified standards and implementation of measures at every stage of the Life Cycle of the product, leading to clearly measurable environmental benefits.

The certification system evaluates green features for products based on various performance parameters grouped under the following Credit Modules.

1. **Product Design:** The certification necessitates the manufacturer to demonstrate its top management commitment towards environmental performance improvement of the product.
2. **Product Performance:** The required performance parameters of the product need to be demonstrated through product testing as per the specified standards.
3. **Raw Materials:** The certification demands for efforts to bring down the use of virgin materials through recycling and elimination of toxic and hazardous content in the input materials for product manufacturing.
4. **Manufacturing Process:** The green product Certification recognizes the efforts taken by the product manufacturer to reduce the resource consumption during the manufacturing process
5. **Waste Management:** The certification calls for efforts to minimize the wastes or safer disposal of the wastes generated during manufacturing process.
6. **Life Cycle Approach:** The certification encourages the product manufacturer to carry out Life cycle analysis for the products and implement measures based on the impact analysis.
7. **Product Stewardship:** The certification recognizes the measures implemented by the product manufacturers to reduce environmental and health impacts in product transportation, use and recycling / product disposal
8. **Innovation:** The certification recognizes the innovative measures implemented by the product manufacturers which had resulted in substantial reduction in environment impact exceeding the threshold level specified in the certification standard.

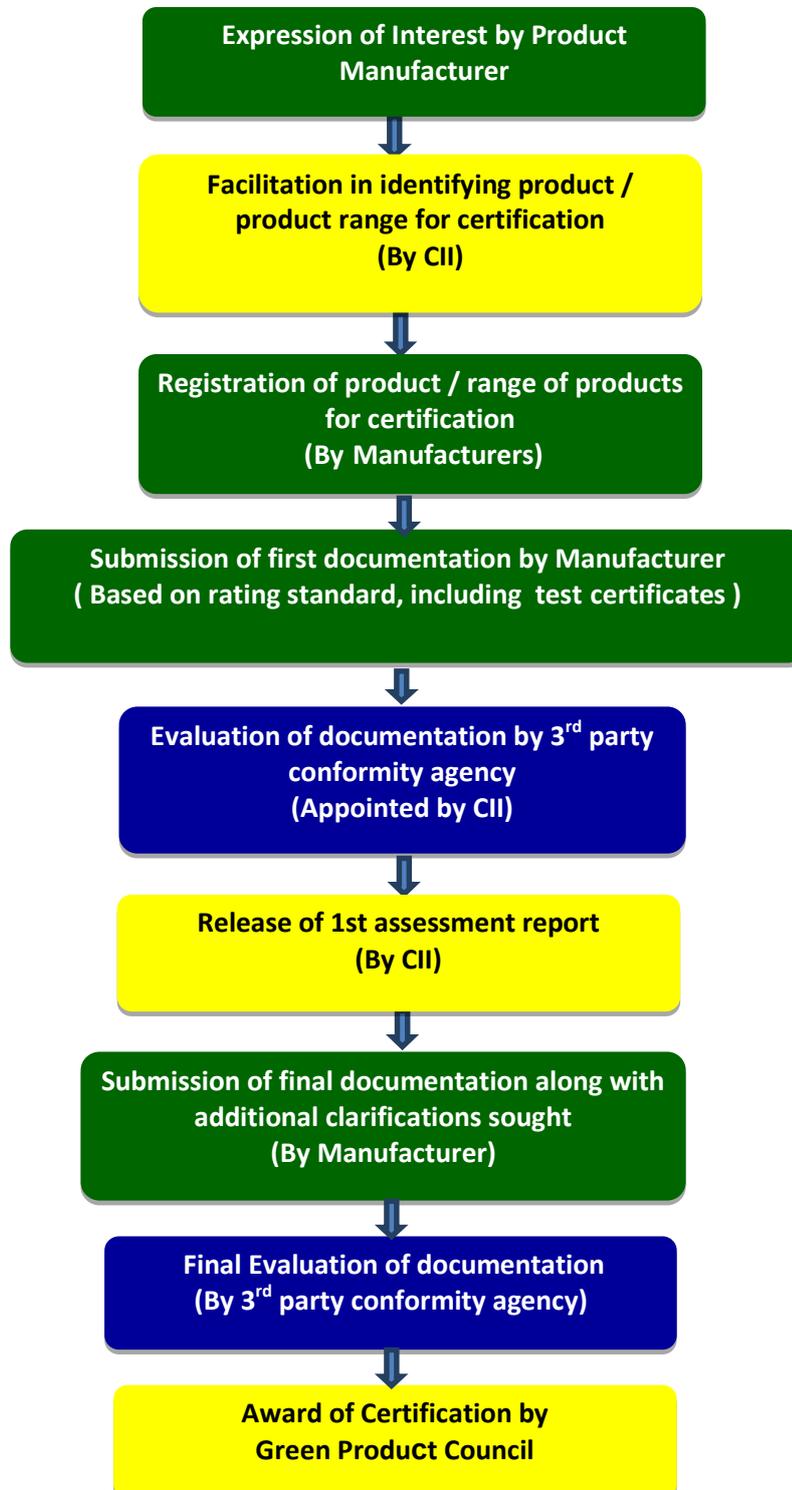
The approach and the Credit Modules for evaluation of products remain by and large the same for all the product categories. However, the credits as part of the individual Credit Modules and the weightage will vary depending upon the product categories and their significance.

**A product needs to comply with certain specified mandatory requirements. The mandatory requirements will vary depending upon the product category.**

The threshold limit of all the credits is 100. The product manufacturers can apply for the credits depending upon the applicability and gain credit points for the certification.

## 5. Methodology of Certification

The step by step methodology for the Certification is mentioned below.



## 5.1 Product Testing

The Green Product Certification calls for testing of select product parameters for the award of certification. The product parameters will vary depending upon product categories. Wherever testing of the products is specified, the certification system also specifies the testing standards and the requirements.

The product manufacturers can carry out the product testing in any of the Laboratories accredited by the **National Accreditation Board for Testing and Calibration Laboratories (NABL)** according to the specified standards and produce the test certificates with the test results for further evaluation.

If the product testing has been already carried out in an NABL accredited laboratory owned by the product manufacturer, the product manufacturer has to submit the details of the test procedures & methodology for verification.

If the product testing needs to be carried out outside the country, the laboratory should have been accredited by the accrediting agency recognized by the Government of the respective country or an accrediting agency which is a member of international bodies such as International Laboratory Accreditation Co-operation (ILAC), Asia Pacific Laboratory Accreditation Co-operation (APLAC) etc.

## 5.2 Evaluation by 3rd party Conformity Agency

The document submitted by the product manufacturer will be evaluated by a 3<sup>rd</sup> party conformity agency appointed by CII-Godrej GBC.

Conformity agency is a competent 3<sup>rd</sup> party agency for carrying out product conformity assessment for various products which would involve product testing, inspection, factory audits and documentary review.

## 6. Green Product Certification

A product will be certified depending upon the number of credit points achieved based on the evaluation of 3<sup>rd</sup> party conformity agency.

**The maximum achievable credit points are 100. A product will be certified as 'Green Product' if it achieves 50 or more credit points in the evaluation.**

## 7. Validity of the Certification

GreenPro Certification is valid for 2 years from the date of award of the certification with a yearly review for the product / product range. At the end of the validity period, the product manufacturer needs to apply for the renewal of the Green Product Certification.

Before the end of the validity period, the product manufacturer can attempt for higher level of certification after implementing sufficient measures for gaining credit points. However, the attempt can be made only after a year from the date of award of the product Certification.

## **8. Fee for Green product Certification**

The fee details are available on website [www.greenbusinesscentre.com](http://www.greenbusinesscentre.com). The fee details can also be obtained through the contact details mentioned in the manual.

## **9. Updation of the Standard**

GreenPro Certification Standard for Solar Photovoltaic Module is the result of Green Product and Services council's efforts towards facilitating market transformation in Green Products. The council's endeavor is to periodically update the standard and raise the bar.

The updating of the standard will be taken up with the support of the product committee on consensus basis. Updates or addenda will be incorporated and formally communicated to the applicants.

## **Summary of Credits & Points Distribution**

<b>GreenPro Ecolabelling Standard for Rooftop Solar Photovoltaic Modules</b>		
<i>Credits</i>	<i>Criteria</i>	<i>Proposed Credit Points</i>
<b>Mandatory Requirements</b>		
	1. Solar photovoltaic module must conform to following criteria <ul style="list-style-type: none"> <li>• IEC / BIS Standards for Solar PV module design qualification and type approval               <ul style="list-style-type: none"> <li>a) IEC 61215 / IS 14286: Crystalline Silicon Terrestrial</li> <li>b) IEC 61646 / IS 16077: Thin Film Terrestrial</li> </ul> </li> <li>• IS/IEC 61730 Part 1 &amp; 2 for Safety Qualification</li> </ul> <p style="text-align: center;">(OR)</p> A valid certificate from BIS is alternative document for demonstrating compliance of design and type qualification.	
	2. Manufacturing plants must have consent to operate under 'Air Act' and 'Water Act' (environmental compliance).	
	3. The company applying for certification should have minimum 2 years of production experience.	
<b>1</b>	<b>Product Design</b>	<b>5</b>
<b>Credit 1.1</b>	<b>Eco-vision Statement</b>	
	A policy related to eco-vision at organizational level and details of strategies / green measures implemented at design and manufacturing stage of the product	2
	ISO 9001: Quality Management System certified manufacturing unit	1
	ISO 14001: Environmental Management System certified manufacturing unit	1
	ISO 18001: Occupational Health and Safety Management System certified manufacturing unit	1
<b>2</b>	<b>Product Performance</b>	<b>40</b>
<b>Mandatory Requirement</b>	<ul style="list-style-type: none"> <li>• Solar PV module efficiency at STC shall be tested as per IEC 61215 / IS 14286 for crystalline cells and IEC 61646 / IS 16077 for thin film cell. The module efficiency must be               <ul style="list-style-type: none"> <li>a) Monocrystalline : 18%</li> <li>b) Polycrystalline : 16.5%</li> <li>c) Thin film : 12%</li> </ul> </li> <li>• Guarantee for solar module performance (power generation) shall be               <ul style="list-style-type: none"> <li>a) 90% power generation capacity at the end of 10 years</li> <li>b) 80% power generation capacity at the end of 25 years</li> </ul> </li> </ul>	

<b>Credit 2.1</b>	<b>Module Efficiency</b>	
	Note: Report the median solar PV module manufactured by a company. Evaluate the efficiency of about 70% of solar PV modules within the median.	
	Module Efficiency $\geq 12$ and $< 14$	6
	Module Efficiency $\geq 14$ and $< 16$	12
	Module Efficiency $\geq 16$ and $< 18$	18
	Module Efficiency $\geq 18$ and $< 20$	24
	Module Efficiency $\geq 20$	30
<b>Credit 2.2</b>	<b>Performance Degradation</b>	
	Performance degradation shall be linear and warranty documents are required for awarding credits.	
	Power generation capacity $> 90\%$ at the end of 12 years	1
	Power generation capacity $> 91\%$ at the end of 12 years	3
	Power generation capacity $> 92\%$ at the end of 12 years	5
<b>Credit 2.3</b>	<b>Potential-induced Degradation</b>	
	Potential-induced degradation of solar photovoltaic modules shall be tested as per IEC 62804: Test Method for Detecting Potentially Induced Degradation.	
	PID $< 5\%$ and $\geq 4\%$	1
	PID $< 4\%$ and $\geq 3\%$	2
	PID $< 3\%$ and $\geq 2\%$	3
	PID $< 2\%$	5
<b>3</b>	<b>Raw Materials</b>	<b>15</b>
<b>Credit 3.1</b>	<b>Elimination of Hazardous Substances</b>	<b>10</b>
	The concentration level of hazardous substances such as lead, mercury, cadmium, hexavalent chromium IV, Polybrominated biphenyls (PBB) and Polybrominated diphenyl ether (PBDE) shall not exceed the following thresholds (RoHS compliance).	
	Lead Concentration shall be $< 1000$ PPM	2
	Hexavalent Chromium Concentration shall be $< 1000$ PPM	2
	Cadmium Concentration shall be $< 100$ PPM	2
	Polybrominated Biphenyls Concentration shall be $< 1000$ PPM	2
	Polybrominated Diphenyl Ether Concentration shall be $< 1000$ PPM	2
	<u>Testing Methods:</u> Lead and Cadmium IEC 62321–5:2013 Mercury IEC 62321–4:2013 Hexavalent chromium IEC 62321–4:2008 PBB and PBDE IEC 62321–6:2015	

<b>Credit 3.2</b>	<b>Recovery of Broken Solar Cells / Modules</b>	
	Reduce broken solar cells waste generation by recycling it in manufacturing of low capacity solar modules.	
	Percentage utilization of broken cells $\geq$ 15%	1
	Percentage utilization of broken cells $\geq$ 30%	3
	Percentage utilization of broken cells $\geq$ 50%	5
<b>4</b>	<b>Manufacturing Process</b>	<b>21</b>
<b>Credit 4.1</b>	<b>Energy Efficiency</b>	
	Conduct detailed energy audit at regular interval (once in 3 years) and implement energy efficiency measures	1
	<b>Specific Energy Consumption (SEC)</b>	
	Reduction in specific energy consumption $\geq$ 4%	1
	Reduction in specific energy consumption $\geq$ 8%	2
	Reduction in specific energy consumption $\geq$ 12%	3
	<b>(OR)</b>	
	National Benchmarking – Among top 5 Companies	2
	International Benchmarking – Among top 10 Companies	3
<b>Credit 4.2</b>	<b>Water Efficiency</b>	
	<b>Specific Water Consumption (SWC)</b>	
	Reduction in specific water consumption $\geq$ 5%	1
	Reduction in specific water consumption $\geq$ 10%	2
	Reduction in specific water consumption $\geq$ 15%	3
	<i>Note: Focus on reducing domestic water consumption</i>	
	Rainwater Harvesting System	1
	Beyond the fence initiatives	1
<b>Credit 4.3</b>	<b>Renewable Energy</b>	
	On-site and offsite renewable energy for meeting their energy requirements	
	$\geq$ 5% of annual electricity consumption	1
	$\geq$ 10% of annual electricity consumption	3
	$\geq$ 15% of annual electricity consumption	5
<b>Credit 4.4</b>	<b>Minimize Generation of Solar Cell Waste</b>	
	Generation of Solar Cell Waste $<$ 5%	1
	Generation of Solar Cell Waste $<$ 3%	3
	Generation of Solar Cell Waste $<$ 1%	5
<b>Credit 4.5</b>	<b>Green Factory Building</b>	2

<b>5</b>	<b>Waste Management</b>	<b>5</b>
<b>Mandatory Requirement</b>	<ul style="list-style-type: none"> <li>Solid and Liquid Wastes : Compliance to local / regional / national regulations</li> </ul>	
<b>Credit 5.1</b>	<b>Hazardous Waste</b>	
	≥ 5% reduction in disposal of waste per unit of production	1
	≥ 10% reduction in disposal of waste per unit of production	2
	≥ 15% reduction in disposal of waste per unit of production	3
<b>Credit 5.2</b>	<b>Non Hazardous Waste</b>	
	≥ 10% reduction in disposal of waste per unit of production	1
	≥ 20% reduction in disposal of waste per unit of production	2
<b>6</b>	<b>Life Cycle Approach</b>	<b>5</b>
<b>Credit 6.1</b>	<b>Life Cycle Assessment</b>	
	Carry out life cycle analysis considering 'Cradle to Gate' as boundary condition and identify environmental reduction strategies.	2
	<b>Implementation of Strategies and Quantification of Benefits</b>	
	Strategies implemented ≥ 1	1
	Strategies implemented ≥ 2	2
	Strategies implemented ≥ 3	3
<b>7</b>	<b>Product Stewardship</b>	<b>5</b>
<b>Credit 7.1</b>	Stakeholder Education and Awareness	2
<b>Credit 7.2</b>	Quality Management System	1
<b>Credit 7.3</b>	Extended Producer Responsibility <ul style="list-style-type: none"> <li>Product take-back at end of the life / after warranty</li> <li>Green packaging / recycled packaging</li> </ul>	2
<b>8</b>	<b>Innovation</b>	<b>4</b>
<b>Credit 8.1</b>	<b>Product Innovation</b>	
	<ul style="list-style-type: none"> <li>Achieve significant and measurable environmental performance using a strategy not addressed in the GreenPro standard</li> <li>Any measure exceeding the threshold of the credits that are applicable for exemplary performance</li> </ul>	4
	<b>Total Points</b>	<b>100</b>

# **GREENPRO ECOLABELLING STANDARD FOR ROOFTOP SOLAR PHOTOVOLTAIC MODULES**

## Mandatory Requirements

For a solar photovoltaic module to be taken up for GreenPro Certification, the manufacturer shall comply with the applicable local and national acts & rules related to environment, health and safety, and following criteria:

1. Solar photovoltaic module must conform to following criteria
  - a) IEC/BIS Standards for PV module design qualification and type approval
    - i. IEC 61215 / IS 14286: Crystalline Silicon Terrestrial
    - ii. IEC 61646 / IS 16077: Thin Film Terrestrial
  - b) IS/IEC 61730 Part 1 & 2 for Safety Qualification
2. Manufacturing plants must have consent to operate under 'Air Act' and 'Water Act' (prevention and control of pollution).
3. The company applying for certification should have minimum 2 years of production experience.

*Note:*

*Testing of solar PV modules as per mandatory requirements need to be taken up as per the latest edition of IEC / BIS standard.*

## 1.0 Product Design

### Credit 1.1: Eco-Vision Statement

**Points: 5**

#### Intent

To design the product holistically considering all the environmental attributes, so as to minimize associated impacts.

#### Award of Points

Provide the details of the eco-vision to action as per the following for achieving excellence in design of the products that would result in environmental, health and well-being benefits.

- ❖ Eco-vision statement
- ❖ Strategies adopted, resource allocation, stakeholder engagement, improvement measures/green measures implemented
  - At design stage
  - At manufacturing stage

Credits	Criteria	Proposed Credit Points
<b>1</b>	<b>Product Design</b>	
<b>Credit 1.1</b>	<b>Eco-vision Statement</b>	
	A policy related to eco-vision (sustainability / energy / environment) at organizational level and details of strategies / green measures implemented at design and manufacturing stage of the product	2
	ISO 9001: Quality Management System certified manufacturing unit	1
	ISO 14001: Environmental Management System certified manufacturing unit	1
	ISO 18001: Occupational Health and Safety Management System certified manufacturing unit	1
<b>Sub Total</b>		<b>5</b>

#### Exemplary Performance

This credit is not eligible for exemplary performance under Innovation Credit.

#### Documentation Required

1. Eco-vision statement (Policy on sustainability / energy / environment).
2. Strategies adopted at design & manufacturing stage to achieve eco-vision.
  - Resource allocation for improving the design and manufacturing of the product
  - Details of employees and stakeholders engagement
3. Details of measures implemented at design stage and manufacturing stage of product with quantification of benefits.

## 2.0 Product Performance

### Mandatory Requirements

#### Intent

Enhance the performance of solar photovoltaic module to ensure higher specific electricity generation (kWh/kWp) and minimal performance deterioration during its use.

#### Requirements

1. Solar photovoltaic module efficiency, at STC, shall be tested as per IEC 61215 / IS 14286 for crystalline cells and IEC 61646 / IS 16077 for thin film cell. The module efficiency must be
  - Monocrystalline : 18%
  - Polycrystalline : 16.5%
  - Thin film : 12%
2. Guarantee for solar photovoltaic module performance (power generation) shall be
  - 90% power generation capacity at the end of 10 years
  - 80% power generation capacity at the end of 25 years

#### Documentation Required

1. Test report from NABL accredited laboratory for module efficiency.
2. Guarantee declaration from solar photovoltaic module manufacturer for product performance.

**Credit 2.1: Module Efficiency****Points: 30****Intent**

Design and manufacture efficient solar photovoltaic module to increase electricity generation during its use.

**Award of Points**

Solar photovoltaic module efficiency, at STC, shall be tested as per IEC 61215 / IS 14286 for crystalline cells and IEC 61646 / IS 16077 for thin film cell.

<b>Credits</b>	<b>Criteria</b>	<b>Proposed Credit Points</b>
<b>2</b>	<b>Product Performance</b>	
<b>Credit 2.1</b>	<b>Module Efficiency</b>	
	Note: Report the median solar PV module manufactured by a company. Evaluate the efficiency of about 70% of solar PV modules within the median.	
	Module Efficiency $\geq 12$ and $< 14$	6
	Module Efficiency $\geq 14$ and $< 16$	12
	Module Efficiency $\geq 16$ and $< 18$	18
	Module Efficiency $\geq 18$ and $< 20$	24
	Module Efficiency $\geq 20$	30
<b>Sub Total</b>		<b>30</b>

**Exemplary Performance**

This credit is eligible for exemplary performance under Innovation Credit, if the module efficiency is greater than 22.

**Documentation Required**

1. Technical specifications of solar photovoltaic module applied for GreenPro certification.
2. Test report from NABL accredited laboratory for module efficiency.

**Credit 2.2: Performance Degradation****Points: 5****Intent**

Design and manufacture high performance solar photovoltaic module to reduce degradation of power generation each year.

**Award of Points**

Performance guarantee documents shall be submitted for awarding and credits. The trend of performance degradation shall be linear.

<b>Credits</b>	<b>Criteria</b>	<b>Proposed Credit Points</b>
<b>2</b>	<b>Product Performance</b>	
<b>Credit 2.2</b>	<b>Performance Degradation</b>	
	Power generation > 90% at the end of 12 years	1
	Power generation > 91% at the end of 12 years	3
	Power generation > 92% at the end of 12 years	5
<b>Sub Total</b>		<b>5</b>

**Exemplary Performance**

This credit is eligible for exemplary performance under Innovation Credit, if the power generation is greater than 93%.

**Documentation Required**

1. Technical specifications of solar photovoltaic module applied for GreenPro certification.
2. Warranty documents from the manufacturer for performance (power generation) degradation.

**Credit 2.3: Potential-induced Degradation****Points: 5****Intent**

Design and manufacture high performance solar photovoltaic module to reduce power loss by limiting potential-induced degradation (PID) level.

**Award of Points**

Potential-induced degradation shall be tested as per IEC 62804: Test Method for Detecting Potentially Induced Degradation. The credits will be awarded based on PID levels.

<b>Credits</b>	<b>Criteria</b>	<b>Proposed Credit Points</b>
<b>2</b>	<b>Product Performance</b>	
<b>Credit 2.3</b>	<b>Potential-induced Degradation</b>	
	PID < 5% and $\geq$ 4%	1
	PID < 4% and $\geq$ 3%	2
	PID < 3% and $\geq$ 2%	3
	PID < 2%	5
<b>Sub Total</b>		<b>5</b>

**Exemplary Performance**

This credit is eligible for exemplary performance under Innovation Credit, if the potential-induced degradation generation is less than 1%.

**Documentation Required**

1. Test report from NABL accredited laboratory for potential-induced degradation.

### 3.0 Raw Materials

#### Credit 3.1: Elimination of Hazardous Substances

Points: 10

##### Intent

Eliminate / restrict exposure to hazardous substances that can lead to long-term health effects through either respiration / direct contact.

##### Award of Points

Solar photovoltaic module shall be RoHS compliant by limiting concentration level of hazardous substances. Carryout hazardous substance test as per standard specified below.

Credits	Criteria	Proposed Credit Points
<b>3</b>	<b>Raw Materials</b>	
<b>Credit 3.1</b>	<b>Elimination of Hazardous Substances</b>	
	The concentration level of hazardous substances such as lead, mercury, cadmium, hexavalent chromium IV, Polybrominated biphenyls (PBB) and Polybrominated diphenyl ether (PBDE) shall not exceed the following thresholds (RoHS compliance).	
	Lead Concentration < 1000 PPM	2
	Hexavalent Chromium Concentration < 1000 PPM	2
	Cadmium Concentration < 100 PPM	2
	Polybrominated Biphenyls Concentration < 1000 PPM	2
	Polybrominated Diphenyl Ether Concentration < 1000 PPM	2
	<u>Testing Methods:</u> Lead and Cadmium IEC 62321-5:2013 Mercury IEC 62321-4:2013 Hexavalent chromium IEC 62321-4:2008 PBB and PBDE IEC 62321-6:2015	
<b>Sub Total</b>		<b>10</b>

##### Exemplary Performance

This credit is not eligible for exemplary performance under Innovation Credit.

##### Documentation Required

1. Test report from NABL accredited laboratory for hazardous substances present in the module.

**Credit 3.2: Recovery of Broken Solar Cells / Modules****Points: 5****Intent**

Reduce solar cells waste generation by recycling it efficiently for manufacturing low capacity solar PV modules.

**Award of Points**

Utilize broken solar cells / modules for manufacturing of low capacity solar PV modules thereby reduce solar cell waste generation.

<b>Credits</b>	<b>Criteria</b>	<b>Proposed Credit Points</b>
<b>3</b>	<b>Raw Materials</b>	
<b>Credit 3.2</b>	<b>Recycling of Broken Solar Cells</b>	
	Percentage utilization of broken cells / modules $\geq$ 15%	1
	Percentage utilization of broken cells / modules $\geq$ 30%	3
	Percentage utilization of broken cells / modules $\geq$ 50%	5
<b>Sub Total</b>		<b>5</b>

**Exemplary Performance**

This credit is not eligible for exemplary performance under Innovation Credit.

**Documentation Required**

1. Declaration by the manufacturer highlighting the quantity of broken solar cells recycled against total quantity of solar cell waste generated.

## 4.0 Manufacturing Process

### Credit 4.1: Energy Efficiency

**Points: 4**

#### Intent

Improve energy efficiency in the manufacturing process of solar photovoltaic module to reduce environmental impacts.

#### Award of Points

Conduct detailed energy audit to identify energy efficiency measures. Prior to implementation of identified energy efficiency measures, establish specific energy consumption of the plant and monitor energy consumption on a continuous basis, to evaluate energy performance improvement.

Carryout energy benchmarking at national / international level to demonstrate energy performance of manufacturing unit.

Credits	Criteria	Proposed Credit Points
<b>4</b>	<b>Manufacturing Process</b>	
<b>Credit 4.1</b>	<b>Energy Efficiency</b>	
	Conduct detailed energy audit at regular interval (once in 3 years) and implement energy efficiency measures	1
	<b>Specific Energy Consumption (SEC)</b>	
	Reduction in specific energy consumption $\geq$ 4%	1
	Reduction in specific energy consumption $\geq$ 8%	2
	Reduction in specific energy consumption $\geq$ 12%	3
	<b>(OR)</b>	
	National Benchmarking – Among top 5 Companies with production capacity of 50 MW and above	2
	International Benchmarking – Among top 10 Companies with production capacity of 50 MW and above	3
	<b>Sub Total</b>	<b>4</b>

#### Exemplary Performance

This credit is eligible for exemplary performance under Innovation Credit, provided, the measures implemented for reducing the energy consumption have exceeded the specified threshold limits.

#### Documentation Required

1. Details of annual production, energy consumption & specific energy consumption for the preceding 3 years
2. Details of National Benchmark & International Benchmark data with comparisons
3. Details of energy efficiency improvement measures implemented with actual benefits achieved

Note: Manufacturing units which are in operation for less than 2 years need to demonstrate a system in place for SEC monitoring and provide the benchmarking details.

Green Products and Services Council                      GreenPro Ecolabelling – Solar Photovoltaic Modules

**Credit 4.2: Water Efficiency****Points: 5****Intent**

Incorporate water conservation measures in domestic water use to reduce potable water demand and implement water related measures to benefit the society at large.

**Award of Points**

Implement water efficiency measures such as use of low flow plumbing fixtures, reuse of treated water from onsite treatment plant and etc., to reduce specific water consumption.

Provide rainwater harvesting system to manage 95% of runoff from roof and non-roof areas of the manufacturing unit by reusing the collected runoff for gardening and flushing application or recharging ground water aquifers through percolation pits.

Implement measures for improving the availability of portable water beyond the fence for the benefit of the local community

<b>Credits</b>	<b>Criteria</b>	<b>Proposed Credit Points</b>
<b>4</b>	<b>Manufacturing Process</b>	
<b>Credit 4.2</b>	<b>Water Efficiency</b>	
	<b><i>Specific Water Consumption (SWC)*</i></b>	
	Reduction in specific water consumption $\geq$ 5%	1
	Reduction in specific water consumption $\geq$ 10%	2
	Reduction in specific water consumption $\geq$ 15%	3
	<i>Note: * Focus on reducing domestic water consumption</i>	
	Rainwater Harvesting System	1
	Beyond the fence initiatives	1
	<b>Sub Total</b>	<b>5</b>

\*Recycling of water can be factored into the reduction in specific water consumption

**Exemplary Performance**

This credit is eligible for exemplary performance under Innovation, if the facility achieves the status of “Zero Liquid Discharge”.

(OR)

The reduction in specific water consumption exceeded the threshold provided above.

**Documentation Required**

1. Details of annual production, water consumption & specific water consumption for the preceding 3 years
2. Details of rain water harvesting system capacity and quantity of water harvested annually
3. Details of beyond the fence initiatives implemented and the benefits

**Credit 4.3: Renewable Energy****Points: 5****Intent**

Encourage the use of onsite and off-site renewable energy to reduce the dependence on fossil fuels and their associated environmental impacts

**Award of Points**

Install onsite and off-site renewable energy system to offset energy generated by burning fossil fuels.

<b>Credits</b>	<b>Criteria</b>	<b>Proposed Credit Points</b>
<b>4</b>	<b>Manufacturing Process</b>	
<b>Credit 4.3</b>	<b>Renewable Energy</b>	
	On-site and offsite renewable energy for meeting their energy requirements	
	≥ 5% of annual electricity consumption	1
	≥ 10% of annual electricity consumption	3
	≥ 15% of annual electricity consumption	5
<b>Sub Total</b>		<b>5</b>

**Exemplary Performance**

This credit is eligible for exemplary performance under Innovation Credit, if the contribution from the renewable energy sources is 100% of annual energy consumption of the manufacturing facility.

**Documentation Required**

1. Details of onsite and offsite renewable energy system such as capacity, technology, location and etc.
2. Details of total energy consumption in the manufacturing facility and renewable energy generated and consumed in kWh.

**Credit 4.4: Minimize Generation of Solar Cell Waste****Points: 2****Intent**

Encourage the manufacturer to reduce generation of solar cells waste by optimizing process parameters and product design.

**Award of Points**

Inventory on solar cells waste generation shall be submitted to establish percentage of solar cell waste. The credits shall be awarded based on percentage of solar cell waste generation.

<b>Credits</b>	<b>Criteria</b>	<b>Proposed Credit Points</b>
<b>4</b>	<b>Manufacturing Process</b>	
<b>Credit 4.4</b>	<b>Minimize Generation of Solar Cell Waste</b>	
	Generation of Solar Cell Waste < 5%	1
	Generation of Solar Cell Waste < 3%	3
	Generation of Solar Cell Waste < 1%	5

**Exemplary Performance**

This credit is not eligible for exemplary performance under Innovation Credit.

**Documentation Required**

1. Inventory on solar cell waste generation and total quantity of solar cell purchased.

**Credit 4.5: Green Factory Building****Points: 2****Intent**

Encourage the manufacturer to implement green measures to promote sustainable procurement, eco-friendly commuting and landscaping practices, indoor environment quality and etc., at manufacturing unit level.

**Award of Points**

Solar photovoltaic module manufacturing unit shall be certified by IGBC or GreenCo rating system.

<b>Credits</b>	<b>Criteria</b>	<b>Proposed Credit Points</b>
<b>4</b>	<b>Manufacturing Process</b>	
<b>Credit 4.5</b>	<b>Green Factory Building</b>	
	Obtain Green Factory Building recognition from IGBC or GreenCo rating system.	2

**Exemplary Performance**

This credit is not eligible for exemplary performance under Innovation Credit.

**Documentation Required**

1. Details of 'Green Factory Building' recognition from CII IGBC or CII GreenCo rating system.

## **5.0 Waste Management**

### **Mandatory Requirement**

#### **Intent**

Ensure the solid, liquid and gaseous wastes discharged from the manufacturing unit are complying with all applicable local / regional / national regulations.

#### **Requirement**

The manufacturing unit shall have environmental clearance from state pollution control board.

#### **Documentation Required**

- Consent to operate under 'Air Act' and 'Water Act', and authorization under the hazardous wastes (Management, Handling and Transboundary Movement) from state pollution control board.

**Credit 5.1: Hazardous Waste****Points: 3****Intent**

Encourage the manufacturer to implement appropriate handling and disposal of hazardous waste generated during solar photovoltaic module manufacturing, thereby reduce environmental impacts.

**Award of Points**

Minimize hazardous wastes generation and sent to landfill or incineration through 3R principle (Reduce, Reuse and Recycle). Segregate hazardous wastes into recyclable and non-recyclable wastes.

Maximize utilization of recyclable wastes at site or through external recycling agency and reduce non-recyclable wastes generation.

<b>Credits</b>	<b>Criteria</b>	<b>Proposed Credit Points</b>
<b>5</b>	<b>Waste Management</b>	
<b>Credit 5.1</b>	<b>Hazardous Waste</b>	
	≥ 5% reduction in disposal of waste per unit of production	1
	≥ 10% reduction in disposal of waste per unit of production	2
	≥ 15% reduction in disposal of waste per unit of production	3
<b>Sub Total</b>		<b>3</b>

**Exemplary Performance**

This credit is eligible for exemplary performance under Innovation Credit, if 50% of hazardous waste generated is reused / recycled through innovative methods.

**Documentation Required**

1. Details of hazardous waste management process exist at manufacturing unit
2. Details of hazardous waste generated and disposed (quantity, reused, recycled, incinerated, etc.,) for the preceding 3 years.
3. Details of the wastes handed over to local authority approved common Hazardous Wastes Treatment Storage and Disposal Facility (TSDF) for the preceding 3 years.

**Credit 5.2: Non Hazardous Waste****Points: 2****Intent**

Encourage the manufacturer to implement appropriate handling and disposal of non hazardous waste generated during solar photovoltaic module manufacturing, thereby reduce environmental impacts.

**Award of Points**

Minimize non hazardous wastes generation and sent to landfill or incineration through 3R principle (Reduce, Reuse and Recycle). Segregate non hazardous wastes into recyclable and non-recyclable wastes.

Maximize utilization of recyclable wastes at site or through external recycling agency and reduce non-recyclable wastes generation.

<b>Credits</b>	<b>Criteria</b>	<b>Proposed Credit Points</b>
<b>5</b>	<b>Waste Management</b>	
<b>Credit 5.2</b>	<b>Non Hazardous Waste</b>	
	≥ 10% reduction in disposal of waste per unit of production	1
	≥ 20% reduction in disposal of waste per unit of production	2
	<b>Sub Total</b>	<b>2</b>

**Exemplary Performance**

This credit is not eligible for exemplary performance under Innovation Credit.

**Documentation Required**

1. Details of non hazardous waste management process exist at manufacturing unit
2. Details of non hazardous waste generated and disposed (quantity, reused, recycled, incinerated, etc.,) for the preceding 3 years.
3. Details of external recycler engaged for recycling non hazardous waste for the preceding 3 years.

## 6.0 Life Cycle Approach

### Credit 6.1: Life Cycle Assessment

**Points: 5**

#### Intent

Identify environmental impacts at every stage of the life cycle of solar photovoltaic module and implement measures to reduce environmental impacts.

#### Award of Points

Carryout life cycle analysis considering Gate to Gate as boundary condition by external agency or internal team, using a validated LCA tool and identify emission reduction strategies. Identified strategies shall be implemented for reducing the environmental impacts.

Credits	Criteria	Proposed Credit Points
<b>6</b>	<b>Life Cycle Approach</b>	
<b>Credit 6.1</b>	<b>Life Cycle Assessment</b>	
	Carry out life cycle analysis considering 'Cradle to Gate' as boundary condition and identify environmental reduction strategies.	2
	<b>Implementation of Strategies and Quantification of Benefits</b>	
	Strategies implemented $\geq 1$	1
	Strategies implemented $\geq 2$	2
	Strategies implemented $\geq 3$	3
	<b>Sub Total</b>	<b>5</b>

#### Exemplary Performance

This credit is eligible for exemplary performance under Innovation Credit, if the strategies implemented for reducing environmental impacts are exceeded the specified threshold limits.

#### Documentation Required

1. Life Cycle Assessment report with environmental impact reduction strategies identified and implemented as part of study and their benefits quantification.

## 7.0 Product Stewardship

Product stewardship advocates that all those involved in the life cycle of product must share responsibility for reducing its health and environmental impacts with producers bearing prime responsibility.

In the Green Product rating, Product Stewardship credit focuses on the following:

- Education and awareness program for the stakeholder on Green Products for reaping the intended benefits.
- Quality Management System (QMS) for minimizing the rejection rate after product dispatch.
- Extended producer responsibility to increase recycling rate and safer disposal at the end of product life.

The credit points are allotted for the focus areas as applicable for the individual product categories.

In case of solar photovoltaic module, all the three aspects such as stakeholder education and awareness, Quality Management System (QMS) for minimizing rejections after dispatch of products and extended producer responsibility are considered.

**Credit 7.1: Stakeholder Education and Awareness****Points: 2****Intent**

Educate those involved in handling the product at every stage post-dispatch, so as to reap the intended environmental benefits of the green product.

**Award of Points**

Solar photovoltaic module manufacturer to develop and implement stakeholder specific awareness and information sharing programmes for reaping the benefits of Green Products at every stage after dispatch of the product.

<b>Credits</b>	<b>Criteria</b>	<b>Proposed Credit Points</b>
<b>7</b>	<b>Product Stewardship</b>	
<b>Credit 7.1</b>	<b>Stakeholder Education and Awareness</b>	
	> 10% of people involved in handling the product after dispatch and users	1
	> 20% of people involved in handling the product after dispatch and users	2
<b>Sub Total</b>		<b>2</b>

**Exemplary Performance**

This credit is not eligible for exemplary performance under Innovation Credit.

**Documentation Required**

- Details of the stake holders specific awareness or information dissemination programmes about the Green Products, its features and their roles to reap the intended benefits
- Estimation of % of stakeholders covered on education and awareness program

**Credit 7.2: Quality Management System****Points: 1****Intent**

Reduce rejection rate of solar photovoltaic module after dispatch by implementing effective quality management system.

**Award of Points**

Establish a Quality Management System (QMS) for monitoring the quality of the product after dispatch till installation and identifying root causes. Develop corrective action and preventive action plan to reduce rejection rate after dispatch.

<b>Credits</b>	<b>Criteria</b>	<b>Proposed Credit Points</b>
<b>7</b>	<b>Product Stewardship</b>	
<b>Credit 7.2</b>	<b>Quality Management System</b>	
	Minimization of solar photovoltaic module rejection rate after dispatch	1
<b>Sub Total</b>		<b>1</b>

**Exemplary Performance**

This credit is not eligible for exemplary performance under Innovation Credit.

**Documentation Required**

- Details of Quality Management System implemented to bring down the rejection rate after the dispatch of the products.
- Details of rejection rate analysis carried out by the plant team.

**Credit 7.3: Extended Producer Responsibility****Points: 2****Intent**

Encourage manufacturers to institute a mechanism for product take-back for recycling or safe disposal at the end of useful life.

**Award of Points**

Establish a mechanism for solar photovoltaic module and packaging materials take-back at the end of life to promote circular economy by reusing or recycling them. Inventory on extended producer responsibility shall be maintained by the plant team to monitor the quantity of used products sent for recycling / safe disposal.

Manufacturer shall employ an environmentally friendly method to dispose of products that cannot be reused or recycled. The disposal method must comply with applicable acts & rules of the country.

<b>Credits</b>	<b>Criteria</b>	<b>Proposed Credit Points</b>
<b>7</b>	<b>Product Stewardship</b>	
<b>Credit 7.3</b>	<b>Extended Producer Responsibility</b>	
	Institute a system for product take-back at the end of useful life for recycling or safe disposal by encouraging the suppliers to give undertaking for facilitating solar PV module recycling	1
	Use green packaging or recycled for packaging materials take-back for reuse / recycle or use green packaging or recycled packaging	1
<b>Sub Total</b>		<b>2</b>

Green Packaging is

- Made of recycled content (post consumer / pre-consumer waste) or rapidly renewable materials (harvesting cycle is less than 10 years)  
(OR)
- Sourced, manufactured and transported in a resource efficient way (using production technologies and best practices) and with minimal environmental impacts.

**Exemplary Performance**

This credit is not eligible for exemplary performance under Innovation Credit.

**Documentation Required**

- Details of mechanism adopted for product and packaging materials take-back.
- Details of quantity of products and packaging materials taken back, and the quantity of products and packaging materials reused / recycled.

## 8.0 Innovation

### Credit 8.1: Product Innovation

**Points: 4**

#### Intent

Recognize initiatives that are not addressed in this Certification system but have a profound impact in protecting the environment

#### Award of Points

As part of the credit, the solar photovoltaic module manufacturer can apply for maximum four innovative measures. If the implemented measures meet any one of the following criteria can be considered as an innovative measure,

- Achieve significant and measurable environmental performance using a strategy not addressed in the GreenPro standard
- Any measure exceeding the threshold of the credits that are applicable for exemplary performance

Credits	Criteria	Proposed Credit Points
<b>8</b>	<b>Innovation</b>	
<b>Credit 8.1</b>	<b>Product Innovation</b>	
	<ul style="list-style-type: none"> <li>• Achieve significant and measurable environmental performance using a strategy not addressed in the GreenPro standard</li> <li>• Any measure exceeding the threshold of the credits that are applicable for exemplary performance</li> </ul>	4
<b>Sub Total</b>		<b>4</b>

#### Documentation Required

1. Details of innovative measures implemented highlighting the intent and benefits achieved.

## About CII

The Confederation of Indian Industry (CII) works to create and sustain an environment conducive to the development of India, partnering industry, Government, and civil society, through advisory and consultative processes. CII is a non-government, not-for-profit, industry-led and industry managed organization, playing a proactive role in India's development process. Founded in 1895, India's premier business association has around 9000 members, from the private as well as public sectors, including SMEs and MNCs, and an indirect membership of over 300,000 enterprises from around 265 national and regional sectoral industry bodies.

CII charts change by working closely with Government on policy issues, interfacing with thought leaders, and enhancing efficiency, competitiveness and business opportunities for industry through a range of specialized services and strategic global linkages. It also provides a platform for consensus-building and networking on key issues.

## About GPSC

The Green Products and Services Council was formed by CII-Sohrabji Godrej Green Business Centre, CII's Developmental Institute on Green Practices and Businesses. The objective of the council is to facilitate Green Product Market Transformation in India. The council is committee-based, member driven and consensus focused. The council involves all major stakeholders including Government, Product Manufacturers, Standard Developers, Conformity Agencies, Product Testing Laboratories and Academia.

The Green Products and Services Council presently offers GreenPro Certification which is a Type -1 Eco-label for Green Building Products, Materials and Technologies. The standards are developed based on consensus by Technical Committees involving all major stakeholders. The GreenPro certification has been accredited by Global Ecolabelling Network (GEN) based on international standard ISO 14024.

*For further details, please contact:*

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