Indian Green Building Council
Greening India since 2001

IGBC Green New Buildings

IGBC Green New Buildings Rating System

Version 3.0

Abridged Reference Guide

September 2014

Indian Green Building Council

Greening India since 2001

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Contents

Foreword from the Indian Green Building Council (IGBC)

India is witnessing tremendous growth in infrastructure and construction development. The construction industry in India is one of the largest economic activities and is growing at an average rate of 9.5% as compared to the global average of 5%. As the sector is growing rapidly, preserving the environment poses a host of challenges. To enable the construction industry environmentally sensitive, CII-Sohrabji Godrej Green Business Centre has established the Indian Green Building Council (IGBC). IGBC, is a consensus driven not-for-profit Council, represents the building industry, consisting of more than 1,923 committed members. The Council encourages, builders, developers, owners, architects and consultants to design & construct green buildings, thereby enhancing the economic and environmental performance of buildings.

The Green Building Movement in India has been spearheaded by IGBC since 2001, by creating awareness amongst the stakeholders. Thus far, the Council has been instrumental in enabling 2.23 Billion sq.ft of green buildings in the country. The Council's activities have enabled a market transformation with regard to green building materials and technologies.

IGBC continuously works to provide tools that facilitate the adoption of green building practices in India. The development of IGBC Green New Buildings rating system® is another important step in this direction.

Acknowledgements

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IGBC would like to thank the following Organisations for their participation and contribution in developing the rating programme:

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- Brigade Enterprises Limited
- C R Narayana Rao Architects & Engineers
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- Conserve Consultants Pvt Ltd
- Cushman & Wakefield India Pvt Ltd
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- Eagle Technology, Inc.
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- Ela Green Buildings & Infrastructure Consultants Pvt Ltd
- Environmental Building Consultants
- Essenn Architects
- Evershine Build India Pvt Ltd
- Fortis Healthcare Limited
- Fountain Head II
- Freespanz Design Build Pvt Ltd
- Ganesh Technical Consultancy Services
- Godrej & Boyce Mfg Co Ltd
- Greats
- Green Inertia
- GreenPath Energy & Sustainability Services
- GreenTree Building Energy Private Limited
- Hyderabad Industries Ltd
- Hyperion Green Energy India Pvt Ltd
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- IIIT, Hyderabad
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- K.Raheja Corp.
- Kaizen Design Solutions

- Kamal Cogent Energy Pvt Ltd
- Kanchan Infrastructures Ltd.
- Kerakoll India Pvt Ltd
- Kirby Building Systems India Ltd
- Kirloskar Brothers Limited
- Kohinoor Group
- LEAD Consultancy and Engineering Services (India) Private Limited
- Lloyd Insulations India Limited
- Lunkad Realty
- Mahindra Lifespace Developers Ltd
- Manohar Constructions
- Marvel realtors
- MC Design Consultants Pvt Ltd
- McD Built Environment Research Laboratory Pvt Ltd
- Murty & Manyam Architects & Engineers
- National Remote Sensing Centre (NRSC)
- National Institute Construction Management and Research, Hyderabad
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- Pidilite Industries Ltd
- Promac Advisors Pvt. Ltd.
- Prowin Health
- Pyrotek India Pvt.Ltd
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- Rudra Buildwell
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- Sandvik Asia Pvt Ltd
- Santrupti engineers
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- SGS India Private Limited
- Skyshade
- SMG Design Inc
- SNS Design'e Group
- Sobha Developers Ltd.
- SSJ Power Projects & Infrastructure Pvt Ltd
- Stanley Consultants India Pvt Ltd
- State Bank of Hyderabad
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- Supertech limited
- Surmount Energy Solutions Pvt Ltd
- Synergy Infra Consultants Pvt Ltd
- Taiba Engineering Consultants
- Tata Consultancy Services Limited
- Tata Motors
- The Tata Power Company Limited
- Transven
- TRIL Info Park
- United Access Floors Pvt Ltd
- United Engineering Corporation
- Universal Realtors Pvt Ltd
- V S Kukreja & Associates
- Venus Gas Products & Services (Mysore) Pvt Ltd
- VK:e environmental
- Wipro EcoEnergy
- Y T Enterprises

I. Introduction

The building sector in India is growing at a rapid pace and contributing immensely to the growth of the economy. This augurs well for the country and now there is an imminent need to introduce green concepts and techniques in this sector, which can aid growth in a sustainable manner.

The green concepts and techniques in the building sector can help address national issues like water efficiency, energy efficiency, reduction in fossil fuel use for commuting, handling of consumer waste and conserving natural resources. Most importantly, these concepts can enhance occupant health, productivity and well-being.

Against this background, the Indian Green Building Council (IGBC) has launched 'IGBC Green New Buildings rating system® to address the national priorities. This rating programme is a tool which enables the designer to apply green concepts and reduce environmental impacts that are measurable. The rating programme covers methodologies to cover diverse climatic zones and changing lifestyles.

IGBC has set up the Green New Buildings Core Committee under the leadership of Ar. Raghavendran, to develop the rating programme. This committee comprised of key stakeholders, including architects, builders, consultants, developers, owners, institutions, manufacturers and industry representatives. The committee, with a diverse background and knowledge has enriched the rating system, both in its content and process.

II. Benefits of Green New Buildings

Green New buildings can have tremendous benefits, both tangible and intangible. The most tangible benefits are the reduction in water and energy consumption right from day one of occupancy. The energy savings could range from 20 - 30 % and water savings around 30 - 50%. The intangible benefits of green new buildings include enhanced air quality, excellent daylighting, health & well-being of the occupants, safety benefits and conservation of scarce national resources.

III. National Priorities Addressed in the Rating System

The IGBC Green New Buildings rating system addresses the most important national priorities which include water conservation, handling waste, energy efficiency, reduced use of fossil fuels, lesser dependence on usage of virgin materials and health & well-being of occupants. The rating system requires the application of National standards and codes such as the NBC, ECBC, MoEF guidelines, CPCB guidelines, and several others. The overarching objective is to be better than the national standards so as to create new benchmarks.

❖ **Water Conservation:**

Most of the Asian countries are water stressed and in countries like India, the water table has reduced drastically over the last decade. IGBC Green New Buildings rating system encourages use of water in a self-sustainable manner through reduce, recycle and reuse strategies. By adopting this rating programme, green new buildings can save potable water to an extent of 30 - 50%.

❖ **Handling of Consumer Waste:**

Handling of waste in buildings is extremely difficult as most of the waste generated is not segregated at source and has a high probability of going to landfills. This continues to be a challenge to the municipalities which needs to be addressed. The rating system intends to address this by encouraging buildings to segregate the building waste.

❖ **Energy Efficiency:**

The building sector is a large consumer of electrical energy. Through IGBC Green New Buildings rating system, buildings can reduce energy consumption through energy efficient - building envelope, lighting, air conditioning systems, etc., The energy savings that can be realised by adopting this rating programme can be to the tune of 20 - 30%.

❖ **Reduced Use of Fossil Fuels:**

Fossil fuel is a slowly depleting resource, the world over. The use of fossil fuel for transportation has been a major source of pollution. The rating system encourages the use of alternate fuel vehicles for transportation.

❖ **Reduced Dependency on Virgin Materials:**

The rating system encourages projects to use recycled & reused material and discourages the use of virgin materials, thereby, addressing environmental impacts associated with extraction and processing of scare natural resources.

❖ **Health and Well-being of Occupants:**

Health and well-being of occupants are the most important aspect of IGBC Green New Buildings rating system. The rating system ensures adequate ventilation, daylight and occupant well-being facilities which are essential in a building. The rating system also recognises measures to minimise indoor air pollutants.

IV. IGBC Green New Buildings Rating System®

IGBC has set up the Green New Buildings Core Committee to develop the rating programme. This committee comprised of key stakeholders, including architects, builders, consultants, developers, owners, institutions, manufacturers and industry representatives. The committee, with a diverse background and knowledge has enriched the rating system, both in its content and process.

A. Features

IGBC Green New Buildings rating system® is a voluntary and consensus based programme. The rating system has been developed based on materials and technologies that are presently available. The objective of IGBC Green New Buildings rating system is to facilitate a holisitc approach to create environment friendly buildings, through architectural design, water efficiency, effective handling of waste, energy efficiency, sustainable buildings, and focus on occupant comfort & well-being.

The rating system evaluates certain mandatory requirements & credit points using a prescriptive approach and others on a performance based approach. The rating system is evolved so as to be comprehensive and at the same time user-friendly. The programme is fundamentally designed to address national priorities and quality of life for occupants.

Some of the unique aspects addressed in this rating system are as follows:

- Recognition for architectural excellence through integrated design approach.
- Recognition for passive architectural features.
- Structural design optimisation with regard to steel and cement. This is a developmental credit. Projects are encouraged to attempt this credit, so as to help IGBC in developing baselines for future use.
- Water use reduction for construction. This is also a developmental credit.
- Based on the feedback from green building proponents, use of certified green products will be encouraged. IGBC has launched a new initiative to certify green products to transform markets. Products would be evaluated right from extraction to disposal.
- Handholding from IGBC Counsellors will now be available for the projects.
- A site visit and audit is proposed before award of the rating.
- Projects are encouraged to report energy and water consumption data on an annual basis, to facilitate research in this area.

B. Scope

IGBC Green New Buildings rating system® is designed primarily for new buildings, both for air-conditioned and non air-conditioned buildings. New Buildings include (but are not limited to) offices, IT parks, banks, shopping malls, hotels, hospitals, airports, stadiums, convention centers, educational institutions (colleges, universities), libraries, museums, etc., Building types such as residential, factory buildings, schools, integrated townships will be covered under other IGBC rating programmes.

IGBC Green New Buildings rating system is broadly classified into two types:

1) **Owner-occupied buildings** are those wherein 51% or more of the building's built-up area is occupied by the owner.

2) **Tenant-occupied buildings** are those wherein 51% or more of the building's built-up area is occupied by the tenants.

Based on the scope of work, projects can choose any of the above options.

C. The Future of IGBC Green New Buildings Rating System

Many new green building materials, equipment and technologies are being introduced in the market. With continuous up-gradation and introduction of new green technologies and products, it is important that the rating programme also keeps pace with current standards and technologies.

Therefore, the rating programme will undergo periodic revisions to incorporate the latest advancement and changes. It is important to note that project teams applying for IGBC Green New Buildings rating system® should register their projects with the latest version of the rating system. During the course of implementation, projects have an option to transit to the latest version of the rating system.

IGBC will highlight new developments on its website (www.igbc.in).

V. Overview and Process

IGBC Green New Buildings rating system® addresses green features under the following categories:

- ❖ Sustainable Architecture and Design
- ❖ Site Selection and Planning
- ❖ Water Conservation
- ❖ Energy Efficiency

- ❖ Building Materials and Resources
- ❖ Indoor Environmental Quality
- ❖ Innovation and Development

The guidelines detailed under each mandatory requirement & credit enables the design and construction of new buildings of all sizes and types (as defined in scope). Different levels of green building certification are awarded based on the total credits earned. However, every green new building should meet certain mandatory requirements, which are non-negotiable.

The various levels of rating awarded are as below:

Certification Level	Recognition
Certified	Good Practices
Silver	Best Practices
Gold	Outstanding Performance
Platinum	National Excellence
Super Platinum	Global Leadership

A. When to use IGBC Green New Buildings Rating System ®

IGBC Green New Buildings rating system® is designed primarily for New Buildings (owner-occupied and tenant-occupied).

The project team can evaluate all the possible points to apply under the rating system using a suitable checklist (Owner-occupied buildings and Tenant-occupied buildings). The project can apply for IGBC Green New Buildings rating system® certification, if the project can meet all mandatory requirements and achieve the minimum required points.

B. Registration

Organisations interested in registering their projects under IGBC Green New Buildings rating system Certification are advised to first register on IGBC website (www.igbc.in) under 'IGBC Green New Buildings Rating System' tab. The website includes information on registration fee for IGBC member companies as well as non-members.

Registration is the first step which helps establish initial contact with IGBC and provides access

to the required documents, templates, important communications and along with other necessary information.

IGBC website provides all important details on IGBC Green New Buildings rating system® registration & certification - process, schedule and fee.

C. Certification

To achieve the IGBC Green New Buildings rating, the project must satisfy all the mandatory requirements and the minimum number of credit points.

The project team is expected to provide supporting documents at preliminary and final stage of submission, for all the mandatory requirements and the credits attempted.

The project needs to submit the following:

1. General information about project, including
    a. Project brief stating project type, different type of spaces, occupancy, number of floors, area statement, etc.,
    b. General drawings (in PDF format only):
        i. Master/ Site plan
        ii. Parking plans
        iii. Floor plans
        iv. Elevations
        v. Sections
    c. Photographs / Rendered images
2. Filled-in templates
3. Narratives and supporting documentation such as drawings, calculations (in excel sheets), declarations / contract documents, purchase invoices, manufacturer cut-sheets / letters / material test reports, etc., for each mandatory requirement and credit.

The project documentation is submitted in two phases - Preliminary submittal and Final submittal:

- Preliminary phase involves submission of all documents, which shall include the mandatory requirements and the minimum number of credits. After the preliminary submission, review is done by third party assessors and review comments would be provided within 30 days.

- The next phase involves submission of clarifications to preliminary review queries and final submittal. This review will also be provided within 30 days, after which the rating is awarded.

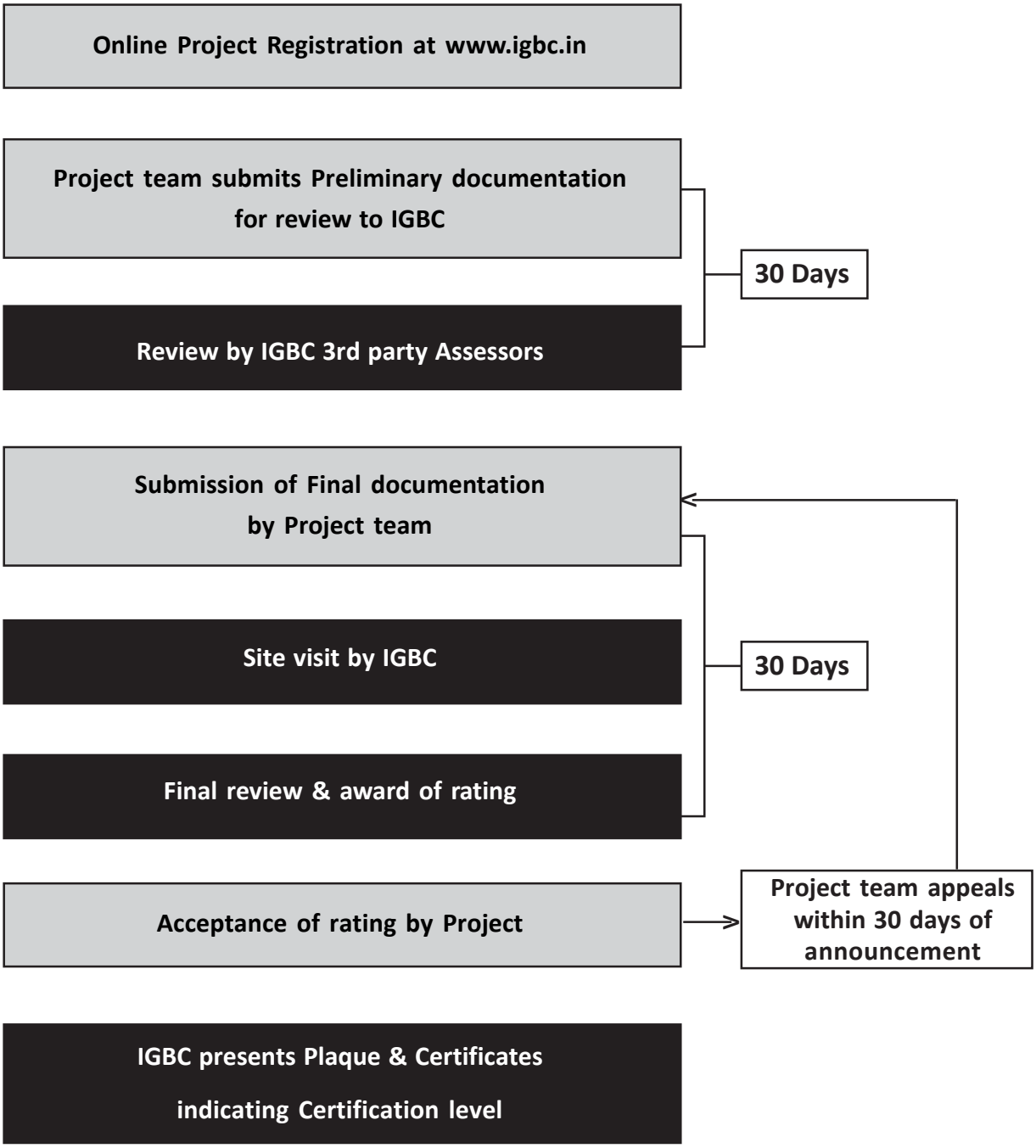
It is important to note that the mandatory requirements and credits earned at the preliminary review are only considered as expected. These mandatory requirements and credits are not awarded until the final documents are submitted, along with additional documents showing implementation of design features. If there are changes in any 'expected credits' after preliminary review, these changes need to be documented and resubmitted during the final review.

The threshold criteria for certification levels are as under:

Certification Level	Owner-occupied Buildings	Tenant-occupied Buildings	Recognition
Certified	50 – 59	50 – 59	Good Practices
Silver	60 – 69	60 – 69	Best Practices
Gold	70 – 79	70 – 79	Outstanding Performance
Platinum	80 – 89	80 – 89	National Excellence
Super Platinum	90 - 100	90 - 100	Global Leadership

IGBC will recognise Green New Buildings that achieve one of the rating levels with a formal letter of certification and a mountable plaque.

Certification Process



D. Precertification

Projects (Tenant - occupied Buildings)by developers can register for Precertification. This is an option provided for projects aspiring to get precertified at the design stage. Precertification also gives the developer a unique advantage to market the project to potential buyers.

The documentation submitted for precertification must detail the project design features which will be implemented. The rating awarded under precertification is based on the project's intention to conform to the requirements of IGBC Green New Buildings rating system®. It is important to note that the precertification rating awarded need not necessarily correspond to the final rating.

Precertified projects are required to provide the status of the project to IGBC, in relation to the rating, once in every six months until the award of the final rating.

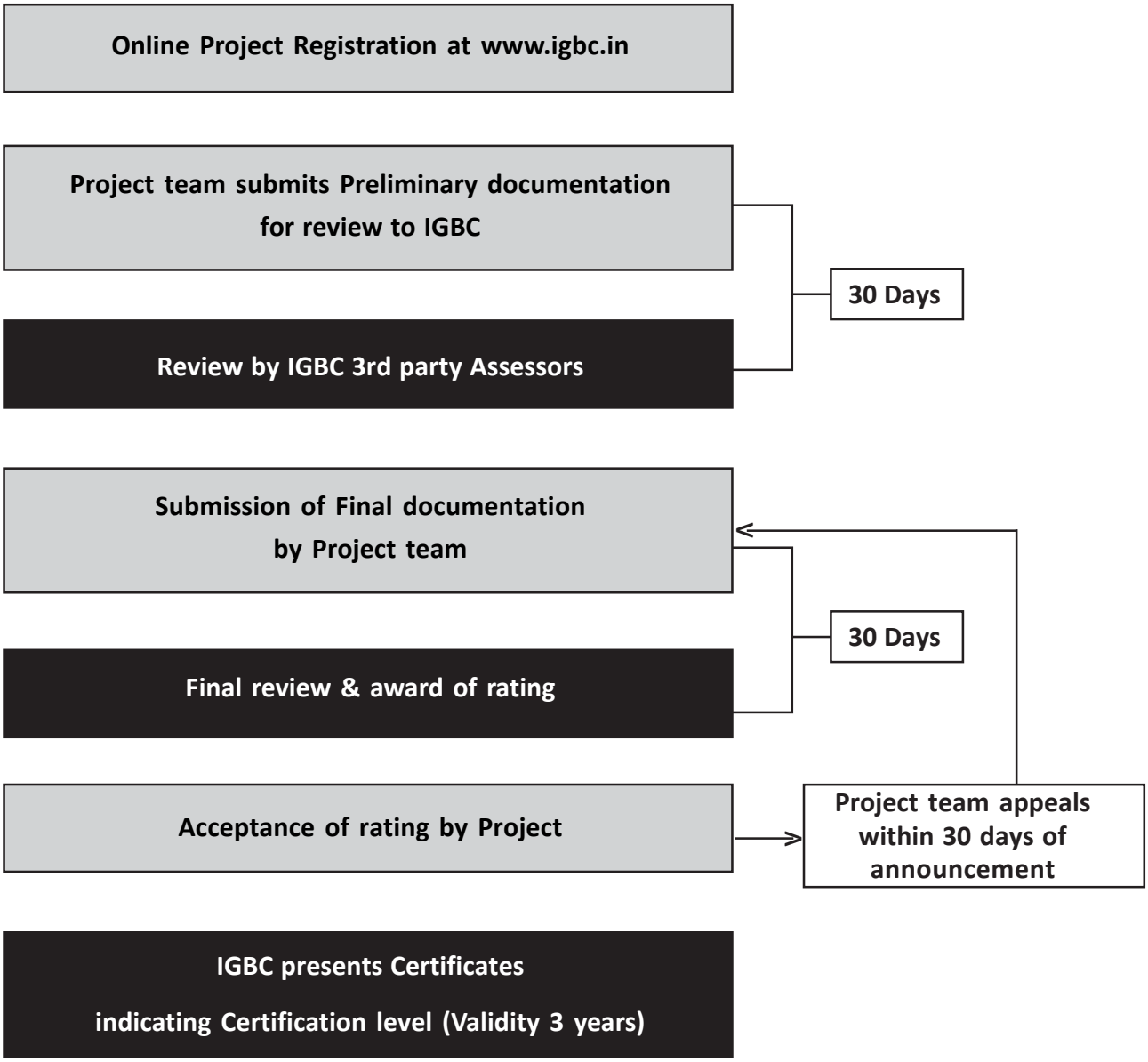
Those projects which seek precertification need to submit the following documentation:

1. General information about project, including
    a. Project brief stating project type, different type of spaces, occupancy, number of floors, area statement, etc.,
    b. General drawings (in PDF format only):
        1. Master/ Site plan
        2. Parking plans
        3. Floor plans
        4. Elevations
        5. Sections
    c. Photographs/ Rendered views
2. Filled-in templates
3. Narratives and supporting documentation such as conceptual drawings, estimate / tentative calculations (in excel sheets), declarations from the owner, etc., for each of the mandatory requirement and credit

IGBC would take 30 days to review the first set of precertification documents. On receiving the clarifications posed in the first review, IGBC would take another 30 days to award the precertification.

A certificate and a letter are provided to projects on precertification.

Precertification Process



The Precertification is valid for 3 years from the date of award, after which projects are Projects by developers can register for Precertification. This is an option provided for projects required to apply for the full certification (or) submit construction progress reports once in six months to get an extension certificate for Precertification rating.

Note **:**

- *Projects (Owner-occupid Buildings) applying for MoEF clearance can apply for Provisional Certification. The Provisional Certification process will be same as Precertification process.*

E. Credit Interpretation Ruling (CIR)

In some instances, there is a possibility that the design team may encounter certain challenges in applying or interpreting a mandatory requirement or a credit. It can also happen in cases where the project can opt to achieve the same intent through a different compliance route.

To address this, IGBC uses the process of Credit Interpretation Ruling (CIR) to ensure that interpretations are consistent and applicable to other projects as well.

The following are the steps to be followed in case the project team encounters any difficulty:

- ❖ Refer the Abridged Reference Guide for description of the credit intent and compliance options.
- ❖ Review the intent of the mandatory requirement / credit and self-evaluate whether the project satisfies the intent.
- ❖ Review the Credit Interpretation Ruling web page for previous CIRs on the relevant mandatory requirement or credit. All projects registered under IGBC Green New Buildings rating system will have access to this page.
- ❖ If a similar CIR has not been addressed or does not answer the question sufficiently, submit a credit interpretation request. Only registered projects are eligible to post credit interpretation request. Two CIRs are answered without levying any fee, and for any CIR beyond the first two CIRs, a fee is levied.

F. Appeal

In rare cases, mandatory requirements / credits get denied due to misinterpretation of the intent. On receipt of the final review and if the project team feels that sufficient grounds exist to appeal a credit denied in the final review, the project has an option to appeal to IGBC for

reassessment of denying mandatory requirements / credits. The documentation of the mandatory requirements / credits seeking appeal may be resubmitted to IGBC along with necessary fees. IGBC will take 30 days to review such documentation. If an appeal is pursued, please note that a different review team will be assessing the appeal documentation. The following documentation should be submitted:

1. General information about project, including
    a. Project brief stating project type, different type of spaces, occupancy, number of floors, area statement, etc.,
    b. General drawings (in PDF format only):
        i. Master/ Site plan
        ii. Parking plans
        iii. Floor plans
        iv. Elevations
        v. Sections
    c. Photographs / Rendered views
2. Filled-in templates for respective mandatory requirement / credit.
3. Resubmittal and appeal submittal documentation for only those mandatory requirements / credits that the project is appealing for. Also, include a narrative for each appealed mandatory requirement / credit to describe how the documents address the reviewers comments and concerns.

G. Fee

Registration, Precertification / Provisional Certification, Certification and CIR fee details are available on the IGBC website (www.igbc.in) or can be obtained from IGBC (igbc@cii.in).

H. Updates and Addenda

As the rating system continues to improve and evolve, updates, addenda and errata to the abridged reference guide will be made available through IGBC website. The additions thereof will be suitably incorporated in the next version of the rating system.

IGBC Green New Buildings Rating System Checklist		Points Available	
		Owner-occupied Buildings	Tenant-occupied Buildings
Modules		**100**	**100**
Sustainable Architecture and Design		**5**	**5**
SA Credit 1	Integrated Design Approach	1	1
SA Credit 2	Site Preservation	2	2
SA Credit 3	Passive Architecture	2	2
Site Selection and Planning		**14**	**14**
SSP Mandatory Requirement 1	Local Building Regulations	Required	Required
SSP Mandatory Requirement 2	Soil Erosion Control	Required	Required
SSP Credit 1	Basic Amenities	1	1
SSP Credit 2	Proximity to Public Transport	1	1
SSP Credit 3	Low-emitting Vehicles	1	1
SSP Credit 4	Natural Topography or Vegetation	2	2
SSP Credit 5	Preservation or Transplantation of Trees	1	1
SSP Credit 6	Heat Island Reduction, Non-roof	2	2
SSP Credit 7	Heat Island Reduction, Roof	2	2
SSP Credit 8	Outdoor Light Pollution Reduction	1	1
SSP Credit 9	Universal Design	1	1
SSP Credit 10	Basic Facilities for Construction Workforce	1	1
SSP Credit 11	Green Building Guidelines	1	1
Water Conservation		**18**	**19**
WC Mandatory Requirement 1	Rainwater Harvesting, Roof & Non-roof	Required	Required
WC Mandatory Requirement 2	Water Efficient Plumbing Fixtures	Required	Required
WC Credit 1	Landscape Design	2	2
WC Credit 2	Management of Irrigation Systems	1	1
WC Credit 3	Rainwater Harvesting, Roof & Non-roof	4	4
WC Credit 4	Water Efficient Plumbing Fixtures	5	5
WC Credit 5	Wastewater Treatment and Reuse	5	5
WC Credit 6	Water Metering	1	2

Modules		Points Available	
		Owner-occupied Buildings	Tenant-occupied Buildings
Energy Efficiency		**28**	**28**
EE Mandatory Requirement 1	Ozone Depleting Substances	Required	Required
EE Mandatory Requirement 2	Minimum Energy Efficiency	Required	Required
EE Mandatory Requirement 3	Commissioning Plan for Building Equipment & Systems	Required	Required
EE Credit 1	Eco-friendly Refrigerants	1	1
EE Credit 2	Enhanced Energy Efficiency	15	15
EE Credit 3	On-site Renewable Energy	6	6
EE Credit 4	Off-site Renewable Energy	2	2
EE Credit 5	Commissioning, Post-installation of Equipment & Systems	2	2
EE Credit 6	Energy Metering and Management	2	2
Building Materials and Resources		**16**	**16**
BMR Mandatory Requirement 1	Segregation of Waste, Post-occupancy	Required	Required
BMR Credit 1	Sustainable Building Materials	8	8
BMR Credit 2	Organic Waste Management, Post-occupancy	2	2
BMR Credit 3	Handling of Waste Materials, During Construction	1	1
BMR Credit 4	Use of Certified Green Building Materials, Products & Equipment	5	5
Indoor Environmental Quality		**12**	**11**
IEQ Mandatory Requirement 1	Minimum Fresh Air Ventilation	Required	Required
IEQ Mandatory Requirement 2	Tobacco Smoke Control	Required	Required
IEQ Credit 1	CO_2 Monitoring	1	1
IEQ Credit 2	Daylighting	2	2
IEQ Credit 3	Outdoor Views	1	1

Modules		Points Available	
		Owner-occupied Buildings	Tenant-occupied Buildings
IEQ Credit 4	Minimise Indoor and Outdoor Pollutants	1	1
IEQ Credit 5	Low-emitting Materials	3	3
IEQ Credit 6	Occupant Well-being Facilities	1	-
IEQ Credit 7	Indoor Air Quality Testing, After Construction and Before Occupancy	2	2
IEQ Credit 8	Indoor Air Quality Management, During Construction	1	1
Innovation and Development		**7**	**7**
ID Credit 1	Innovation in Design Process	4	4
ID Credit 2	Optimisation in Structural Design	1	1
ID Credit 3	Waste Water Reuse, During Construction	1	1
ID Credit 4	IGBC Accredited Professional	1	1

The threshold criteria for certification levels are as under:

Certification Level	Owner-occupied Buildings	Tenant-occupied Buildings	Recognition
Certified	50 - 59	50 - 59	Good Practices
Silver	60 - 69	60 - 69	Best Practices
Gold	70 - 79	70 - 79	Outstanding Performance
Platinum	80 - 89	80 - 89	National Excellence
Super Platinum	90 - 100	90 - 100	Global Leadership

Sustainable Architecture and Design

Integrated Design Approach

SA Credit 1 Points: 1

Intent:

Encourage integrated design approach to construct a high performance building, thereby reducing negative environmental impacts.

Compliance Options:

Demonstrate that the project has involved team members from multi-disciplinary fields for effective decision-making and enhanced building performance, right from conceptual stage till completion of the project.

- Ensure that the project owner involves the following project team members, as applicable, at each stage of the project:

  Architect, Commissioning Authority, Energy Modeler, Facility Managers, General Contractor, Green Building Consultant, Interior Designer, Landscape Architect, MEP Consultant, Project Management Consultant, Structural Consultant, and other project team members.

- Document at least three project meetings at different stages of the project.

Exemplary Performance:

This credit is not eligible for exemplary performance.

Site Preservation

SA Credit 2 Points: 2

Intent:

Encourage retaining the site features to minimise site damage and associated negative environmental impacts.

Compliance Options:

Demonstrate that the project complies with at least two of the following measures:
(1 point for each measure; maximum 2 points)

- **Site Contour:**

  Retain site contour to an extent of at least 50% of the site, including building footprint.

- **Water Bodies and Channels:**

  Retain 100% of water bodies and channels existing on the site.

- **Natural Rocks:**

  Retain at least 50% of natural rocks, excluding building footprint.

- **Existing Topography / Landscape:**

  Retain at least 10% of the existing topography / landscape, without any disturbance whatsoever.

- **Existing Trees:**

  Design to integrate trees with new development, so as to preserve 75% of existing trees.

Exemplary Performance:

This credit is not eligible for exemplary performance.

Passive Architecture

SA Credit 3 Points: 2

Intent:

Adopt passive architectural design features to minimise negative environmental impacts.

Compliance Options:

❖ **Option 1: Simulation Approach**

Demonstrate that the passive architecture measures implemented in the project has resulted in at least 2% energy savings of total annual energy consumption (through whole building simulation approach).

The approach shall address the following aspects, but not limited to:

- Climate-responsive concepts and design features

  (Eg: orientation, skylights, light wells, courtyard, shaded corridors, shading devices, shading from trees & adjacent buildings, pergolas, punched windows, extended louvers, horizontal and vertical landscaping)

- Passive cooling / heating technologies

  (Eg: wind tower, earth tunnel, geothermal technologies)

Points are awarded as below:

Percentage of Energy Savings achieved through Passive Architecture	Points
≥ 2%	1
≥ 4%	2

❖ **Option 2: Prescriptive Approach**

Demonstrate that the project has implemented at least one of the following passive measures that result in energy savings: *(1 point for each measure; maximum 2 points)*

- **Exterior Openings:**

  At least 80% of the exterior openings (fenestration) have a Projection Factor* of 0.5 or more

  **Projection Factor is a ratio of the length of overhang projection divided by height from window sill to the bottom end of the overhang (must be permanent)*

- **Skylights:**

  At least 5% of roof area have skylights

- **Daylighting:**

  50 % of the regularly occupied spaces with daylight illuminance levels for a minimum of 110 Lux (and a maximum of 1,100 Lux) in a clear sky condition on 21st September at 12 noon, at working plane (through simulation or measurement approach)

- **Passive Cooling / Heating Technologies:**

  (Eg: wind tower, earth tunnel, geothermal technologies)

- **Any other passive measures**

Exemplary Performance:

This credit is not eligible for exemplary performance.

Site Selection and Planning

Local Building Regulations

SSP Mandatory Requirement 1

Intent:

Ensure that the building complies with necessary statutory and regulatory codes.

Compliance Options:

The project shall comply with following statutory approvals from the Government of India or State Government authorities, as applicable:

- ❖ Approved site plan (and/ or) building plans for construction, as applicable
- ❖ Fit-for-occupancy Certificate

Notes:

- *Buildings with 20,000 sq.m built-up area or more shall submit 'Environmental Clearance Certificate' or 'Environmental Impact Assessment (EIA) Study Report', as applicable, approved by Ministry of Environment & Forests (MoEF) or State Environment Impact Assessment Authority (SEIAA) to show compliance for certification.*
- *Projects awaiting 'Fit-for-occupancy Certificate' can submit an acknowledgement letter / proof of submission received from concerned Government authority stating that 'Fit-for-occupancy' requisition is under process.*

Soil Erosion Control

SSP Mandatory Requirement 2

Intent:

Control soil erosion and sedimentation, thereby, reducing negative impacts to the site and surroundings.

Compliance Options:

Implement the following measures, as applicable:

- ❖ Soil erosion control measures taken before construction and during construction must conform to the best management practices highlighted in the National Building Code (NBC) of India 2005, Part 10, Section 1, Chapter 4 - Protection of Landscape during Construction and Chapter 5 - Soil and Water Conservation.
- ❖ Fertile topsoil to be stockpiled prior to construction, for future reuse or donation.
- ❖ Develop appropriate measures to address soil erosion, after occupancy.

Note:

- *If the top soil (10-20 cm) in the project is not fertile (or) suitable for preservation, in such a case the project may provide relevant justification.*

Basic Amenities

SSP Credit 1 Points: 1

Intent:

Provide access to basic amenities, so as to reduce negative impacts caused from automobile use.

Compliance Options:

Select a site with access to at least seven basic amenities, within a walking distance of 1 km from the building entrance.

List of Basic Amenities:

- ATM / Bank
- Clinic / Hospital
- Crèche / School
- Grocery store / Supermarket
- Laundry / Dry cleaners
- Park / Garden
- Pharmacy
- Post office / Courier service
- Restaurant / Cafeteria
- Service apartment / Hotel
- Sports club / Fitness center / Gym
- Theatre
- Utility bill payment center (Electricity / Water)

Notes:

- *The basic amenities shall be functional at the time of project completion.*
- *All amenities are to be considered only once.*
- *The amenities shall be accessible to building occupants and other users of the building.*
- *Basic amenities within the campus can also be considered to show compliance.*

- *For campus projects with multiple buildings, the compliance for basic amenities can be shown through one or a combination of the following criteria:*
  - o *From center of the campus / zone*
  - o *From entrance of the campus / zone*

Exemplary Performance:

This credit is not eligible for exemplary performance.

Proximity to Public Transport

SSP Credit 2 Points: 1

Intent:

Encourage use of public transport, so as to reduce negative impacts caused from automobile use.

Compliance Options:

❖ **Option 1: Public Transport**

Locate the building within 800 meters walking distance from an intra-city railway station (or) a bus-stop (or) other modes of public transport.

Note:

- *For campus projects with multiple buildings, the compliance can be shown from the entrance of the campus/ zone.*

❖ **Option 2: Shuttle Service**

The project can operate or have a contract in place for shuttle services (from / to the nearest intra-city railway station or bus-stop), for the building occupants and visitors.

Exemplary Performance:

This credit is not eligible for exemplary performance.

Low-emitting Vehicles

SSP Credit 3 Points: 1

Intent:

Encourage the use of non-fossil fuel vehicles, thereby reducing negative impacts resulting from fossil fuel based automobiles.

Compliance Options:

Use electric vehicles or Compressed Natural Gas (CNG) powered vehicles within the site, to cater at least 5% of the building occupants (excluding visitors). Also, designate preferred parking spaces for such vehicles within the site.

Additionally, the project shall comply with the following, as applicable:

- Electric Vehicles: If the project is providing electric vehicles, electric charging facilities shall be installed within project parking area to cater to the electric vehicles.
- CNG-powered Vehicles: If the project is providing CNG-powered vehicles, at least one CNG filling station shall be available within 5 km distance from the project campus entrance.

Note:

- *Preferred parking spaces refer to the spaces that are easily accessible to the building entrance.*

Exemplary Performance:

This credit is not eligible for exemplary performance.

Natural Topography or Vegetation

SSP Credit 4 **Points: 1-2**

Intent:

Minimise disturbances or restore the site so as to reduce long-term negative environmental impacts, thereby promoting habitat and biodiversity.

Compliance Options:

❖ **Option 1: Natural Topography and/or Vegetation**

Avoid disturbance to the site by retaining natural topography (and/ or) design vegetated spaces on the ground, for at least 15% of the site area.

Points are awarded as below:

Percentage of Site Area with Natural Topography and/or Vegetated Area	Points
≥ 15%	1
≥ 20%	2

Notes:

- *Retaining 'Natural Topography' in its broad sense means preserving the natural features of the terrain such as exposed natural rocks, water body, etc.,*
- *Vegetation on the ground shall only be considered; vegetation over built structures such as roofs, basement, podiums, etc., shall not be considered.*
- *Grass medians, grass pavers, jogging track, open-air theatre, parking areas, driveways, walkways, playground, swimming pool, etc., are considered as site disturbances.*
- *Only native / adaptive vegetation shall be considered for this credit calculation.*
- *Potted plants shall not be considered as vegetation.*
- *Artificial vegetation shall not be considered for this credit calculation.*

❖ **Option 2: Vegetation over Built Structures**

Restore disturbed site area by designing vegetated spaces over built structures and on the ground, for at least 30% of the site area (including development footprint).

Points are awarded as below:

Percentage of Site Area with Vegetation over built structures and on the ground	Points
≥ 30%	1
≥ 40%	2

Notes:

- *Development footprint includes building footprint and other hardscapes areas such as parking, footpaths, walkways, roads, grass medians, grass pavers, etc.,*
- *Vegetation on the ground as well as vegetation over built structures such as roofs, basement, podiums, etc., can be considered.*
- *Partially vegetated areas and disturbed site areas such as grass pavers, grass medians, jogging track, open-air theatre, playground, is considered as site disturbances and shall not be considered.*
- *Only native / adaptive vegetation shall be considered for this credit calculation.*
- *Potted plants shall not be considered as vegetation.*
- *Artificial vegetation shall not be considered.*

Exemplary Performance:

The project is eligible for exemplary performance under ID Credit 1 - Innovation in Design Process, if:

❖ More than 25% of the site area is left undisturbed (i.e. retained with the natural topography and/ or vegetated).

(Or)

❖ More than 50% of the site area (including development footprint) is restored by designing vegetated spaces over built structures and on the ground.

Preservation or Transplantation of Trees

SSP Credit 5 Points: 1

Intent:

Preserve existing fully grown trees and plant new tree saplings, so as to promote habitat and biodiversity.

Compliance Options:

❖ **Case 1: Preservation or Transplantation of Existing Trees**

Preserve or transplant at least 75% of existing fully grown trees within the project site / campus.

Notes:

- *Projects which cannot comply with 'Case* 1*' above can show compliance through 'Case 2' highlighted below.*
- *If the Ministry of Environment & Forest (MoEF) or local authorities prescribe stringent criteria, then the project shall comply with the respective criteria.*

(AND)

❖ **Case 2: Plantation of Tree Saplings**

Plant tree saplings that can mature into fully grown up trees within the next 5 years on the project site, as per the below criteria (including existing and transplanted trees in the project site).

Table 1 - Criteria for Plantation of Tree Saplings
(Including existing and transplanted trees)

Site Area (Including development footprint)	Number of Tree Saplings (Including Existing and Transplanted Trees)
≤ 1 Acre	8 or more
> 1 Acre	12 per Acre or more

Notes:

- *Trees/ Saplings shall be in place at the time of occupancy.*
- *Trees transplanted from other sites to the project site can also be considered to show credit compliance under 'Case-2'.*
- *Calculation of existing fully grown trees (and / or) tree saplings on prorate basis is allowed to show credit compliance.*
- *Only native / adaptive trees and tree saplings shall be considered for this credit calculation.*
- *Trees / Saplings planted in pots shall not be considered for credit calculations.*
- *Development footprint includes building footprint and other hardscapes areas such as parking, footpaths, walkways, roads, grass medians, grass pavers, etc.,*

Exemplary Performance:

This credit is not eligible for exemplary performance.

Heat Island Reduction, Non-roof

SSP Credit 6 Points: 1-2

Intent:

Minimise heat island effect so as to reduce negative impact on micro-climate.

Compliance Options:

❖ **Option 1:**

Provide one or combination of the following, for at least 50% of exposed non-roof impervious areas within the project site:

- Shade from existing tree cover/ newly planted saplings within 5 to 8 years of planting
- Open grid pavers or grass pavers
- Hardscape materials (including pavers) with SRI of at least 29 (and not higher than 64)

Points are awarded as below:

Non-roof Impervious Area as a Percentage of Total Non-roof Area	Points
≥ 50%	1
≥ 75%	2

Notes:

- *Non-roof impervious areas include, but not limited to, footpaths, pathways, roads, driveways, uncovered surface parking, and other impervious areas.*
- *Trees / Saplings shall be in place at the time of occupancy.*
- *SRI values of reflectance materials shall be as per ASTM Standards.*
- *SRI materials that are certified by IGBC under Green Product Certification Programme or by a third party agency approved by IGBC, can be used by the project to show compliance.*

❖ **Option 2:**

Provide at least 75% of the parking under cover.

Note:

- *The exposed roof of the parking shall meet 'Heat Island Effect - Roof' criteria*.

Exemplary Performance:

This credit is eligible for exemplary performance under ID Credit 1 - Innovation in Design Process, if more than 95% of exposed non-roof impervious areas are under tree cover (and / or) with open grid pavers / grass pavers (and / or) hardscape materials with an SRI of at least 29 (and not higher than 64).

Heat Island Reduction, Roof

SSP Credit 7 Points: 1-2

Intent:

Minimise heat island effect so as to reduce negative impact on micro-climate.

Compliance Options:

❖ **Option 1: High Reflective Materials**

Use material with a high solar reflective index to cover at least 75% of the exposed roof area, including covered parking.

Note:

- *Material with high solar reflectance index (SRI) include white / light colored china mosaic tiles or white cement tiles or other high reflective materials / coatings.*

Minimum Solar Reflective Index (SRI) values for different roof types are provided below:

Table 2 - Solar Reflective Index (SRI) values for different roof types

Roof Type	Slope	Minimum SRI Value
Low-sloped roof	≤ 2:12	78
Steep-sloped roof	> 2:12	29

Points are awarded as below:

Percentage of roof area covered with High Reflective Material	Points
≥ 75%	1
≥ 95%	2

(OR)

❖ **Option 2: Vegetation**

Provide vegetation to cover at least 50% of the exposed roof area, including covered parking.

Points are awarded as below:

Percentage of roof area covered with Vegetation	Points
≥ 50%	1
≥ 75%	2

(OR)

❖ **Option 3: Combination High Reflective Materials and Vegetation**

Install combination of high reflective materials and vegetation to cover at least 75% of the exposed roof area, including covered parking.

Points are awarded as below:

Percentage of roof area covered with High Reflective Materials and Vegetation	Points
≥ 75%	1
≥ 95%	2

Notes:

- *All roof areas, including podium, covered surface parking and utility blocks, which are exposed to the sky (at and above ground level) shall be considered for this credit calculation.*
- *Exposed roof area need not include equipment platforms, areas covered with solar photovoltaic & solar water heaters, skylights, water body, driveways, pathways, roads, play areas etc.,*
- *Artificial vegetation shall not be considered.*

- *SRI values of high reflectance materials shall be as per ASTM Standards. China mosaic tiles are exempted from showing SRI value.*
- *SRI materials that are certified by IGBC under Green Product Certification Programme or by a third party agency approved by IGBC, can be used by the project to show compliance.*
- *Pavers installed over basement shall have SRI of at least 29 (and not higher than 64).*

Exemplary Performance:

The project is eligible for exemplary performance under ID Credit 1 - Innovation in Design Process, if more than 95% of the exposed roof area is covered with vegetation.

Outdoor Light Pollution Reduction

SSP Credit 8 Points: 1

Intent

Reduce light pollution to increase night sky access and enhance the nocturnal environment.

Compliance Options:

❖ **Option 1: Prescriptive Approach**

➢ Upward Lighting:

Design exterior lighting such that no external light fixture emits more than 5% of the total initial designed fixture Lumens, at an angle of 90 degrees or higher from nadir (straight down).

(AND)

➢ Lighting Power Density:

The lighting power density should be reduced by 30% for building facades and exterior areas vis-à-vis the ASHRAE Standard 90.1-2010 baselines, Section 9.4.3 - Exterior Building Lighting Power (tradable & non-tradable surfaces).

Notes:

- *Total initial designed fixture Lumens shall be based on the sum total of all fixtures installed on site.*
- *Classify the project under one of the lighting zones, as defined in ASHRAE Standard 90.1-2010, and follow all the requirements of the respective zone. The justification shall be provided for the selected lighting zone.*
- *Exterior light fixtures that are certified by IGBC under Green Product Certification Programme or by a third party agency approved by IGBC can be used by the project to show compliance.*

❖ **Option 2: Simulation Approach**

➢ Upward Lighting:

Design exterior lighting such that all site and building-mounted luminaires produce a maximum initial illuminance values, as defined in ASHRAE Standard 90.1-2010.

(AND)

➢ Lighting Power Density:

The lighting power density should be reduced by 30% for building facades and exterior areas vis-à-vis the ASHRAE Standard 90.1-2010 baselines, Section 9.4.3 - Exterior Building Lighting Power (tradable & non-tradable surfaces).

Notes:

- *Classify the project under one of the lighting zones, as defined in ASHRAE Standard 90.1-2010, and follow all the requirements of the respective zone. The justification shall be provided for the selected lighting zone.*
- *Exterior light fixtures that are certified by IGBC under Green Product Certification Programme or by a third party agency approved by IGBC can be used by the project to show compliance.*

LZ1: Dark (Developed Areas of National Parks, State Parks, Forest Land and Rural Areas)

Design exterior lighting so that all site and building-mounted luminaires produce a maximum initial illuminance value no greater than 0.01 horizontal and vertical footcandles (0.1 horizontal and vertical Lux) at the site boundary and beyond. Document that 0% of the total initial designed fixture Lumens (sum total of all fixtures on site) are emitted at an angle of 90 degrees or higher from nadir (straight down).

LZ2: Low (Areas predominantly consisting of residential zones, neighborhood business districts, light industrial areas with limited night time use and residential mixed-use areas)

Design exterior lighting so that all site and building-mounted luminaires produce a maximum initial illuminance value no greater than 0.1 horizontal and vertical footcandles (1.0 horizontal and vertical Lux) at the site boundary and no greater than 0.01 horizontal footcandles (0.1 horizontal Lux) 10 feet (3 meters) beyond the site boundary. Document that no more than 2% of the total initial designed fixture Lumens (sum total of all fixtures on site) are emitted at an angle of 90 degrees or higher from nadir (straight down).

LZ3: Medium (All other areas not included in LZ1, LZ2 or LZ4, such as commercial/ industrial, and high-density residential)

Design exterior lighting so that all site and building-mounted luminaires produce a maximum initial illuminance value no greater than 0.2 horizontal and vertical footcandles (2.0 horizontal and vertical Lux) at the site boundary and no greater than 0.01 horizontal footcandles (0.1 horizontal Lux) 15 feet (4.5 meters) beyond the site. Document that no more than 5% of the total initial designed fixture Lumens (sum total of all fixtures on site) are emitted at an angle of 90 degrees or higher from nadir (straight down).

LZ4: High14 (High-activity commercial districts in major metropolitan areas)

Design exterior lighting so that all site and building-mounted luminaires produce a maximum initial illuminance value no greater than 0.6 horizontal and vertical footcandles (6.5 horizontal and vertical Lux) at the site boundary and no greater than 0.01 horizontal footcandles (0.1 horizontal Lux) 15 feet (4.5 meters) beyond the site. Document that no more than 10% of the total initial designed fixture Lumens (sum total of all fixtures on site) are emitted at an angle of 90 degrees or higher from nadir (straight down).

LZ2, LZ3 and LZ4: For site boundaries that abut public rights-of-way, light trespass requirements may be met relative to the curb line instead of the site boundary.

For All Zones

Illuminance generated from a single luminaire placed at the intersection of a private vehicular driveway and public roadway accessing the site is allowed to use the centerline of the public roadway as the site boundary for a length of 2 times the driveway width centered on the centerline of the driveway.

Exemplary Performance:

This credit is not eligible for exemplary performance.

Universal Design

SSP Credit 9 Points: 1

Intent:

Ensure that the building design caters to differently abled and senior citizens.

Compliance Options:

Design the building / campus to provide the following, as applicable, for differently abled and senior citizens in accordance with the guidelines of the National Building Code (NBC) of India 2005.

- Appropriately designed preferred car park spaces having an easy access to the main entrance or closer to the lift lobby.
  (Provide at least one car park space for the first 100 car park spaces and one additional for every 250 car park spaces thereafter or as defined by local byelaw).
- Easy access to the main entrance of the building.
- Non-slippery ramps with handrails on at least one side.
- Braille and audio assistance in lifts for visually impaired people.
- Seating area near lift lobbies.
- Uniformity in floor level for hindrance-free movement in common areas & exterior areas.
- Restrooms (toilets) in common areas designed for differently abled people.
  (Provide at least one restroom for the first 100 building occupants and one additional for every 250 occupants thereafter or as defined by local byelaw)
- Main walkways / pathways with adequate width in exterior areas.
- Visual warning signage in common areas & exterior areas.

Exemplary Performance:

This credit is not eligible for exemplary performance.

Basic Facilities for Construction Workforce

SSP Credit 10 **Points: 1**

Intent:

Promote welfare of the construction workforce by providing safe and healthy work conditions.

Compliance Options:

Provide basic facilities for construction workforce to exceed the guidelines of 'The Building and other Construction Workers Act, 1996 & Rules, 1998'.

- Adequate housing to meet or exceed local / labour byelaw requirement.
- Sanitary facilities:

  Provide at least 3 toilet seats & 3 urinals for the first 100 workers and one additional toilet seat & urinal for every 100 workers thereafter (or) as defined by local / labour byelaw.
  (The sanitary measures should be provided separately for men and women).
- First-aid and emergency facilities.
- Adequate drinking water facilities.
- Personal protective equipment (by owner / contractor).
- Dust suppression measures.
- Adequate illumination levels in construction work areas.
- Site emergency alarm.
- Day care/ crèche facility for workers' children.
  (Only if, more than 50 female building workers are employed full time)

Note:

- *The project can consider 'Constructional Practices and Safety Guidelines' from National Building Code (NBC) of India 2005, Part 7 - Constructional Practices and Safety.*

Exemplary Performance:

This credit is not eligible for exemplary performance.

Green Building Guidelines

SSP Credit 11 Points: 1

Intent:

Provide building occupants, prospective tenants, and the facility team with descriptive guidelines that educate and help them implement and maintain green design features.

Compliance Options:

❖ **Case 1: Owner-occupied Buildings**

Develop & publish the following:

- Project specific green building guidelines providing information that helps building occupants to implement and utilise the green features, post occupancy.
- Project specific green building renovation guidelines providing information that helps developer facilities team to implement green features, during the building renovation process.

❖ **Case 2: Tenant-occupied Buildings**

- **Design Stage**

  Include green design features proposed in the project brochures, as applicable. *(Refer Exhibit - A)*

- **Post-occupancy Stage**

  Develop & publish the following:

  - Project specific green building guidelines providing information that helps tenants to implement and utilise the green features, post occupancy.
  - Project specific green building renovation guidelines providing information that helps facilities team to implement green features, during the building renovation process.

Exemplary Performance:

This credit is not eligible for exemplary performance.

Exhibit - A: List of Credits applicable for Green Building Guidelines

- Basic Amenities
- Proximity to Public Transport
- Low-emitting Vehicles
- Natural Topography or Vegetation
- Preservation or Transplantation of Trees
- Heat Island Reduction, Non-roof
- Heat Island Reduction, Roof
- Outdoor Light Pollution Reduction
- Universal Design
- Rainwater Harvesting, Roof & Non-roof
- Water Efficient Plumbing Fixtures
- Management of Irrigation Systems
- Wastewater Treatment and Reuse
- Water Metering
- Energy Efficiency
- Ozone Depleting Substances
- Eco-friendly Refrigerants
- On-site Renewable Energy
- Energy Metering and Monitoring
- Segregation of Waste, Post occupancy
- Sustainable Building Materials
- Organic Waste Management, Post occupancy
- Handling of Waste Materials, During Construction
- Use of Certified Green Building Materials, Products & Equipments
- Minimum Fresh Air Ventilation
- Tobacco Smoke Control
- CO_2 Monitoring
- Daylighting
- Outdoor Views
- Minimise Indoor & Outdoor Pollutants
- Low-emitting Materials
  (Paints, Adhesives, Carpets, Composite Wood, and New Wood Furniture)
- Occupant Well-being Facilities
- Indoor Air Quality Testing, After Construction and Before Occupancy
- Indoor Air Quality Management, During Construction

Note: *The list is illustrative only.*

Water Conservation

Rainwater Harvesting, Roof & Non-roof

WC Mandatory Requirement 1

Intent:

Enhance ground water table and reduce municipal water demand through effective rainwater management.

Compliance Options:

- Design rainwater harvesting system to capture at least 'one-day rainfall*' runoff volume from roof and non-roof areas.

  ** One-day rainfall can be derived from 'percentage of average peak month rainfall' given in Table - 3.*

  To arrive at average peak month rainfall, consider an average of at least last 5 years peak month rainfall (of the respective year).

Table 3 - Criteria to arrive at 'One-day Rainfall'

S No	Average Peak Month Rainfall (in mm)	One-day Rainfall (% of Average Peak Month Rainfall)
1	Upto 250	12%
2	251 – 350	10%
3	351 – 500	8%
4	501 – 700	6%
5	701 & above	4%

- In areas where the Central / State Ground Water Board does not recommend artificial rain water recharge (or) if the groundwater table is less than 4 meters, the project is required o provide justification for not implementing rainwater harvesting system.

Notes:

- *For rainfall information, refer Indian Meteorological Department data at http://www.imd.gov.in*
- *Runoff volume = Surface area x Runoff Coefficient x Rainfall.*
- *Consider Rainwater Harvesting Guidelines (as and when available) from the National Building Code (NBC) of India, Part 11 - Approach to Sustainability, Section 7.2 - Rainwater Harvesting-Surface Runoff.*
- *In areas where the water percolation is limited, collection tanks / water bodies may be provided to meet the above requirement.*

  Filtering of suspended solids shall be ensured by providing suitable filtering media before letting the water into the collection tanks, water bodies, municipal storm water drains.

Table 4 - Runoff Coefficients for Typical Surface Types

S No	Surface Type	Runoff Coefficient
1	Cemented / Tiled Roof	0.95
2	Roof Garden (<100 mm thickness)	0.5
3	Roof Garden (100 – 200 mm thickness)	0.3
4	Roof Garden (201 – 500 mm thickness)	0.2
5	Roof Garden (> 500 mm thickness)	0.1
6	Turf, Flat (0 - 1% slope)	0.25
7	Turf, Average (1 – 3% slope)	0.35
8	Turf, Hilly (3 - 10% slope)	0.4
9	Turf, Steep (> 10% slope)	0.45
10	Vegetation, Flat (0 - 1% slope)	0.1
11	Vegetation, Average (1 - 3% slope)	0.2
12	Vegetation, Hilly (1 - 3% slope)	0.25
13	Vegetation, Steep (> 10% slope)	0.3
14	Concrete Pavement	0.95
15	Gravel Pavement	0.75
16	Open-grid Concrete Pavement	0.75
17	Open-grid Grass Pavement	0.5
18	Water Bodies (lined) Ex: Swimming Pool	0.95
19	Water Bodies (un-lined) Ex: Water Pond	0

Water Efficient Plumbing Fixtures

WC Mandatory Requirement 2

Intent:

Enhance efficiency of plumbing fixtures, thereby minimising potable water use.

Compliance Options:

Use water efficient plumbing fixtures (as applicable) whose flow rates meet the baseline criteria in aggregate. The total annual water consumption of the building should not exceed the total base case water consumption computed.

Note:

- *Use of treated waste water/ captured rain water shall not be considered to show water savings.*

The baseline criteria is as below:

Table 5 - Baseline Flow Rates / Consumption for Plumbing Fixtures

Fixture Type	Maximum Flow Rate/ Consumption	Duration	Estimated Daily Uses per FTE **
Water Closets (Full-flush)	6 LPF	1 flush	1 for male; 1 for female
Water Closets (Half-flush)	3 LPF	1 flush	2 for female
Urinals	4 LPF	1 flush	2 for male
Faucets / Taps*	6 LPM	15 seconds	4
Health Faucet*	6 LPM	15 seconds	1
Showerhead / Handheld Spray*	10 LPM	8 minutes	0.1

Source: Uniform Plumbing Code - India

* *Reporting pressure for these fixtures shall be at 3 bar.*

** *Full Time Equivalent (FTE) represents a regular building occupant who spends 8 hours per day in the building. Part-time or overtime occupants have FTE values based on their hours per day divided by 8.*

Notes:

- *Water fixtures do not include irrigation systems.*
- *Faucets / Taps installed for hand wash in rest rooms and canteen shall be considered; whereas, faucets / taps installed for dish washing and washing clothes need not be considered.*
- *Rain showers (if any) need to be considered in the calculations under Showerhead.*
- *The baseline flows can be demonstrated at a flowing water pressure of 3 bar. Flowing water pressure of 3 bar does not mean that the water supply in the building is at 3 bar. The building fixtures can operate at lower pressures, however to show compliance under this credit, the design flow rates are to be submitted at 3 bar.*
- *Default occupancy shall be considered as 50% for male and female.*
- *FTE occupancy shall be considered in calculation, including visitors.*
- *Plumbing fixtures that are certified by IGBC under Green Product Certification Programme or by a third party agency approved by IGBC, can be used by the project to show compliance.*

Landscape Design

WC Credit 1 Points: 1-2

Intent:

Design landscape to ensure minimum water consumption.

Compliance Option:

Limit use of turf on the site to conserve water and / or ensure that landscaped area is planted with drought tolerant / native / adaptive species.

Notes:

- *This credit is applicable only for those projects which have at least 10% of the site area landscaped.*
- *Landscape areas over built structures such as basements, podium, roofs, etc., can be considered for this credit calculation.*

Points are awarded as below:

Type of Landscape	Percentage of the Total Landscaped Area	Points
Turf Area	≤ 30%	1
Drought Tolerant / Native / Adaptive Species Area	≥ 30%	1

Notes:

- *The landscape here refers to soft landscaping, which includes only pervious vegetation.*
- *Drought tolerant species are those species that do not require supplemental irrigation. Generally accepted time frame for temporary irrigation is 1 - 2 years.*
- *Potted plants shall not be considered as vegetation.*
- *Areas planted with turf should not exceed a slope of 25 percent (i.e. 4 to 1 slope).*

Exemplary Performance:

This credit is eligible for exemplary performance under ID Credit 1 - Innovation in Design Process, if:

- There is no turf in the landscape designed.

  (AND)

- More than 60% of the landscaped area is planted with drought tolerant / native / adaptive species.

Management of Irrigation Systems

WC Credit 2 Points: 1

Intent:

Reduce water demand for irrigation through water efficient management systems and techniques.

Compliance Options:

Provide or install highly efficient irrigation systems incorporating the features mentioned below: *(Minimum four features)*

- Central shut-off valve
- Soil moisture sensors integrated with irrigation system
- Turf and each type of bedding area must be segregated into independent zones based on watering needs
- At least 75% of landscape planting beds must have a drip irrigation system to reduce evaporation
- Time based controller for the valves such that evaporation loss is minimised and plant health is ensured
- Pressure regulating device(s) to maintain optimal pressure to prevent water loss
- Any other innovative methods for watering

Notes:

- *This credit is applicable only for those projects which have at least 10% of the site area landscaped.*
- *Landscape areas over built structures such as basements, podium, roofs, etc., can be considered for this credit calculation.*

Exemplary Performance:

This credit is not eligible for exemplary performance.

Rainwater Harvesting, Roof & Non-roof

WC Credit 3 **Points: 2-4**

Intent:

Enhance ground water table and reduce municipal water demand through effective rainwater management.

Compliance Options:

- Design rainwater harvesting system to capture at least 'one-day rainfall*' runoff volume from roof and non-roof areas.

  ** One-day rainfall can be derived from 'percentage of average peak month rainfall' given in Table - 6.*

  To arrive at average peak month rainfall, consider an average of at least last 5 years peak month rainfall (of the respective year).

Table 6 - Criteria to arrive at 'One-day Rainfall'

S No	Average Peak Month Rainfall (mm)	One-day Rainfall (% of Average Peak Month Rainfall)	
		2 points	4 points
1	Upto 250	15%	18%
2	251 – 350	12.5%	15%
3	351 – 500	10%	12%
4	501 – 700	7.5%	9%
5	701 & above	5%	6%

Notes:

- *For rainfall information, refer Indian Meteorological Department data at http://www.imd.gov.in*

- *Runoff volume = Surface area x Runoff Coefficient x Rainfall.*
- *Consider Rainwater Harvesting Guidelines (as and when available) from the National Building Code (NBC) of India, Part 11 - Approach to Sustainability, Section 7.2 - Rainwater Harvesting-Surface Runoff.*
- *In areas where the water percolation is limited, collection tanks may be provided to meet the above requirement.*

  Filtering of suspended solids shall be ensured by providing suitable filtering media before letting the water into the collection tanks, water bodies, municipal storm water drains.

Exemplary Performance:

This credit is eligible for exemplary performance under ID Credit 1 - Innovation in Design Process, if rainwater runoff from roof & non-roof areas is captured and / or recharged, as per Table-7 listed below:

Table 7 - Criteria to arrive at 'One-day Rainfall' for Exemplary Performance

S No	Average Peak Month Rainfall (mm)	One-day Rainfall (% of Average Peak Month Rainfall)
1	Upto 250	24%
2	251 - 350	20%
3	351 - 500	16%
4	501 - 700	12%
5	700 & above	8%

Water Efficient Plumbing Fixtures

WC Credit 4 Points: 1-5

Intent:

Enhance efficiency of plumbing fixtures, thereby minimising potable water use.

Compliance Options:

Use water efficient plumbing fixtures (as applicable) whose flow rates are 10% less than the baseline criteria given Table - 5, in aggregate.

Note:

- *Use of treated waste water / captured rain water shall not be considered to show potable water savings.*

The baseline criteria is as below:

Table 5 - Baseline Flow Rates / Consumption for Plumbing Fixtures

Fixture Type	Maximum Flow Rate / Consumption	Duration	Estimated Daily Uses per FTE**
Water Closets (Full-flush)	6 LPF	1 flush	1 for male; 1 for female
Water Closets (Half-flush)	3 LPF	1 flush	2 for female
Urinals	4 LPF	1 flush	2 for male
Faucets / Taps*	6 LPM	15 seconds	4
Health Faucet*	6 LPM	15 seconds	1
Showerhead / Handheld Spray*	10 LPM	8 minutes	0.1

Source: Uniform Plumbing Code - India

* *Reporting pressure for these fixtures shall be at 3 bar.*

*** Full Time Equivalent (FTE) represents a regular building occupant who spends 8 hours per day in the building. Part-time or overtime occupants have FTE values based on their hours per day divided by 8.*

Points are awarded as below:

Water Efficient Plumbing Fixtures (Individually or in aggregate)	Points
10% less than baseline criteria	1
15% less than baseline criteria	2
20% less than baseline criteria	3
25% less than baseline criteria	4
30% less than baseline criteria	5

Notes:

- *Water fixtures do not include irrigation systems.*
- *Faucets / Taps installed for hand wash in rest rooms and canteen shall be considered; whereas, faucets / taps installed for dish washing and washing clothes need not be considered.*
- *Rain showers (if any) need to be considered in the calculations under 'Showerhead'.*
- *The baseline flows can be demonstrated at a flowing water pressure of 3 bar. Flowing water pressure of 3 bar does not mean that the water supply in the building is at 3 bar. The building fixtures can operate at lower pressures, however to show compliance under this credit, the design flow rates are to be submitted at 3 bar.*
- *Default occupancy shall be considered as 50% for male and female.*
- *FTE occupancy shall be considered in calculation, including visitors.*
- *Plumbing fixtures that are certified by IGBC under Green Product Certification Programme or by a third party agency approved by IGBC can be used by the project to show compliance.*

Exemplary Performance:

This credit is eligible for exemplary performance under ID Credit 1 - Innovation in Design Process, if water consumption is 35% lesser than the baseline criteria.

Waste Water Treatment and Reuse

WC Credit 5 Points: 1-5

Intent:

Treat waste water generated on-site, so as to avoid polluting the receiving streams by safe disposal. Use treated waste water, thereby reducing dependence on potable water.

Compliance Options:

❖ **Waste Water Treatment:** ***(2 Points)***

Have an on-site treatment system to handle 100% of waste water generated in the building, to the quality standards suitable for reuse, as prescribed by Central (or) State Pollution Control Board, as applicable.

(And)

❖ **Waste Water Reuse:** ***(3 Points)***

Use treated waste water for at least 25% of the total water required for landscaping, flushing, and cooling tower make-up water (if the project uses water-cooled chillers).

Points are awarded as below:

Application	Percentage of Total Water catered through Treated Waste Water	Points
Landscaping, Flushing and Air-conditioning make-up	≥ 25% ≥ 50% ≥ 75%	1 2 3

Notes:

- *Waste water here refers to both grey and black water.*
- *The credit point(s) can be claimed only if the waste water is treated in-situ and reused in-situ. In case the local authorities insist the project to divert waste water to a centralised /*

common waste water treatment plant, then the project can show compliance with 'Case-2' given above, by reusing treated wastewater from the centralised / common / any other waste water treatment plant.

- *Treated waste water sourced from other sites / local authorities through permanent piped connections or other means can also be considered to show compliance for 'waste water reuse'.*
- *Water from sources such as bore wells, natural wells, municipal water systems is considered as potable water.*
- *Captured rain water can also be considered to show compliance.*
- *The water requirement and average number of watering days for landscaping shall be considered as 6 liters per sq.m. per day (i.e. 6 liters / sq.m. / day) for a minimum of 300 days, (or)*

  Justify if the water requirement and the average number of watering days for landscaping is less than the above requirement.
- *Potted plants shall not be considered under vegetation.*

Exemplary Performance:

This credit is eligible for exemplary performance under ID Credit 1 - Innovation in Design Process, if treated waste water is used for at least 95% of the total water required for landscaping, flushing, and cooling make-up water (if the project uses water-cooled chillers).

Water Metering

WC Credit 6 Points: 1-2

Intent:

Encourage sub-metering to improve water performance of the building, and thereby save potable water.

Compliance Options:

❖ **Water Metering**

➢ **Building-level Metering:** ***(1 Point)***

Demonstrate sub-metering for at least three of the following water use applications, as applicable:

- Municipal water supply
- Bore water consumption
- Treated waste water consumption
- Water consumption for landscape requirements
- Water consumption for flushing
- Water consumption for air-conditioning cooling tower makeup
- Any other major source of water consumption

➢ **Tenant-level Metering:** ***(1 Point)***
(Applicable only for Tenant-occupied buildings)

Demonstrate sub-metering for the following water use applications, as applicable:

- Municipal water supply / Water consumption through bore-well (Potable water)
- Water consumption for flushing (Non-potable water)

Exemplary Performance:

This credit is not eligible for exemplary performance.

Energy Efficiency

Ozone Depleting Substances

EE Mandatory Requirement 1

Intent:

Encourage use of eco-friendly refrigerants and halons in the building, thereby minimising negative impact on the ozone layer.

Compliance Options

❖ **CFC-free Refrigerants**

Demonstrate that refrigerants used in the buildings Heating, Ventilation & Air-conditioning (HVAC) equipment are CFC (Chloro Fluoro Carbon)-free.

(AND)

❖ **Halon-free Fire Suppression Systems**

Demonstrate that fire suppression systems used in the building are free from Halons or any other ozone depleting substances.

Minimum Energy Efficiency

EE Mandatory Requirement 2

Intent:

Optimise energy consumption, to reduce negative environmental impacts from excessive energy use.

Compliance Options:

❖ **Case 1 - Air-conditioned Buildings:**

Design the building to comply with Energy Conservation Building Code (Revised Version May, 2008) (or) ASHRAE Standard 90.1-2010 (without amendments) through one of the following approaches:

- Option 1 - Performance based approach (Whole building simulation)
- Option 2 - Prescriptive approach

The total annual energy consumption of the building should not exceed the total base case energy consumption computed, as per ECBC (or) ASHRAE Standard 90.1-2010.

Note:

- *Project with multiple buildings (including projects with common basement) must independently meet the Minimum Energy Performance criteria for each building.*

➢ **Option 1 - Performance Based Approach (Whole Building Simulation)**

Demonstrate compliance of the building performance by whole building simulation, as per the baselines outlined in ECBC (or) ASHRAE Standard 90.1-2010 (without amendments), Appendix - G. Simulation is to be carried out at comfort temperatures of 24 $\pm$ 2 deg C.

Notes:

- *In tenant-occupied buildings, the developer shall install high-side air-conditioned systems to cater to tenant-occupied areas.*
- *In tenant-occupied buildings, if lighting is in tenant scope, the LPD in the proposed case shall be same as the base case.*

- *Projects which use on-site renewable energy sources (such as solar energy, wind power, biomass, etc.,) can subtract renewable energy generated from the total annual energy consumption of the proposed case.*

  Whereas, projects which use solar hot water systems can model the systems in the proposed case, as against electrical heaters in the base case, to show energy savings.

➢ **Option 2 - Prescriptive Approach**

The project should meet the applicable criteria as established in prescriptive measures of ECBC (or) ASHRAE Standard 90.1-2010 (without amendments).

❖ **<u>Case 2 - Non air-conditioned Buildings:</u> (Prescriptive Approach)**
(Applicable only for Owner-occupied Buildings)

Non air-conditioned buildings are those which are not serviced and will not be serviced in the future, either through central air-conditioned systems or unitary air-conditioners.

- *Air-conditioning may be considered for critical areas, not more than 10% of the total regularly occupied area.*
- *Spaces with unitary air-conditioners shall comply with IEQ Mandatory Requirement 1 - Fresh Air Ventilation, Non air-conditioned buildings criteria.*

Owner-occupied non air-conditioned buildings shall meet the following prescriptive measures, as applicable:

1) Building Envelope:

The project must ensure that the following building envelope measures meet the baseline criteria as outlined in Annexure - II.

❖ Solar Heat Gain Coefficient (SHGC) *

❖ Window Glazing U-value *(only if WWR > 40%) ***

❖ Overall Wall Assembly U-value

❖ Overall Roof Assembly U-value

Notes:

- *For Climatic Zones of India, please refer Annexure - I.*
- **Low SHGC value can be achieved through chajjas or other sun shading devices or efficient fenestration or a combination of both. For details, refer ECBC section 4.3.3 - Vertical Fenestration, Exception to ECBC 4.3.3.*
- ***Compliance for window glazing U-value should be shown only if Window-to-Wall Ratio (WWR) is more than 40%.*

2) Lighting:

The Lighting Power Density (LPD) in the building interior, exterior and parking areas shall be reduced by minimum 10% over ECBC base case.

Notes:

- *Compliance for the lighting power density shall be shown either through 'Building Area Method' or 'Space Function Method'. If 'Building Area Method' is considered, compliance for parking area lighting shall be shown separately.*
- *Exterior areas illuminated by lighting only should be considered for lighting power density calculations.*
- *The LPD should include power consumption of complete fixture, including lamps and ballasts.*

3) Air-conditioning Systems:

Projects having air-conditioners (as per criteria the defined for non air-conditioned buildings), shall consider unitary air-conditioners with BEE 3-star rating (or) air-conditioners with a COP equivalent to 3.1 (EER of 10.58), or more.

4) Heating Systems:

Projects having more than 150 Heating degree days** (HDD18) shall consider heating systems in proposed case to meet a base line COP of 2.5 (EER of 8.53), when heat pumps are installed in the building.

Notes:

- *** Degree day: The difference in temperature between the outdoor mean temperature over 24 hour period and a given base temperature.*
- ***Heating degree day base 18°C, (HDD 18): For any one day, when the mean temperature is less than 18°C, there are as many degree-days as degree centigrade temperature difference between the mean temperature for the day and 18°C.*

Annual heating degree-days (HDDs) are the sum of the degree-days over the calendar year.

5) Fans:

Fans installed in the building shall have an efficiency equivalent to BEE 3-star rating or more.

6) Pumps & Motors:

Pumps & Motors installed in the building shall have an efficiency equivalent to BEE 3-star rating or more.

General Notes:

- *Projects which use on-site renewable energy sources (such as solar energy, wind power, biomass, etc.,) can subtract renewable energy generated from the total energy of the proposed case.*
- *Projects installing solar hot water systems can assume electrical heating in the base case.*
- *Energy efficient materials, products and equipment that are certificed by IGBC under Green Product Certification Programme or by a third party agency approved by IGBC can be used by the project to show compliance.*

Commissioning Plan for Building Equipment & Systems

EE Mandatory Requirement 3

Intent:

Verify and ensure that the building's equipment & systems are commissioned to achieve performance as envisaged during the design stage.

Compliance Options:

The project shall comply with the following requirements:

❖ Demonstrate that the project owner has signed an agreement with third party commissioning authority, not involved in the design. The commissioning authority is also required to have at least 3 years prior experience in equipment & systems.

Notes:

- *Air-conditioned Buildings: Projects with less than 2,000 sq.m of built-up area, the owner or the designer can submit the commissioning plan.*
- *Non air-conditioned Buildings: For non air-conditioned projects, the owner or the designer can submit the commissioning plan.*

(AND)

❖ Document owners brief in terms of performance expectations from the building.

❖ Submit a plan to show how the building would be audited for its green building performance after occupancy, with regard to the following:

- HVAC systems - chiller, VRV systems, primary & secondary water pumps, cooling tower, AHU fans, fresh air fans and flow settings, fresh air treatment units, heat recovery wheel, VFDs
- Unitary air-conditioners
- Temperature and RH measurements in individual spaces
- Pumps & motors
- Lighting systems
- Renwable energy systems

- CO_2 monitoring system
- Energy & Water metering
- Building management system
- DG sets or Back-up systems
- Sewage treatment plant
- Any other equipments and systems

❖ Report specific observations and variations identified by commissioning authority to the project owner, for each equipment & system, with respect to commissioning plan and how they were addressed.

❖ Submit measurement & verification plan for yearly reporting.

❖ Submit post-occupancy survey to verify occupant comfort (lighting levels, temperature, relative humidity, noise levels, etc.,).

❖ Report on green building performance of the equipment & systems listed in commissioning plan. The report for each of the equipment & systems should cover the following:

- Equipment specifications
- Test results with specific comments from the Commissioning Authority, at the time of commssioning
- Key monitoring aspects to sustain performance
- Estimated energy & water consumption
- Scope for performance enhancing in future, and savings thereof

Eco-friendly Refrigerants

EE Credit 1 Points: 1

Intent

Encourage use of eco-friendly refrigerants in the facility, thereby minimising impact on the ozone layer.

Compliance Options

Demonstrate that refrigerants used in the buildings Heating, Ventilation & Air-conditioning (HVAC) equipment are eco-friendly and have low or no Ozone Depletion Potential (ODP) and Global Warming Potential (GWP).

The projects HVAC equipment must comply with the following formula, which sets a maximum threshold for the combined contributions to ozone depletion and global warming potential:

$$LCGWP + LCODP \times 10^5 \leq 13$$

LCODP = [ODPr x (Lr x Life +Mr) x Rc]/Life

LCGWP = [GWPr x (Lr x Life +Mr) x Rc]/Life

LCODP : Lifecycle Ozone Depletion Potential (kg CFC 11 / kW-Year)

LCGWP : Lifecycle Direct Global Warming Potential (kg CO_2/ kW-Year)

GWPr : Global Warming Potential of Refrigerant (0 to 12,000 kg CO_2/ kg r)

ODPr : Ozone Depletion Potential of Refrigerant (0 to 0.2 kg CFC 11 / kg r)

Lr : Refrigerant Leakage Rate (0.5% to 2.0%; default of 2% unless otherwise demonstrated)

Mr : End-of-life Refrigerant Loss (2% to 10%; default of 10% unless otherwise demonstrated)

Rc : Refrigerant Charge (0.065 to 0.65 kg of refrigerant per kW of gross AHRI rated cooling capacity or Eurovent Certified cooling capacity)

Life : Equipment Life (10 years; default based on equipment type, unless otherwise demonstrated)

Notes:

- *For multiple types of equipment, a weighted average of all base building HVAC&R equipment must be calculated using the following formula:*

$$\sum \frac{(LCGWP + LCODP \times 10^5) \times Q_{unit}}{Q_{total}} \leq 13$$

Q_{unit} = *Eurovent Certified cooling capacity of an individual HVAC or refrigeration unit (kW) (or) Gross AHRI rated cooling capacity of an individual HVAC or refrigeration unit (kW)*

Q_{total} = *Total Eurovent Certified cooling capacity of all HVAC or refrigeration (kW) (or) Total gross AHRI rated cooling capacity of all HVAC or refrigeration*

- *Small HVAC units (containing less than 0.25 kg of refrigerant) need not be considered in calculation.*

Exemplary Performance:

This credit is not eligible for exemplary performance.

Enhanced Energy Efficiency

EE Credit 2 Points: 1-15

Intent:

Optimise energy consumption, to reduce negative environmental impacts from excessive energy use.

Compliance Options:

❖ **Case 1 - Air-conditioned Buildings:**

Design the building to comply with ASHRAE Standard 90.1-2010, Appendix - G (without amendments) through Performance based approach (Whole building simulation). Simulation is to be carried out at comfort temperatures of 24 ± 2 deg C.

Points are awarded based on energy cost percentage savings as detailed below:

Percentage of Energy Cost Savings over ASHRAE Standard 90.1-2010 Base case			Points
Owner-occupied Buildings	Tenant-occupied Buildings	Major Renovation Buildings	
6%	4%	4%	1
8%	6%	6%	2
10%	8%	8%	3
12%	10%	10%	4
14%	12%	12%	5
16%	14%	14%	6
18%	16%	16%	7
20%	18%	18%	8
22%	20%	20%	9
24%	22%	22%	10

Owner-occupied Buildings	Tenant-occupied Buildings	Major Renovation Buildings	Points
26%	24%	24%	11
28%	26%	26%	12
30%	28%	28%	13
32%	30%	30%	14
34%	32%	32%	15

Notes:

- *Project with multiple buildings (including projects with common basement) must independently meet the minimum energy performance criteria for each building, to be eligible for Enhanced Energy Performance.*
- *Major Renovation Buildings are those buildings where significant modifications have been made in the building envelope, mechanical and electrical systems.*
- *Energy efficient materials, products and equipment that are certificed by IGBC under Green Product Certification Programme or by a third party agency approved by IGBC can be used by the project to show compliance.*

❖ **Case 2 - Non air-conditioned Buildings: (Prescriptive Approach)**
(Applicable only for Owner-occupied Buildings)

Owner-occupied non air-conditioned buildings shall meet or exceed the following prescriptive measures, as applicable: ***(Maximum 8 Points)***

1) Building Envelope: *(3 Points)*

The project must ensure that at least three of the following building envelope measures meet the baseline criteria as outlined in Annexure - III.

- ❖ Solar Heat Gain Coefficient (SHGC)
- ❖ Window Glazing U-value
- ❖ Overall Wall Assembly U-value
- ❖ Overall Roof Assembly U-value

2) Lighting:

❖ **Lighting Power Density: (*2 Points*)**

The lighting power density in the building interior, exterior and parking areas shall be reduced by minimum 20% over ECBC base case.

Points are awarded as below:

Reduction in Lighting Power Density	Points
≥ 20 %	1
≥ 30 %	2

❖ **Lighting Controls: *(1 point)***

All non-emergency exterior & common area lighting such as façade, pathways, landscaping, surface and covered parking, street lighting, staircases should have at least one of the following:

- Daylight sensor
- Occupancy / Motion sensor
- Timer

3) Air-conditioning Systems: *(1 Point)*

Projects having air-conditioners (as per the criteria defined for non-air conditioned buildings), shall consider unitary air-conditioners with BEE 5-star rating (or) air-conditioners with a COP equivalent to 3.5 (EER of 11.95), or more.

4) Heating Systems: *(1 Point)*

Projects having more than 150 Heating degree days** (HDD18) shall consider heating systems in proposed case and show a minimum of 10% efficiency over the baseline COP of 2.5 (EER of 8.53), when heat pumps are installed in the building.

5) Fans: *(2 Points)*

Fans installed in the building shall have an efficiency equivalent to BEE 5-star rating.

6) Pumps & Motors: ***(1 Point)***

Pumps & Motors installed in the building shall have an efficiency equivalent to BEE 3-star rating.

Note ***:***

- *Energy efficient materials, products and equipment that are certificed by IGBC under Green Product Certification Programme or by a third party agency approved by IGBC can be used by the project to show compliance.*

Exemplary Performance:

This credit (Case 1 - Air-conditioned Buildings) is eligible for exemplary performance under ID Credit 1 - Innovation in Design Process, if:

- *Owner-occupied buildings:* Energy cost savings are more than 36% in Owner-occupied buildings, when compared to the ASHRAE Standard 90.1-2010, Appendix - G base case.
- *Tenant-occupied buildings:* Energy cost savings are more than 34% in Tenant-occupied buildings, when compared to the ASHRAE Standard 90.1-2010, Appendix - G base case.
- *Major renovation buildings:* Energy cost savings are more than 34% in Major renovation buildings, when compared to the ASHRAE Standard 90.1-2010, Appendix - G base case.

On-site Renewable Energy

EE Credit 3 Points: 2-6

Intent:

Encourage the use of on-site renewable technologies, to minimise the environmental impacts associated with the use of fossil fuel energy.

Compliance Options:

❖ **Owner Occupied-buildings**

Demonstrate the use of on - site renewable technologies, to minimise the environmental impacts associated with the use of fossil fuel energy

Points are awarded as below:

Percentage of On-site Renewable Energy Generated to the Total Annual Energy Consumption	Points
≥ 2.5 %	2
≥ 5 %	4
≥ 7.5 %	6

❖ **Tenant Occupied-buildings**

Demonstrate on-site renewable energy generation for at least 2.5% of total annual lighting energy consumption of the building (interior & exterior areas), including tenant-occupied spaces.

Points are awarded as below:

Percentage of On-site Renewable Energy Generated to the Total Annual Lighting Energy Consumption of the Building	Points
≥ 2.5 %	2
≥ 5 %	4
≥ 7.5 %	6

Notes:

- *Renewable energy sources include solar energy, wind power, biomass, etc.*
- *Solar hot water systems cannot be considered as power generation source and cannot be subtracted from the total annual energy consumption of the proposed case.*
- *The total annual energy consumption can be arrived either through Performance based approach or Prescriptive approach.*
  - o *Owner-occupied buildings following Prescriptive approach should estimate the total annual energy consumption of the building by calculating the energy consumption of all mechanical and electrical equipment & systems based on the number of hours of operation per day.*
  - o *Tenant-occupied buildings following Prescriptive approach should estimate the total annual lighting energy consumption of the building by calculating the energy consumption of all lighting fixtures (including lighting fixtures in tenant-occupied spaces and exterior lighting fixtures) based on the number of hours of operation per day.*

Exemplary Performance:

This credit is eligible for exemplary performance under ID Credit 1 - Innovation in Design Process, if:

- ❖ *Owner-occupied buildings:* On-site renewable energy generation is at least 10% of total annual energy consumption.
- ❖ *Tenant-occupied buildings:* On-site renewable energy generation is at least 10% total annual lighting energy consumption of the building (interior & exterior areas), including tenant-occupied spaces.

Off-site Renewable Energy

EE Credit 4 Points: 1-2

Intent:

Encourage the use of off-site renewable technologies, to minimise the environmental impacts associated with fossil fuel energy use.

Compliance Options

❖ **Option 1: Off-site Renewable Energy Investments**

- *Owner-occupied buildings:* Demonstrate that the project has invested in off-site renewable energy equivalent to at least 50% of the total annual energy consumption of the building.
- *Tenant-occupied buildings:* Demonstrate that the project has invested in off-site renewable energy equivalent to at least 50% of the total annual lighting energy consumption of the building (interior & exterior areas), including tenant-occupied spaces.

Note:

- *The contract with the off-site renewable energy developer to generate energy shall be for a minimum period of two years.*

Points are awarded as below:

Percentage of Off-site Renewable Energy Generated to the Total Annual Energy Consumption	Points
≥ 50%	1
100%	2

(OR)

❖ **Option 2: Renewable Energy Certificates (RECs)**

- *Owner-occupied buildings:* Demonstrate that the project has purchased Renewable Energy Certificates (RECs) equivalent to at least 25% of the total annual energy consumption of the building.

- *Tenant-occupied buildings:* Demonstrate that the project has purchased Renewable Energy Certificates (RECs) equivalent to at least 25% of the total annual lighting energy consumption of the building (interior & exterior areas), including tenant-occupied spaces.

Notes:

- *The RECs purchased shall be valid for a period of two years.*
- *The RECs can be either solar or non-solar or both.*

Points are awarded as below:

Percentage of Renewable Energy Certificates (RECs) Purchased	Points
≥ 25%	1
≥ 50%	2

***Notes*:**

- *Type of renewable energy source shall be in compliance with the Ministry of New and Renewable Energy (MNRE), Government of India and respective State Regulatory Commissions.*
- *Off-site renewable energy so generated shall be counted only once.*
- *Hydro power projects with 25 MW or lesser size shall only be considered under this credit.*
- *For credit calculations, RECs purchased in the last 6 months of building operation can also be considered, to show compliance.*
- *In case, the Project purchases RECs through an Authorised Agency of exchange, then a legal contract should exist between the Authorised Agency and the Project.*
- *The total annual energy consumption can be arrived either through Performance based approach (Whole building simulation) or Prescriptive approach.*
  - *Owner-occupied buildings following Prescriptive approach should estimate the total annual energy consumption of the building by calculating the energy consumption of all mechanical and electrical equipment & systems based on the number of hours of operation per day.*

- *Tenant-occupied buildings following Prescriptive approach should estimate the total annual lighting energy consumption of the building by calculating the energy consumption of all lighting fixtures (including lighting fixtures in tenant-occupied spaces and exterior lighting fixtures) based on the number of hours of operation per day.*

Exemplary Performance:

This credit is eligible for exemplary performance under ID Credit 1 - Innovation in Design Process, if:

- *Owner-occupied buildings:* Demonstrate that the project has purchased Renewable Energy Certificates (RECs) equivalent to at least 75% of the total annual energy consumption of the building.
- *Tenant-occupied buildings:* Demonstrate that the project has purchased Renewable Energy Certificates (RECs) equivalent to at least 75% of the total annual lighting energy consumption of the building (interior & exterior areas), including tenant-occupied spaces.

Commissioning, Post-installation of Equipment & Systems

EE Credit 5 **Points: 2**

Intent:

Verify and ensure that the building equipment & systems are commissioned to achieve performance as envisaged at the design stage.

Compliance Options:

The project shall comply with the following requirements:

- Report specific observations and variations vis-à-vis the plan drawn under EE MR 2, identified during post occupancy commissioning and report how they were addressed.
- Demonstrate that there is an agreement in place for post occupancy commissioning by a third party commissioning authority for a period of one year, to ensure that the commissioned equipment & systems perform efficiently.

Exemplary Performance:

This credit is not eligible for exemplary performance.

Energy Metering and Management

EE Credit 6 **Points: 1-2**

Intent:

Encourage sub-metering and continuous monitoring to identify improvement opportunities in building's energy performance.

Compliance Options:

❖ **Case 1: Energy Metering:** ***(1 point)***

Demonstrate sub-metering for at least five of the following energy use applications, as applicable:

- Interior & Common area lighting
- Exterior area lighting
- Municipal water pumping
- Ground water pumping
- Treated waste water pumping
- Renewable energy generation
- Power backup systems (Generators sets, Gas turbines, etc.,)
- Elevators, Escalators, Travelators, etc.,
- BTU meter for chilled water consumption
  (*Applicable for tenant-occupied buildings only)*
- Any other energy consuming equipment and systems

(AND)

❖ **Case 2: Building Management System:** ***(1 point)***

Demonstrate that the building management system is in place to control and monitor the following systems, as applicable:

- Air-conditioning management system
- Lighting management system
- Renewable energy management system
- Elevator management system

- Fresh air monitoring system
- CO_2 control and monitoring system
- Water management system

Also, commit to provide the annual total building energy consumption data to IGBC. The energy data shall be provided for all the major energy consuming equipment and systems.

Exemplary Performance:

This credit is not eligible for exemplary performance.

Building Materials and Resources

Segregation of Waste, Post-occupancy

BMR Mandatory Requirement 1

Intent:

Facilitate segregation of waste at source to encourage reuse or recycling of materials, thereby avoiding waste being sent to landfills.

Compliance Options:

❖ **Case 1: Building-level Facility**

Provide separate bins to collect dry waste (paper, plastic, metals, glass, etc.,) and wet waste (organic), at all the floors and common areas of the building, as applicable. Divert the collected waste to a centralised facility, which is easily accessible for hauling.

(AND)

❖ **Case 2: Centralised Facility**

In addition to dry and wet waste bins, provide separate bins for safe disposal of the following hazardous waste, at the centralised facility:

- Batteries
- 'e' waste
- Lamps
- Medical waste, if any

Note:

- *The project has to follow the Hazardous Waste Management Guidelines as prescribed by the Ministry of Environment & Forest (MoEF), Government of India.*

Sustainable Building Materials

BMR Credit 1 Points: 1-8

Intent:

Encourage the use of building materials to reduce dependence on materials that have associated negative environmental impacts.

Compliance Options: ***(Maximum 8 Points)***

❖ **Building Reuse:** ***(1-2 Points)***

Ensure at least 50% (by area) of the structural and non-structural (interiors) elements of the existing building are retained.

Points are awarded as below:

Building Elements	Percentage Retained	Points
Structural	≥ 50%	1
Non-structural (Interiors)	≥ 50%	1

Notes:

- *Building reuse is applicable only to those projects which extend the life of building by retaining the structural and non-structural (interiors) elements of the existing building after its life span.*
- *Structural elements include, columns, beams, floor slabs, exterior walls, structural glazing, etc.,*
- *Non-structural (interiors) elements include, interior walls, ceiling, flooring materials, doors, windows, etc.,*

❖ **Reuse of Salvaged Materials:** ***(1-2 Points)***

Ensure at least 2.5% of the total building materials (by cost) used in the building (as per owner / developer's scope) are salvaged or reused or refurbished.

Points are awarded as below:

Percentage of Salvaged Materials used	Points
≥ 2.5%	1
≥ 5%	2

Notes:

- *Salvaged or reused materials are buildings materials recovered from existing buildings or construction sites and reused. Common salvaged materials include furniture, doors, cabinetry, brick and tiles.*
- *Refurbished materials are products that could have been disposed of as solid waste. These products have completed their life cycle as consumer items and are then refurbished for reuse without substantial alteration of their form.*
- *Refurbishing includes renovating, repairing, restoring, or generally improving the appearance, performance, quality, functionality, or value of a product.*
- *Excavated earth & stones shall not be considered under 'Reuse of Salvaged Materials, as these are natural resources.*

❖ **Materials with Recycled Content:** ***(1-2 Points)***

Use materials with recycled content in the building (as per owner / developer's scope) such that the total recycled content constitutes at least 10% of the total cost of building materials.

Points are awarded as below:

Percentage of Materials with Recycled Content	Points
≥ 10%	1
≥ 20%	2

Notes:

- *Recycled Content is the content in a material or product derived from recycled materials versus virgin materials. Recycled content can be materials from recycling programs (post-consumer) or waste materials from the production process or an industrial/agricultural source (pre-consumer or post-industrial).*

- *Materials (with recycled content) that ate certified by IGBC under Green Product Certification Programme or by a third party agency approved by IGBC can be used by the project to show compliance.*

❖ **Local Materials:** ***(1-2 Points)***

Ensure at least 20% of the total building materials (by cost) used in the building (as per owner / developer's scope) are manufactured locally within a distance of 400 km.

Points are awarded as below:

Percentage of Local Materials Sourced	Points
≥ 20%	1
≥ 30%	2

Notes:

- *Local Materials are those which are manufactured within a distance of 400 km. Assembly of building materials shall not be considered.*
- *Extraction and processing of raw materials need not be considered as part of this credit calculation.*
- *Local Materials that are certified by IGBC under Green Product Certification Programme or by a third party agency approved by IGBC can be used by the project to show compliance.*

❖ **Wood Based Materials:** ***(1-2 Points)***

Ensure at least 50% of all new wood based materials (by cost) used in the building (as per owner / developer's scope) are:

➢ Rapidly renewable

(And / Or)

➢ Wood certified by Forest Stewardship Council (FSC) or Programme for the Endorsement of Forest Certification (PEFC) or equivalent.

Points are awarded as below:

Percentage of Rapidly Renewable or Certified Wood	Points
≥ 50%	1
≥ 75%	2

Notes

- *Rapidly renewable materials are agricultural products that take 10 years or less to harvest.*
- *Certified wood shall be compliant with Forest Stewardship Council (FSC) or Programme for the Endorsement of Forest Certification (PEFC) or equivalent system. For a list of certified wood suppliers and product manufacturers, visit the official website of respective certification bodies.*
- *Salvaged wood based materials shall not be considered under 'Wood Based materials' calculations.*
- *Wood based Materials that are certified by IGBC under Green Product Certification Programme or by a third party agency approved by IGBC can be used by the project to show compliance.*

General Notes:

- *Building materials here refer to civil & interior materials.*
- *Material Cost = Total Cost - (Labour Cost + Installation Cost).*
- *If Labour and Installation Cost is not known, the default material cost should be considered as 60% of the total cost of the material.*
- *The cost of electrical, mechanical & plumbing - equipment, systems & appliances, and movable materials & furniture shall not be considered in the total material cost.*
- *Temporary materials such as materials used for formwork, scaffolding, etc., should not be considered for this credit calculation.*

Exemplary Performance:

The criteria listed below are eligible for exemplary performance under ID Credit 1 - Innovation in Design Process:

- Retention of at least 95% of the structural / non-structural elements (by area) of the existing building.
- Reuse of Salvaged Materials by at least 7.5% of total building materials (by cost).
- Use of Materials with Recycled Content by at least 30% of total building material (by cost).
- Use of Local Materials by at least 40% of total building materials (by cost).
- Use of Rapidly renewable and/ or Certified wood for at least 95% of all wood based materials (by cost).

Organic Waste Management, Post-occupancy

BMR Credit 2 Points: 1-2

Intent:

Ensure effective organic waste management, so as to avoid domestic waste being sent to landfills and to improve sanitation and health.

Compliance Options:

Install an on-site waste treatment system for handling at least 50% of the organic and landscape waste generated in the building (including tenant-occupied areas). The generated manure or bio-gas shall be utilised as appropriate.

Points are awarded as below:

Percentage of Organic and Landscape Waste Treated	Points
≥ 50%	1
≥ 95%	2

Notes:

- *For calculation, food waste can be considered as 0.1 kg per person per day (i.e. 0.1 kg/ person/ day) or as prescribed by the local byelaw, whichever is more stringent; landscaped waste can be considered as 0.25 kg per sq.m per day (i.e. 0.25 kg/ sq.m/ day).*

Exemplary Performance:

This credit is not eligible for exemplary performance.

Handling of Waste Materials, During Construction

BMR Credit 3 Points: 1

Intent:

Facilitate segregation of construction and demolition waste at source to encourage reuse or recycling of materials, thereby avoiding waste being sent to landfills.

Compliance Options:

Demonstrate that at least 75% of waste generated during construction (as per owner / developer's scope) is diverted from landfills, for reuse or recycling. Use consistent metrics, either weight or volume, to show compliance.

Notes:

- *Construction waste here refers to civil & interior building waste.*
- *Excavated earth & stones should not be considered under this credit, as these are natural resources.*
- *Temporary materials such as materials used for formwork, scaffolding, etc., shall not be considered for this credit calculation.*

Exemplary Performance:

The project is eligible for exemplary performance under ID Credit 1 - Innovation in Design Process, if at least 95% of waste generated during construction (as per owner / developer's scope) is diverted from landfills, for reuse or recycling.

Use of Certified Green Building Materials, Products & Equipment

BMR Credit 4 Points: 1-5

Intent:

Use certified green building materials, products, and equipment, so as to reduce dependence on materials that have associated negative environmental impacts.

Compliance Options:

Ensure that the project uses at least five passive or active green building materials, products, and equipment that are certified by IGBC under Green Product Certification Programme or by a third party agency approved by IGBC.

Points are awarded as below:

Number of Certified Green Products used	Points
1	1
2	2
3	3
4	4
5	5

Notes:

- *Passive Products & Materials include glazing, insulation, paints & coatings, adhesives & sealants, flyash blocks, cement, concrete, composite wood, certified new wood, housekeeping chemicals, false ceiling materials, flooring materials, furniture, gypsum based products, high reflective materials & coatings, etc.,*
- *Active Products include Electrical systems (Lighting Systems & Controls, Pumps & Motors, etc.,), Mechanical systems (unitary air conditioners, etc.,), Plumbing Fixtures (faucets, showers, etc.,)*

Exemplary Performance:

This credit is not eligible for exemplary performance.

Indoor Environmental Quality

Minimum Fresh Air Ventilation

Mandatory Requirement 1

Intent:

Provide adequate outdoor air ventilation, so as to avoid pollutants affecting indoor air quality.

Compliance Options:

❖ **Mechanically Ventilated Spaces:**

Demonstrate that the fresh air ventilation in all regularly occupied areas (owner-occupied and tenant-occupied) to meet the minimum ventilation rates, as prescribed in ASHRAE Standard 62.1 - 2010.

Notes:

- *Projects with unitary air conditioning system catering less than 10% of the total regularly occupied area can show compliance for minimum fresh air ventilation through the criteria defined for Non Air-conditioned Spaces in EE MR 2, 'Case - 2'.*
- *Residential buildings in mixed-use developments can show compliance for minimum fresh air ventilation through the criteria defined in Non Air-conditioned Spaces.*
- *Tenant-occupied buildings should show compliance through feasible typical floor plans & occupancy.*

(And/ Or)

❖ **Non Air-conditioned Spaces:**

(Applicable only for Owner-occupied buildings)

Provide operable windows and / or Doors to the exteriors, in all regularly occupied areas, such that the operable area is designed to meet the criteria as outlined in the Table - 8 below:

Table 8 - Design Criteria for Openable Windows and / or Doors to the Exteriors

Category	Percentage of Openable Area to the Total Carpet Area
Regularly Occupied Area (≤ 100 sq.m)	8%
Regularly Occupied Area (> 100 sq.m)	12%

Notes:

- *Windows / doors should not have any obstruction within 2 m from the exterior surface. Shading devices can be excluded.*
- *For sliding windows / doors, only openable area to the exteriors shall be considered in calculations.*

General Notes:

- *Regularly occupied areas are those where people sit or stand as they work, irrespective of the number of days occupied in a year.*
- *Regularly occupied areas include work stations, cabins, meeting rooms, conference rooms, waiting areas, cafeteria, etc.,*
- *Non-regularly occupied spaces include toilets, store rooms, etc.,*

Tobacco Smoke Control

IEQ Mandatory Requirement 2

Intent:

Minimise exposure of non-smokers to the adverse health impacts arising due to passive smoking in the building.

Compliance Options:

Demonstrate that smoking is prohibited in the building, and is in accordance with the regulations of Ministry of Health & Family Welfare, Government of India.

In case the project has assigned outdoor smoking areas, locate such areas at a minimum of 7.6 meters from all outdoor air intakes (entrance doors, window openings etc.)

Alternately, compliance can be shown through designated smoking rooms which capture and remove tobacco smoke from the building.

Notes for Designing a Smoking Room:

- *The smoking room shall be completely sealed.*
- *The conditioned air entry into the smoking zone shall not return back or be transferred to the air-handling units. This air shall be completely exhausted.*
- *The exhaust air louver / duct should be located at least 7.6 meters away from building entry or fresh air intakes.*
- *The smoking room shall be maintained at a negative pressure of 5 Pascals (0.00005 bar).*

CO_2 Monitoring

IEQ Credit 1 Points: 1

Intent:

Continuously monitor and control carbon dioxide level in the building to ensure occupant comfort and well-being.

Compliance Options:

Demonstrate that the project has installed CO_2 sensors in return air ducts to maintain a differential CO_2 level of maximum 530 ppm in all regularly occupied areas.

Notes:

- *Regularly occupied areas are those where people sit or stand as they work, irrespective of the number of days occupied in a year.*
- *Regularly occupied spaces include work stations, cabins, meeting rooms, conference rooms, waiting areas, cafeteria, etc.,*
- *Non-regularly occupied spaces include toilets, store rooms, etc.,*

Exemplary Performance:

This credit is not eligible for exemplary performance.

Daylighting

IEQ Credit 2 Points: 1-2

Intent:

Ensure connectivity between the interior and the exterior environment, by providing adequate daylighting.

Compliance Options:

The project can choose any one of the following options or a combination, to show compliance:

- Option 1 - Simulation Approach
- Option 2 - Measurement Approach

Note:

- *Tenant-occupied buildings should show compliance through feasible typical floor plans & sections.*

Points are awarded as below:

Percentage of Regularly Occupied Spaces with Daylighting	Points
≥ 75%	1
≥ 95%	2

Notes:

- *Regularly occupied areas are those where people sit or stand as they work, irrespective of the number of days occupied in a year.*
- *Regularly occupied spaces include work stations, cabins, meeting rooms, etc.; whereas, areas with audio-visual facilities such as auditoriums, conference rooms, etc., can be excluded from this credit calculation, with justification and supporting documents.*
- *Non-regularly occupied spaces include toilets, store rooms, etc.,*
- *Regularly occupied spaces which are used for multi-purposes, such as cafeteria-cum-meeting room, can be considered as separate spaces based on the function. The room boundary need not be a physical boundary.*

❖ **Option 1: Simulation Approach**

Demonstrate through computer simulation that 75% of the regularly occupied spaces in the building achieve daylight illuminance levels for a minimum of 110 Lux (and a maximum of 1,100 Lux) in a clear sky condition on 21st September at 12 noon, at working plane.

Areas with 1,100 Lux or more daylight illumination levels should not be considered.

❖ **Option 2: Measurement Approach**

Demonstrate through daylight illuminance measurement that 75% of the regularly occupied spaces in the building achieve daylight illuminance levels for a minimum of 110 Lux. Areas with 1,100 Lux or more daylight illumination levels shall be not considered.

Measurements shall be taken after installation of furniture, equipment & systems at work plane height at 9 am, 12 pm, and 3 pm, on a 10 foot square grid. To show compliance, consider the average of the measurements taken at 9 am, 12 pm, and 3 pm

Exemplary Performance:

This credit is not eligible for exemplary performance.

Outdoor Views

IEQ Credit 3 Points: 1

Intent:

Ensure connectivity between the interior and the exterior environment, by providing adequate views.

Compliance Option:

Achieve direct line of sight to vision glazing between 0.9 meters (3 feet) and 2.1 meters (7 feet) above the finished floor level, for building occupants in at least 75% of all regularly occupied spaces.

Also, the project shall comply with the following criteria:

- The building occupants must not have any obstruction of views at least 8 meters (26.2 feet) from the exterior vision glazing.

  (Or)

- The building occupants must have access either to sky or flora & fauna or both.

Notes:

- *Tenant-occupied buildings shall show compliance through feasible typical floor plans & sections.*
- *Regularly occupied areas are those where people sit or stand as they work, irrespective of the number of days occupied in a year.*
- *Regularly occupied spaces include work stations, cabins, meeting rooms, etc.; whereas, areas with audio-visual facilities such as auditoriums, conference rooms, etc., can be excluded from this credit calculation, with justification and supporting documents.*
- *Non-regularly occupied spaces include toilets, store rooms, etc.,*
- *Regularly occupied spaces which are used for multi-purposes, such as cafeteria-cum-meeting room, can be considered as separate spaces based on the function. The room boundary need not be a physical boundary.*
- *Internal courtyards with vegetation can be considered for this credit calculation.*

Exemplary Performance:

This credit is eligible for exemplary performance under ID Credit 1 - Innovation in Design Process, if more than 95% of the regularly occupied spaces achieve direct line of sight to vision glazing.

Minimise Indoor and Outdoor Pollutants

IEQ Credit 4 Points: 1

Intent

Minimise the exposure of building occupants and maintenance team to hazardous indoor and outdoor pollutants, which adversely affect indoor air quality and occupant health.

Compliance Options:

Demonstrate that the project complies with at least two of the following criteria, as applicable:

- Install entryway systems of minimum 2 meters (6 feet) in length, at all the building main entrances.
- Isolate areas exposed to hazardous gases or chemicals (such as printer / copier rooms, chemical storage rooms, janitor rooms) from regularly occupied areas, as per owner / developer's scope. Also, design such areas with exhaust system*, self-closing door, deck-to-deck partition / hard ceiling.
- For mechanically ventilated buildings, install air filtering media after building flush-out, with at least MERV 13 (Minimum Efficiency Reporting Value) or EU 7 or equivalent, to treat fresh air.
- For mechanically ventilated buildings, install germicidal/ UV lamps in Air-Handling-Unit (AHU) cooling coils.

Notes:

- *Printers / Copier machines: Floor-mounted printers/ copier machines shall be considered to show compliance; whereas, tabletop printers/ copier machines need not be considered.*
- ** The Printer / Chemical storage / Janitor rooms shall be maintained at a negative pressure of 5 Pascals (0.00005 bar).*

Exemplary Performance:

This credit is not eligible for exemplary performance.

Low-emitting Materials

IEQ Credit 5 Points: 1-3

Intent:

Encourage use of materials and systems with low VOC emissions, so as to reduce adverse health impacts on building occupants.

Compliance Options:

Demonstrate that the project complies with any three of the following categories:
(Maximum 3 Points)

- **Paints & Coatings:** ***(1 point)***

  Use paints and coatings (including primers) with low or no VOC content (as specified in Table-9 given below) for 95% of interior wall and ceiling surface area (as per owner / developer's scope).

Table 9 - VOC Limits for Paints & Coatings

Type of Paints & Coatings	VOC Limit (g/L less water)
Non-flat (Glossy)	150
Flat (Mat)	50
Anti-corrosive/ Anti-rust	250
Clear Wood Finish: Varnish	350
Clear Wood Finish: Lacquer	550
Floor Coatings	100

Note:

- *Paints & Coatings the ate certified by IGBC under Green Product Certification Programme or by a third party agency approved by IGBC can be used by the project to show compliance.*

❖ **Adhesives:** ***(1 point)***

For adhesives used within the interiors (as per owner/ developer's scope), ensure that the VOC content does not exceed the limits as specified in Table-10 given below.

Table 10 - VOC Limits for Adhesives

Type of Adhesives	VOC Limit (g/L less water)
Glazing adhesives	100
Ceramic tile adhesives	65
Drywall and panel adhesives	50
Wood substrata adhesives	30
Wood flooring adhesives	100
HVAC duct insulation	850
Indoor Carpet adhesives	50
Multipurpose construction adhesives	70

Note:

- *Adhesives that are certified by IGBC under Green Product Certification Programme or by a third party agency approved by IGBC can be used by the project to show compliance.*

Notes for Paints & Coatings and Adhesives:

- *Volatile organic compounds (VOCs) are carbon compounds that participate in atmospheric photochemical reactions (excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides and carbonates, and ammonium carbonate). The compounds vaporise at normal room temperatures.*
- *If the project has used small quantities of non-complying paints & coatings and / or adhesives, a VOC budget can be calculated to demonstrate that the weighted average VOC of all products (based on litres of each applied) is below the allowed limit, by each type.*

❖ **Carpets:** ***(1 point)***

All carpets installed in the building interior (as per owner / developer's scope) must comply with CRI Green Label Plus Carpet Programme.

Notes:

- *Project is eligible for this credit point only if, the carpet is installed in at least 10% of the project total carpet area.*
- *Carpets certified by IGBC under Green Product Certification Programme can be used by the project to show compliance, as and when the certified materials are available.*

❖ **Composite Wood:** ***(1 point)***

Composite wood and Agri-fiber materials used in the building (as per owner / developer's scope) must not contain added urea-formaldehyde resins.

Notes:

- *Composite wood consists of wood or plant particles or fibers bonded together by a synthetic resin or binder. Examples include plywood, particle-board, and Medium-Density Fiberboard (MDF).*
- *Composite wood that are certified by IGBC under Green Product Certification Programme or by a third party agency approved by IGBC can be used by the project to show compliance.*

❖ **New Wood Furniture:** ***(1 point)***

(Not applicable for Tenant-occupied Buildings)

New wood furniture items such as work stations, chairs, tables, cabinets, etc., shall comply with the indoor air concentrations that are less than or equal to those listed in Table - 11 given below.

The systems furniture & seating shall be tested by the manufacturer at the manufacturing unit or by a third party testing agency at an accredited laboratory.

Table - 11: Maximum Indoor Air Concentrations

Chemical Contaminant	Emission Limits for System Furniture	Emission Limits for Seating
TVOC	0.5 mg/m^3	0.25 mg/m^3
Formaldehyde	50 parts per billion	25 parts per billion
Total Aldehydes	100 parts per billion	50 parts per billion
4 - Phenylcyclohexene (4 - PCH)	0.0065 mg/m^3	0.325 mg/m^3

Notes:

- *Salvaged wood based materials shall not be considered under 'New Wood Furniture' category.*
- *New wood furniture that are certified by IGBC under Green Product Certification Programme or by a third party agency approved by IGBC can be used by the project to show compliance.*

Exemplary Performance:

This credit is not eligible for exemplary performance.

Occupant Well-being Facilities
(Not applicable for Tenant-occupied Buildings)

IEQ Credit 6 **Points: 1**

Intent

Provide occupant well-being facilities, so as to enhance physical, emotional and spiritual well-being of building occupants.

Compliance Options:

Demonstrate that the project has occupant well-being facilities (such as gymnasium, aerobics, yoga, meditation or any indoor / outdoor games) to cater to at least 5% of building occupants, through the day.

Exemplary Performance:

This credit is not eligible for exemplary performance.

Indoor Air Quality Testing, After Construction and Before Occupancy

IEQ Credit 7 Points: 2

Intent:

Avoid occupant's exposure to indoor airborne contaminants before occupying the premises, so as to reduce the adverse health impacts on building occupants.

Compliance Options:

After construction and prior to occupancy, conduct baseline IAQ testing using testing protocols consistent with the ISO method (listed below in Table 12) and demonstrate that the maximum concentration levels of contaminants are not exceeded, as listed below in Table 12, in all regularly occupied areas and commen areas.

Table 12: Maximum Concentration Levels of Contaminants

Contaminant	Maximum Concentration	ISO Method
Formaldehyde	27 parts per billion	ISO 16000-3
Particulates (PM10)	50 micrograms per cubic meter	ISO 7708
Total volatile organic compounds (TVOCs)	500 micrograms per cubic meter	ISO 16000-6
4-Phenylcyclohexene (4-PCH)*	6.5 micrograms per cubic meter	ISO 16000-6
Carbon monoxide (CO)	9 parts per million and no greater than 2 parts per million above outdoor levels	ISO 44
* This test is only required if carpets and fabrics with styrene butadiene rubber (SBR) latex backing are installed as part of the base building systems.		

For each sampling point where the maximum concentration limits are exceeded, conduct additional flush-out with outside air and retest the specific parameter(s) exceeded to comply with the requirement. Repeat procedure until all requirements have been met. When retesting non-complying building areas, take samples from the same locations as in the first test.

The air sample testing shall be conducted as follows:

- All air sample testing measurements to be conducted before occupancy and during normal occupied hours. The ventilation system should be operational starting at the normal start time operated at minimum outside air flow rate under the occupied mode.
- Prior to testing the building shall have all interior finishes installed.
- The number of sampling locations will vary depending upon the size of the building and number of ventilation systems. For each portion of the building served by a separate ventilation system, the number of sampling points shall not be less than one per 2,500 sq.m. (or) For each contiguous floor area, whichever is larger, and include areas with the least ventilation and greatest presumed source strength.
- Air samples shall be collected between 1 meter and 2 meters from the floor, to represent the breathing zone of occupants, and over a minimum 4-hour period.

Exemplary Performance:

This credit is not eligible for exemplary performance.

Indoor Air Quality Management, During Construction

IEQ Credit 8 Points: 1

Intent

Reduce indoor air quality problems resulting from construction activities, and promote comfort and well-being of construction workers and building occupants.

Compliance Options:

Develop and implement an Indoor Air Quality (IAQ) management plan during construction and pre-occupancy phase, addressing the following measures, as applicable:

Note:

- *Consider 'During Construction Indoor Air Quality Management Guidelines' from National Building Code (NBC) of India, Part 7 - Constructional Practices and Safety.*

❖ **Scheduling**

- ➢ Coordinate construction activities to minimise disruption of occupied spaces.
- ➢ Carefully sequence construction activities to minimise IAQ issues.
- ➢ Protect stored on-site and installed absorptive materials from moisture damage. Do not install moisture-damaged materials unless they have been properly dried.

❖ **Electrical & Mechanical Equipment & Systems Protection**

- ➢ Store equipment & systems in a clean, dry location.
- ➢ Protect ducts and equipment by sealing openings.
- ➢ Clean air plenums before use.

❖ **Housekeeping**

- ➢ Implement practices to ensure a clean job site to control potential contaminants such as dirt, dust and debris.
- ➢ Clean up spills, and keep work areas dry.

❖ **Isolate Clean Areas**

- Isolate areas to prevent contamination of clean or occupied spaces using physical separation.

❖ **Source Control**

- Avoid use of finish materials with high VOC and formaldehyde levels.
- Isolate and ventilate, as appropriate, when using any toxic materials or creating exhaust fumes.
- Implement measures to avoid the tracking of pollutants into the work area and occupied portions of the building.

Exemplary Performance:

This credit is not eligible for exemplary performance.

Innovation and Development

Innovation in Design Process

ID Credit 1 Points: 1-4

Intent:

Provide design teams and projects an opportunity to be awarded points for innovative performance in green building categories not specifically addressed by the IGBC Green New Buildings rating system and / or exemplary performance above the requirements set by the IGBC Green New Buildings rating system.

Compliance Options:

- **Innovation**

  Identify the intent of proposed innovation credit, proposed requirement for compliance, and proposed documentation to demonstrate compliance, and the design approach used to meet the required measures.

  (Or)

- **Exemplary performace**

  The project is eligible for exemplery performance performance, if the design and / or construction measures greatly exceed the credit requirements of the IGBC Green New Buildings rating system.

Notes:

- *As a general rule, points for exemplary performance are awarded for doubling the credit requirements and / or achiving the next incremental percentage threshold.*
- *Eligibility criteria for various credits in the IGBC Green New Buildings rating system are defined in respective credits and Exhibit - B.*

General Notes:

The project shall also meet the following criteria for achieving an Innovation point:

- *Quantitative performance improvements (comparing a baseline and design case).*
- *Strategy must be significantly better than standard sustainable design practices.*
- *Measures must be voluntary. Measures that are mandated by the local byelaws and not addressed in the rating system are not eligible for Innovation.*
- *Measures should be implemented both in interior and common areas, as applicable.*

Exhibit B - List of Base Credits eligible for Exemplary Performance

Site Selection and Planning	
SSP Credit 4	Natural Topography or Vegetation: • ≥ 25% of the site area is left undisturbed • ≥ 50% of the site area is restored
SSP Credit 6	Heat Island Reduction, Non Roof: ≥ 95% (Non-roof Impervious Areas)
SSP Credit 7	Heat Island Reduction, Roof: ≥ 95% (Vegetation)
Water Conservation	
WC Credit 1	Landscape Design: No Turf (and) ≥ 60% Drought Tolerant Species
WC Credit 3	Rainwater Harvesting, Roof & Non-roof (as defined in credit)
WC Credit 4	Water Efficient Plumbing Fixtures: ≥ 35%
WC Credit 5	Wastewater Treatment and Reuse: ≥ 95% (Reuse)
Energy Efficiency	
EE Credit 2	Enhanced Energy Performance: • Owner-occupied Buildings: ≥ 36% • Tenant-occupied Buildings: ≥ 34% • Major Renovation Buildings: ≥ 34%
EE Credit 3	On-site Renewable Energy: ≥ 10%
EE Credit 4	Off-site Renewable Energy: ≥ 75% (RECs)
Building Materials and Resources	
BMR Credit 1	Sustainable Building Materials • Building Reuse: ≥ 95% • Reuse of Salvaged Materials: ≥ 7.5% • Materials with Recycled Content: ≥ 30% • Local Materials: ≥ 40% • Wood based Materials: ≥ 95%
BMR Credit 3	Handling of Waste Materials, During Construction: ≥ 95%
Indoor Environmental Quality	
IEQ Credit 3	Outdoor Views: ≥ 95%

Optimisation in Structural Design
(Developmental Credit)

ID Credit 2 **Points: 1**

Intent:

Encourage optimum structural design to reduce dependence on natural resources.

Compliance Options:

Implement a comprehensive structural design philosophy to conserve steel and cement, as compared to national and international practices, for the building type being designed, while maintaining structural integrity.

Demonstrate a saving of at least 5% by weight of steel and cement.

Notes:

- *This is developmental credit. Projects are encouraged to attempt this credit, so as to help IGBC in developing baselines for future use.*
- *The baseline steel and cement requirements for construction activities shall be defined by the project team with supporting calculations.*

Water Use Reduction for Construction
(Developmental Credit)

ID Credit 3 **Points: 1**

Intent:

Enhance water use efficiency, thereby minimising the use of potable water for construction activities.

Compliance Options:

- Demonstrate that the project has reduced at least 10% of the potable water required for construction activities (concrete mixing, plastering works and curing), as compared to national and international practices, for the building type being designed, with the use of:
  - Treated waste water
  - Admixtures & curing compounds
  - Any other innovative measures

  Ensure that the quality of construction is not compromised by reducing potable water requirement or by reusing treated waste water.

(AND)

- The treated waste water shall meet the quality standards suitable for reuse during construction, as prescribed by:
  - Bureau of Indian Standards (BIS) - Plain and Reinforced Concrete (Code of Practice) IS 456 : 2000, Section 2 - Materials, Workmanship, Inspection and Testing, 5.4 - Water, 'Table 1 - Permissible Limit for Solids'

    (Or)
  - Central (or) State Pollution Control Board

Notes:

- *This is developmental credit. Projects are encouraged to attempt this credit, so as to help IGBC in developing baselines for future use.*
- *Treated waste water from other sites / local authorities through piped connections or other means can also be considered to show compliance.*
- *The baseline water requirement for construction activities shall be defined by the project team with supporting calculations.*

IGBC Accredited Professional

ID Credit 4 **Points: 1**

Intent:

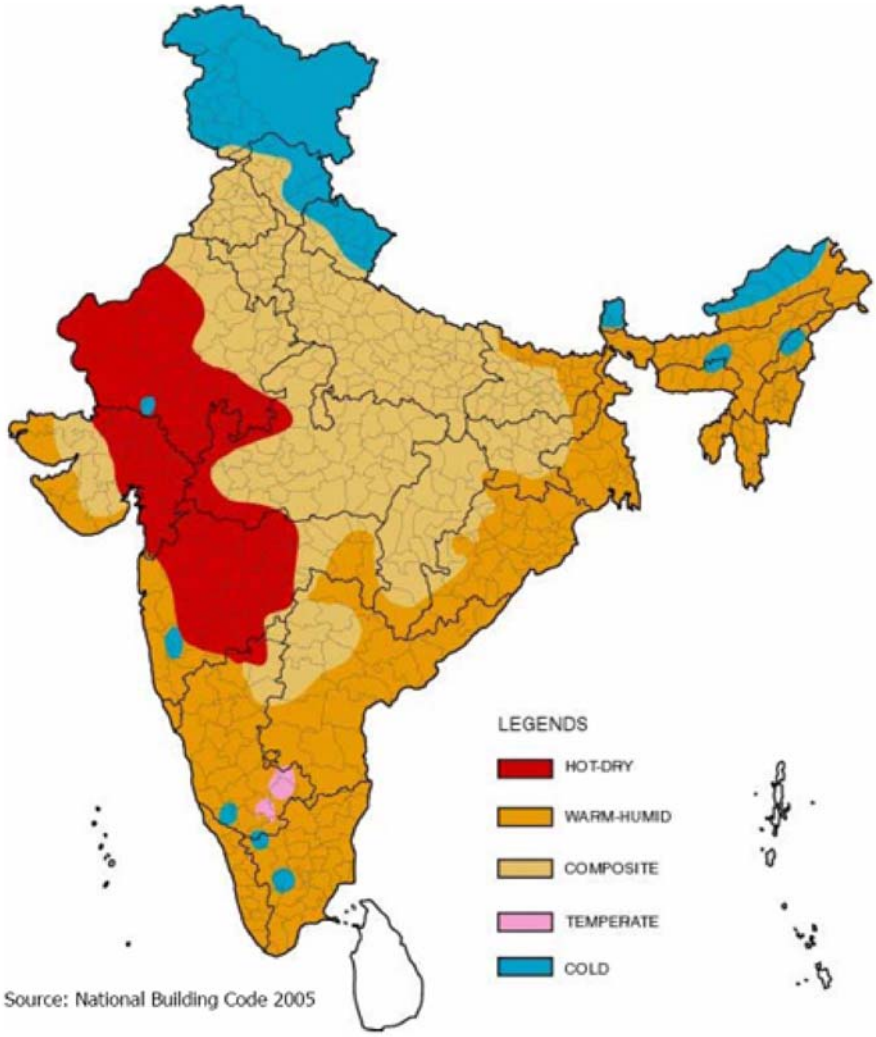
Support and encourage involvement of IGBC Accredited Professional in green building projects, so as to integrate appropriate design measures and streamline the certification process.

Compliance Options:

At least one principal participant of the project team shall be an IGBC Accredited Professional.

Annexures

Annexure - I: Climate Zone Map of India



Annexure - II : EE MR 2 - Minimum Energy Efficiency
Baseline Criteria for Building Envelope Measures under Case 2 - Non air-conditioned Buildings

1) Envelope Measures:
(* For Climatic Zones of India, please refer Annexure - I)

❖ **Fenestration - SHGC value**

Climate Zone *	Maximum SHGC Value	
	WWR ≤ 40%	WWR > 40%
Hot and Dry	0.42	0.36
Warm and Humid	0.42	0.36
Composite	0.42	0.36
Temperate	0.48	0.4
Cold	0.8	0.8

❖ **Glazing U-value**
(Applicable only if Window-to-Wall Ratio WWR > 40%)

Climate Zone *	Maximum U-value (W/m^2K) *(WWR > 40%)*
Hot and Dry	5.7
Warm and Humid	5.7
Composite	5.7
Temperate	5.7
Cold	5.7

❖ **Wall Assembly U-value**

Climate Zone *	Maximum U-value of the overall wall assembly (W/m^2K)
Hot and Dry	2.5
Warm and Humid	2.5
Composite	2.5
Temperate	2.5
Cold	1.1

❖ **Roof Assembly U-value**

Climate Zone *	Maximum U-value of the overall roof assembly (W/m^2K)
Hot and Dry	1.2
Warm and Humid	1.2
Composite	1.2
Temperate	1.8
Cold	1.2

Annexure - III: EE Credit 2 Enhanced Energy Efficiency
Baseline Criteria for Building Envelope Measures under Case 2 - Non-air conditioned Buildings

1) Envelope Measures:
(* For Climatic Zones of India, please refer Annexure - I)

❖ **Fenestration - SHGC value**

Climate Zone *	Maximum SHGC Value	
	WWR ≤ 40%	WWR > 40%
Hot and Dry	0.32	0.27
Warm and Humid	0.32	0.27
Composite	0.32	0.27
Temperate	0.40	0.30
Cold	0.8	0.8

❖ **Glazing U-value**
(Applicable only if Window-to-Wall Ratio WWR > 40%)

Climate Zone *	Maximum U-value	
	WWW < 40%	WWW > 40%
Hot and Dry	3.3	2.8
Warm and Humid	3.3	2.8
Composite	3.3	2.8
Temperate	5.7	3.3
Cold	3.3	2.8

❖ **Wall Assembly U-value**

Climate Zone *	Maximum U-value of the overall wall assembly (W/m^2K)
Hot and Dry	1.8
Warm and Humid	1.8
Composite	1.8
Temperate	1.8
Cold	0.8

❖ **Roof Assembly U-value**

Climate Zone *	Maximum U-value of the overall roof assembly (W/m^2K)
Hot and Dry	0.5
Warm and Humid	0.5
Composite	0.5
Temperate	0.75
Cold	0.5

About CII
(Confederation of Indian Industry)

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 over 7,200 members, from the private as well as public sectors, including SMEs and MNCs, and an indirect membership of over 1,00,000 enterprises from around 242 national and regional sectoral industry bodies.

With 64 offices, including 9 Centres of Excellence, in India, and 7 overseas offices in Australia, China, Egypt, France, Singapore, UK, and USA, as well as institutional partnerships with 312 counterpart organizations in 106 countries, CII serves as a reference point for Indian industry and the international business community.

About IGBC
(Indian Green Building Council)

The Indian Green Building Council (IGBC), part of Confederation on Indian Industry (CII) was formed in the year 2001. The vision of the council is to enable Sustainable Built-Environment for all, and to make India, one of the world leaders in Sustainable Built-Environment by 2025.

The council offers a wide array of services which include developing new green building rating programmes, certification services and green building training programmes. The council also organises Green Building Congress, its annual flagship event on green buildings.

The council is committee-based, member-driven and consensus-focused. All the stakeholders of construction industry comprising of architects, developers, product manufacturers, corporate, Government, academia and nodal agencies participate in the council activities through local chapters.

IGBC Green Building Rating Systems

National by Choice

Global in Performance

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For more information on Green Buildings, please contact

Confederation of Indian Industry

Indian Green Building Council
Greening India since 2001

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