Confederation of Indian Industry

IGBC

IGBC Net Zero Carbon Rating System

(Pilot Version)

November 2023

www.igbc.in

Disclaimer

None of the parties involved in developing the IGBC Net Zero Carbon (pilot version) rating system, including the Indian Green Building Council assume any liability or responsibility, to the user or any third parties for any injuries, losses or damages arising out of such use.

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Foreword from the Indian Green Building Council (IGBC)

India is witnessing tremendous growth in building sector and infrastructure. The building sector in India is one of the largest economic activities and is growing rapidly. As the sector is growing rapidly, preserving the environment poses a host of challenges. To enable the building sector environmentally sensitive, Confederation of Indian Industry has established the Indian Green Building Council (IGBC).

IGBC is a consensus driven not-for-profit Council representing the building industry, consisting of more than 1,710 committed members. The Council encourages, builders, developers, owners, architects, consultants, and contractors to design, construct & operate green and net zero buildings thereby enhancing the economic and environmental performance of buildings.

IGBC has launched the mission on 'Net Zero' with the vision of facilitating India to become one of the foremost countries in transforming to Net Zero by 2050. As part of this mission to facilitate buildings and the built environment to adopt Net Zero concepts, IGBC has developed specific rating systems related to Net Zero Energy, Net Zero Water and Net Zero Waste to Landfill. The development of IGBC Net Zero Carbon (pilot Version) rating system is another important step in this direction to reduce the operational and embodied emissions. The rating system has been developed based on consensus and support of all the relevant stakeholders.

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Introduction

Climate change is posing an existential crisis for humanity. With rising global temperatures, melting ice caps, rising sea levels and man induced natural calamities, the effects of climate change are now more evident than ever before. During the UN Climate Change Conference of the Parties (COP 26), India has committed to achieve Net Zero emissions by 2070. To achieve the Net Zero ambition, India committed that, by 2030, the renewable capacity would be increased to 500 GW, 50% of the energy requirement will be non- fossil fuel based, reduce the carbon emissions by 1 billion-tonne and the carbon emission intensity of economy would be brought down by 45%.

The government of India over the last two decades has initiated several new missions & policies which support the path towards net zero carbon buildings, cities and nation. To name a few missions & policies – Energy Conservation Act (2001) – Energy Conservation Building Code, National Action Plan on Climate Change (2008) – Perform Achieve Trade Scheme, National Solar Mission (2010), Swachh Bharat Mission (2014), Green India Mission (2015), Smart City Mission (2015), National Energy Policy (2018) and Sustainable Public Procurement (2018).

The building and construction sector in India accounts for 32% of the total GHG emissions inventory covering both operational and embodied emissions in 2021 (Source: AEEE). According to IEA's Stated Policies Scenario in India Energy Outlook 2021, India's CO2 emissions from existing and new buildings are projected to grow from 194 MtCO2 in 2020 to 245 MtCO2 in 2040 (Source: IEA).

In this context, the building sector in the country has an excellent opportunity to take the leadership role for accelerating the uptake of Net Zero.

IGBC's Mission on Net Zero

On Earth-day in 2021, IGBC launched 'IGBC Mission on Net Zero' with a vision 'to facilitate India become one of the foremost countries in transforming to Net Zero by 2050'. A journey to achieve Net Zero buildings & built environments by 2050 in all aspects i.e., Energy, Water, Waste and Carbon. The mission facilitates adoption of Net Zero concepts to support market transformation towards total building sector decarbonisation. So far, more than 350 organisations from the Indian building sector have committed to achieve the Net Zero status for their new & existing buildings.

IGBC strongly believes that the Mission on Net Zero would have far reaching impacts on the built environment in the country. The key aspects of the Mission include – creating a National movement on Net Zero by engaging policy makers, corporates & academia, knowledge sharing with stakeholders, capacity building of professionals, and promoting eco-labelled and efficient technologies that would result in quantum jumps in carbon reduction.

IGBC Net Zero Carbon Rating System

IGBC has formed the Net Zero Cabon Technical Committee to develop the rating programme. This committee comprised of key stakeholders, including architects, builders, developers, owners, consultants, 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

The IGBC Net Zero Carbon rating system is a voluntary and consensus-based programme. The rating system is fundamentally designed to encourage the use of low-embodied carbon materials, optimise the buildings' performance using passive features and technologies, and use of on-site & off-site renewable energy systems and carbon sequestration measures to reduce or off-set the carbon emissions associated with the buildings and its concerned environment.

The rating system evaluates certain mandatory requirements & credit points using a prescriptive approach and others on a performance-based approach.

B. Benefits

The IGBC Net Zero Carbon rating system addresses the three pillars of sustainability i.e., Social, Environmental and Economical; thereby, the building and campus projects adopting net zero carbon concepts can have multi-fold tangible and intangible benefits.

- Carbon emission reduction: Promotes the reduction of greenhouse gas emissions, contributing to India's efforts to combat climate change.
- Resource efficiency: Encourages the efficient use of resources, minimising the environmental impact associated with building construction and operations.
- Energy conservation: Promotes the use of energy-efficient technologies and practices, reducing overall energy consumption in buildings.
- Renewable energy integration: Encourages the integration of renewable energy sources, such as solar power, to meet building energy needs.
- Efficient water use: Encourages the adoption of water-efficient technologies and practices to minimize water consumption in buildings.
- Waste minimisation: Emphasizes the reduction of construction and operations waste through responsible practices.
- Climate adaptation: Promotes building designs that are resilient to the impacts of climate change, ensuring long-term viability and safety.

C. Scope

- The Net Zero Carbon rating system (pilot version) is designed for both new & existing buildings and campuses.
- Net Zero Carbon buildings and campuses include (but are not limited to) airports, commercial, educational institutions, healthcare, hospitality, residential, transit, etc.
- Projects in Design & Construction phase are those which are design and/ or in construction or in operations for less than one year.
- Projects in operations phase are those which are in operations for more than one year.
- The rating system is applicable for buildings with enclosed and habitable spaces.
- The rating system is applicable to owner-occupied/ tenant-occupied/ mixed-use permanent buildings and campuses with at least one occupant.
    - Interior fit-out projects are not eligible to apply in the present version.
- The tenant-occupied projects shall include the scope of work as per the scope of developer only and not that of tenants while demonstrating compliance.

D. Certification Levels

The different levels of rating awarded are as below:

- **Design & Construction phase**

Certification Level
Near Net Zero Carbon
Net Zero Carbon

- **Operations phase**

Certification Level
Near Net Zero Carbon
Net Zero Carbon

E. Validity

The rating awarded for IGBC Net Zero Carbon under Design & Construction phase or Operations phase would be valid for a period of 3 years. The projects certified under Design & Construction phase shall apply for Operations phase certification with the prevailing version. The projects certified under Operations phase shall apply for recertification with the prevailing version.

The projects can also apply for re-certification/ renewal within 3 years of award of the rating for upgradation in the rating level.

Overview and Process

The IGBC Net Zero Carbon rating system promotes resource efficiency and encourages use of renewable energy and carbon sequestration measures to offset carbon. The guidelines detailed under each mandatory requirement & credit facilitates the Design & Construction phase and Operations phase projects of all sizes and types (as defined in the Scope) to comply and apply for Certification.

A. When to use IGBC Net Zero Carbon rating system

The IGBC Net Zero Carbon rating system is designed for both new and existing buildings and campuses. The project team shall evaluate all the possible points to apply under the rating system using a relevant checklist - Design & Construction phase or Operations phase.

- **Design & Construction phase**

  The project can apply for IGBC Net Zero Carbon certification - Design & Construction phase, if the project meets all the mandatory requirements along with the criteria given below:

Certification Level	Criteria	Minimum Points to Comply
Near Net Zero Carbon	Achieve embodied carbon of less than or equal to 700 kg CO2e/square meter benchmark and offset at least 75% of the total operational carbon	40
Net Zero Carbon	Achieve embodied carbon of less than or equal to 700 kg CO2e/square meter benchmark and offset at least 90% of the total operational carbon	60

- **Operations phase**

  The project can apply for IGBC Net Zero Carbon certification – Operations phase, if the project meets all the mandatory requirements along with the criteria given below:

Certification Level	Criteria	Minimum Points to Comply
Near Net Zero Carbon	Offset at least 75% of the total operational carbon	40
Net Zero Carbon	Offset at least 90% of the total operational carbon	60

B. Registration

Organisations interested in registering their projects under IGBC Net Zero Carbon rating system are advised to first register on IGBC website (www.igbc.in) under 'IGBC Net Zero Carbon 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, and important communications, along with other necessary information.

IGBC website provides all important details on IGBC Net Zero Carbon rating system registration & certification - process, timeline, and fee.

C. Certification

To achieve the IGBC Net Zero Carbon certification, the project must satisfy all the compliance requirements defined under 'Overview and Process - When to use IGBC Net Zero Carbon rating system'.

The projects can apply for certification at the following phases:

- Design & Construction phase – Design and Final Certification
- Operations phase – Provisional and Final Certification

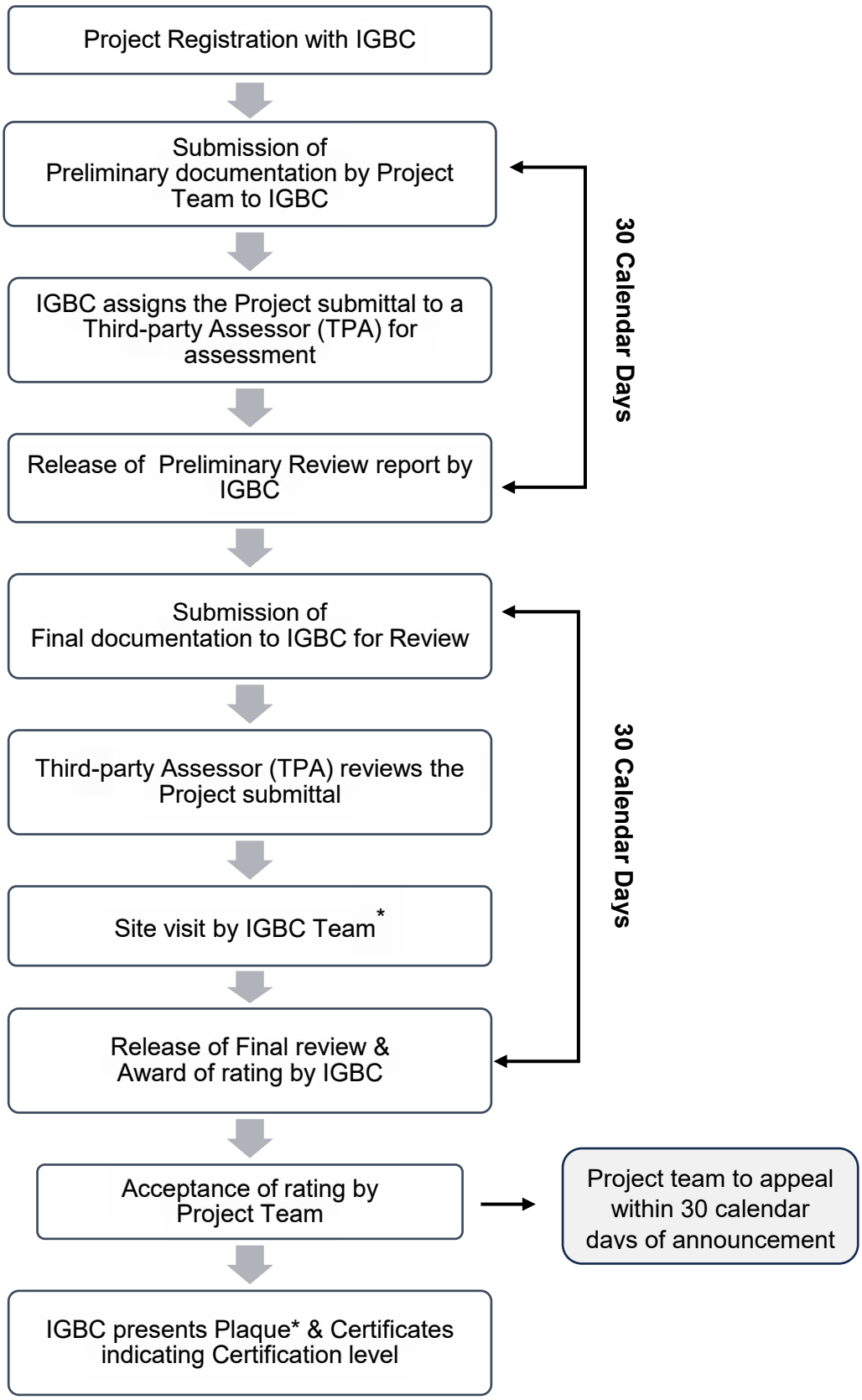
The project team is expected to provide supporting documents at preliminary and final stage of submission, for all the mandatory requirements and the credits attempted. The project documentation is submitted in two phases - Preliminary submittal and Final submittal:

- Preliminary phase involves submission of all documents, which shall include the mandatory requirements and credits. After the preliminary submission, the preliminary review is done by third-party assessors and the review comments would be provided within 30 calendar days.
- The next phase involves submission of clarifications to the preliminary review queries as final submission. The final review will also be provided within 30 calendar days, and the IGBC rating is awarded.

It is important to note that the mandatory requirements and credits achieved 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 the additional documents showing implementation of design and construction features.

If there are changes in any ‘expected credits’ after completing the preliminary review, these changes need to be documented and resubmitted during the final review. The project would be recognised depending upon the number of credit points and the criteria they comply with. IGBC will recognise projects with formal letter of certification and a mountable plaque.

D. Certification Process:



**Applicable for projects applying for final certification under Design & Construction phase and Operations phase*

E. Credit Interpretation Ruling (CIR)

In some instances, there is a possibility that the design/ construction/ operations 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 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 CIR's, if available, on the relevant mandatory requirement or credit. All projects registered under IGBC Net Zero Carbon 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 for each project, 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 denied mandatory requirements/ credits.

The documentation of the mandatory requirements/ credits seeking appeal may be resubmitted to IGBC along with necessary fees. IGBC will take 15 calendar 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 taken at various stages of construction.
2. 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 and Certification 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 pilot version will be made available through IGBC website. The additions thereof will be suitably incorporated in the same or next version of the rating system.

IGBC Net Zero Carbon Rating System (Pilot Version) - Approach

Definition: *"Net Zero Carbon buildings or campuses are highly resource efficient and offsets all direct and indirect carbon emissions on account of its design, construction and operations."*

The IGBC Net Zero Carbon rating system (pilot version) is developed based on the Whole Building Life Cycle Analysis (LCA) approach as per the ISO Standard 14040, to account carbon emissions from different stages of the project i.e., Design, Construction and Operations based on the status of the project. The rating system addresses projects in 'Design & Construction' phase and 'Operations' phase with different checklists to effectively minimise or eliminate the carbon emissions. This distinction allows projects in different phases with tailored strategies i.e., addressing embodied carbon in Design & Construction phase, and energy efficiency & renewable energy in Operations phase.

Projects in Design & Construction Phase

For projects in design & construction phase, the rating system facilitates to:

- Use low embodied carbon materials & products to meet the Embodied Carbon benchmark (i.e., 700 kg of CO2e per square meter).
- Estimate or arrive at the annual energy consumption to account the operational carbon.
- Develop roadmap for offsetting the operational carbon using renewable energy sources and carbon sequestration measures.

Embodied Carbon:

During the design stage, the project shall evaluate the embodied carbon of civil materials & products (excluding finishing materials) available in the market and then choose those materials & products which have lower embodied carbon. The transportation emissions of building materials are also a significant contributor to a building's embodied carbon footprint. The use of locally sourced materials minimises transportation distances, thereby reducing the associated carbon emissions.

Operational Carbon:

Later the project shall calculate the estimated annual energy consumption of a building or campus during its design phase, which involves a detailed analysis of energy usage patterns. This includes energy usage for cooling, lighting, and equipment & systems, etc. Energy-efficient building design goes beyond meeting the regulatory requirements, and involves integrating passive architectural measures, insulation materials, energy-efficient equipment, and smart building systems.

The project shall prioritise energy efficiency measures before considering carbon offsetting strategies. This approach ensures that efforts are first directed towards reducing the building's carbon footprint through internal measures.

The integration of renewable energy systems is key aspect to demonstrate the compliance for net zero carbon. Sourcing of electricity from renewable energy sources and offsetting carbon emissions during the operations phase ensures a continuous commitment to carbon neutrality. This could involve a combination of on-site renewable energy generation and off-site renewable energy purchases or any other carbon sequestration measures to balance the remaining carbon emissions. This approach allows the projects to choose the most suitable offsetting strategies based on their specific requirements and constraints.

Projects in Operations Phase:

The pursuit of Net Zero Carbon for existing buildings raises a question to distinct embodied carbon and operational carbon. Unlike new building projects, existing buildings are already standing structures, and the emphasis typically shifts towards optimising operational efficiency and offsetting operational carbon emissions. It is usually acknowledged that these structures have already undergone construction, and the embodied carbon associated with their creation cannot be retroactively altered.

Recognising the constraints related to offsetting embodied carbon in existing buildings, the Net Zero Carbon compliance approach places complete emphasis on operational carbon. Operational carbon encompasses the emissions generated during the day-to-day functioning of the buildings and its associated environment, including energy, water, and material consumption and waste generation.

The projects in operations phase shall primarily concentrate efforts on implementing energy efficiency measures. This involves adopting technologies and strategies to minimise energy consumption and ultimately reduce the overall operational carbon emissions.

A pivotal aspect for achieving Net Zero Carbon status in the operations phase is the integration of renewable energy sources. By integrating on-site renewable energy generation systems and off-site renewable energy purchases, or carbon sequestration measures, the project can offset operational carbon emissions to a large extent. This way the projects reliance on carbon-intensive energy sources is reduced, thereby contributing to a significant decrease in operational carbon emissions.

Offsetting operational carbon provides a practical pathway for existing buildings to achieve Net Zero Carbon status.

IGBC Net Zero Carbon

Design & Construction Phase

IGBC Net Zero Carbon

Design & Construction Phase – Checklist

Modules		Credit Points
MR 1	Whole Building Life Cycle Analysis	Required
Embodied Carbon		
EC CR 1	Green Procurement	20
EC CR 2	Reduction in Embodied Carbon	40
	Sub-total	**60**
Operational Carbon		
OC MR 1	Integrated Approach to Net Zero	Required
OC CR 1	Passive Architecture	5
OC CR 2	Energy Efficiency	10
OC CR 3	Water Use Performance	5
OC CR 4	Net Zero Waste to Landfill	5
OC CR 5	Offset Operational Carbon	15
	Sub-total	**40**
	Total	**100**

Certification Level	Criteria	Minimum Points to Comply
Near Net Zero Carbon	Achieve embodied carbon of less than or equal to 700 kg CO2e/square meter benchmark (and) offset at least 75% of the total operational carbon	40
Net Zero Carbon	Achieve embodied carbon of less than or equal to 700 kg CO2e/square meter benchmark (and) offset at least 90% of the total operational carbon	60

Whole Building Life Cycle Analysis

Mandatory Requirement 1

Intent:

Ensure project carries out whole building life cycle analysis to improve building performance and reduce carbon emissions by using low carbon materials and technologies.

Compliance Options:

Perform whole building Life Cycle Analysis (LCA) to estimate carbon emissions as per ISO standard 14040, and report the following for the overall built-up area of the project:

- Embodied carbon in kg CO_2e per square meter
- Operational carbon in kg CO_2e per year considering a minimum building lifespan 50 years.

Notes:

- *The LCA shall be carried out using a standard recognised software tool.*
- *The proposed case embodied carbon (in kg of CO2e per square meter) shall be calculated considering all the proposed civil materials as per the Bill of Quantities (BOQ).*
- *The illustrative list of civil materials for core and shell structure shall include cement, steel, concrete, glass, aluminium, Blocks / bricks, RMC, sand, tiles, stones/ marble.*
- *Carbon owing to material transportation from manufacturing plant to project site shall also be considered while calculating the embodied carbon for the respective material.*

<u>Methodology to calculate Proposed case Embodied Carbon:</u>

- The project team shall use Life Cycle Analysis (LCA) tools to calculate the embodied carbon of each material considering embodied carbon of the respective materials and embodied carbon resulting from transportation from the manufacturing plant to the project site.
- The embodied carbon of respective materials can be sourced from Environmental Protection Declarations (EPDs) or Eco-labelling programmes such as GreenPro or equivalent.
- The embodied carbon of all the civil materials shall be considered to calculate the aggregate design case embodied carbon.

Embodied Carbon

(During Design & Construction phase)

Green Procurement

Credit 1 **Points: 20**

Intent:

Procure green products and materials for construction of buildings to reduce embodied carbon emissions.

Compliance Options:

- Develop a green procurement policy for procuring green materials and products for construction. The policy shall cover civil and interior materials and products.
  - Communicate the green procurement policy to the entire project team involved in design and construction for considering green material & products by design. The project team shall specify the green material & products as part of Bill of Quantities (BOQ).
  - The project team shall have a combination of the following materials & products or any other green materials:
    - Eco-labelled materials & products: GreenPro or equivalent Eco-labelled materials & products.
    - Construction & Demolition waste products: Products and materials made up of construction & demolition (C & D) waste.
    - Salvaged materials: Materials that have lived their life and about to be sent to landfill.
    - Recycled materials: Materials with high recycled content.
    - Alternative materials: Alternative construction materials which conserve natural resources e.g., M Sand.

(And)

- Demonstrate at least 10% of the total cost of the suggested green products and materials to the total cost of the products and materials proposed/ used for construction.

Points are awarded as below:

% Cost of Green Materials & Products	Points
> 10%	2
≥ 20%	4
≥ 30%	6
≥ 45%	10
≥ 60%	15
≥ 75%	20

Embodied Carbon Reduction

Credit 2 **Points: 40**

Intent:

Implement low carbon strategies and measures during design & construction phase and ensure reduction in the embodied carbon of materials & products, compared to as usual building industry construction practices.

Compliance Options:

- Demonstrate that the proposed case embodied carbon of the project is less than or equal to 700 kg CO_{2e}/square meter.

  (AND)

- Demonstrate that the project reduces the Embodied Carbon by at least 2% vis-a-vis 700 kg CO_{2e}/square meter benchmark.

  Points are awarded as below:

% Reduction in Embodied Carbon	Points
2%	2
4%	4
6%	6
8%	9
10%	12
12%	15
14%	20
16%	25
18%	32
20%	40

The proposed case embodied carbon (in kg of CO_{2e} per square meter) shall be calculated considering all the proposed civil materials as per the Bill of Quantities (BOQ).

- The illustrative list of civil materials for core and shell structure shall include cement, steel, concrete, glass, aluminium, Blocks / bricks, RMC, sand, tiles, stones/ marble.

- Carbon owing to material transportation from manufacturing plant to project site shall be also considered while calculating the embodied carbon for the respective material.

Operational Carbon

(Estimation for Operations phase)

Integrated Approach to Net Zero

Mandatory Requirement 1

Intent:

Use holistic and integrated approach considering efficient use of energy, water, and consumable materials in operations to reduce carbon emissions.

Compliance Options:

Demonstrate that the project complies with the following criteria, based on the design parameters:

❖ **Energy Efficiency**

- Demonstrate that the proposed case EPI ratio of the project is less than or equal to 0.95, as per the criteria defined in the IGBC Net Zero Energy rating system using whole building energy simulation approach.

❖ **Water Use Performance**

- Demonstrate that the project achieves Water Performance Ratio (WPR) of at least 10%, as per the criteria is defined in IGBC Net Zero Water rating system.

❖ **Green Procurement & Waste Management**

- Green Procurement Policy

  Develop a green procurement policy for procuring green materials and products during operations. The policy shall cover consumables used for building operations.

  - Communicate the green procurement policy to the entire facility team involved in operations for considering green material & products by design. The project team shall specify the green material & products as part of procurement requirement.
  - The project team shall have a combination of the following materials & products or any other green materials:
    - Facility maintenance products: GreenPro or equivalent eco-labelled certified or biodegradable housekeeping chemicals, office consumables
    - Eco-friendly packaging: Paper bag, Cloth bag or equivalent
    - 100% recycled papers - chlorine-free, acid-free or equivalent
    - Biodegradable printing inks

- Waste Segregation and Collection
  - Building-level Facility

    Provide separate bins to collect dry waste (paper, plastic, metals, glass, etc.,) and wet waste (food & garden), 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)

  - 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 must follow the Hazardous Waste Management Guidelines as prescribed by the Ministry of Environment & Forest (MoEF), Government of India.

- On-site Wet Waste Treatment System

  Demonstrate that the project intends to install an on-site waste treatment system for handling at least 50% of the organic (food & garden) waste generated in the building (including tenant-occupied areas). The generated manure or biogas shall be utilised as appropriate.

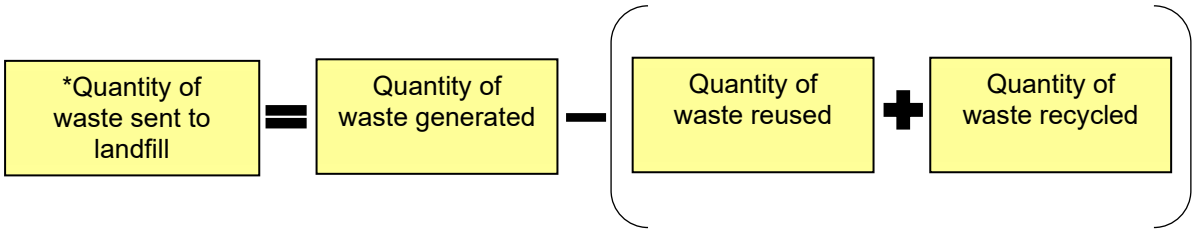
  Notes:

  - *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; projects with canteen and in-house cooking facility can be considered as 0.25 kg per person per day (i.e., 0.25 kg/ person/ day).*
  - *For calculation, garden waste can be considered as 0.2 kg per sq.m per day (i.e., 0.2 kg/ sq.m/ day).*
  - *If the project is having an organic waste convertor in an enclosed room, then design such area with exhaust system, self-closing door, deck-to-deck partition/ hard ceiling.*

- Net Zero Waste to Landfill

  Demonstrate that the waste sent to landfill is less than or equal to 60% of the total waste generated during operations, as defined in IGBC Net Zero Waste to Landfill (Operations) rating system.

$$\%\ \textbf{of quantity of waste sent to landfill} = \frac{*\textbf{Quantity of waste sent to landfill}}{\textbf{Total quantity of waste generated}} \boldsymbol{X100}$$



Passive Architecture

Credit 1 **Points: 5**

Intent:

Adopt passive architectural design features to minimise associated negative environmental impacts.

Compliance Options:

- **Prescriptive Approach**

  Demonstrate that the project has implemented at least one of the following Climate Responsive Passive Design measures as listed in following table: *(1 points for each passive design measure; maximum 5 points)*

Concept	Criteria
Orientation & Internal zoning	Zoning of buffer areas and regularly occupied areas as per the Sun path analysis.
Courtyard	Design building with at least one courtyard. The courtyard's shorter side should not be more than 2.5 times the height of the abutting walls to ensure self-shading while permitting diffused light.
Shading corridors	Design corridors that are exposed to ambient climatic conditions so as to achieve 75% shading during daytime
Exterior Openings	At least 75% of the exterior openings (fenestration) have a Projection Factor* of 0.3 or more (with overhangs or vertical fins) as per climatic zone and orientation.
Light shelves	Design light shelves for 50% of the windows/ glazed areas, as per climatic zone and orientation
Walls	Design 50% of the external walls (Trombe wall, High thermal mass, Cavity walls, Hollow brick walls) by surface area as per climatic zone
Roof garden	Design 50% of net roof area with roof garden to mitigate UHI effect.
Vertical landscaping on exterior building walls	Design 25% of the exterior building walls, excluding glazing, with vertical landscaping
Cross ventilation	Design 50% of the unconditioned regularly occupied spaces so as to achieve cross ventilation. *Note: This criterion is applicable only for naturally ventilated buildings.*
Passive Cooling / Heating Technologies	Wind tower, Earth tunnel, Geothermal technologies, etc.

(OR)

❖ **Simulation Approach**

Demonstrate that the passive architecture measures implemented in the project has resulted in atleast 1% 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 passive concepts and design features

  (E.g., orientation, courtyard, shaded corridors, skylights, light shelves, shading devices, pergolas, punched windows, bay windows, Trombe wall, high thermal mass, cavity walls, hollow brick walls, roof garden, vertical landscaping on exterior building walls, cross ventilation)

- Passive cooling / heating technologies
  (E.g., wind tower, earth tunnel, geothermal technologies)

Points are awarded as below:

Percentage of Energy Savings achieved through Passive Architecture	Points
≥ 1%	1
≥ 2%	2
≥ 3%	3
≥ 4%	4
≥ 5%	5

Energy Efficiency

Credit 2 **Points: 10**

Intent:

Ensure excellence in energy efficiency in building operations to reduce associated environmental impacts from excessive energy use.

Compliance Options:

Demonstrate that the project is able to reduce the Energy Performance Index Ratio (EPI Ratio) by improving the energy performance of the facility.

Calculate the Energy Performance Index Ratio (EPI Ratio) as below:

$$\text{Energy Performance Index Ratio (EPI Ratio)} = \frac{Actual\ Energy\ Performance\ Index}{Standard\ Energy\ Performance\ Index}$$

The Energy Performance Index (EPI) of a building is its annual energy consumption in kWh per square meter of the building. While calculating the EPI of a building, the area of unconditioned basements shall not be included. EPI can be determined by:

$$\text{Energy Performance Index (EPI)} = \frac{Annual\ energy\ consumption\ (in\ kWh)}{Total\ Builtup\ Area\ (in\ Squre\ meters)}$$

Actual Energy Performance Index (EPI):

Actual EPI shall be calculated considering the preceding one year of utility bills and renewable energy generation report. Project team can also perform calibrated energy simulation to arrive actual energy consumption in case of utility bills are not available for project.

Standard Energy Performance Index:

- Standard EPI shall be calculated with the support of calibrated energy simulation while considering ECBC 2017 as a baseline for commercial typology.
- All other typologies shall follow respective IGBC rating's minimum energy performance requirement to calculate or arrive standard EPI.

Points are awarded as below:

EPI ratio	Points
≤ 0.9	1
≤ 0.85	2
≤ 0.8	3
≤ 0.75	4
≤ 0.7	6
≤ 0.65	8
≤ 0.6	10

Water Use Performance

Credit 3 **Points: 5**

Intent:

Use of alternate water for various water end use, to reduce raw water demand.

Compliance Options:

Demonstrate that the project achieves Water Performance Ratio (WPR) of at least 20%, as per the criteria is defined in IGBC Net Zero Water rating system.

$$Water\ Performance\ Ratio = \frac{Alternate\ Water\ Consumption}{Total\ Water\ Consumption}$$

Points are awarded as below:

Water Performance Ratio	Points
20%	1
30%	2
40%	3
50%	5

Net Zero Waste to Landfill

Credit 4 **Points: 5**

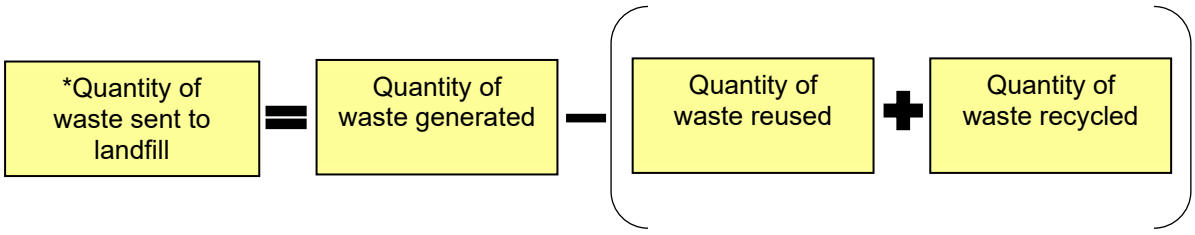
Intent:

Ensure that the quantity of waste diverted from landfill is maximised to reduce the associated environmental impacts.

Compliance Options:

- Develop strategies to demonstrate that the waste sent to landfill is less than or equal to 50% of the total waste generated during operations, as per the equation given below:

$$\%\ \textbf{of quantity of waste sent to landfill} = \frac{*\textbf{Quantity of waste sent to landfill}}{\textbf{Total quantity of waste generated}} \boldsymbol{X100}$$



Points are awarded as below:

% of Waste Reduction to Landfill	Points
50%	1
35%	2
20%	3
10%	4
5%	5

Offset Operational Carbon

Credit 5 **Points: 15**

Intent:

Use renewable energy sources and carbon sequestration measures to reduce carbon emissions.

Compliance Options:

Develop a roadmap to offset at least 75% of the project's estimated annual operational carbon by using renewable energy sources and carbon sequestration measures such as plantation.

Points are awarded as below:

Criteria	Points
Offset at least 75% of total operational carbon	10
Offset at least 90% of total operational carbon	15

Methodology:

- Estimated annual operational carbon shall include electricity and fuel consumption (such as petrol, diesel, CNG, LPG etc.) in building operations and its associated environment within the project boundary.
- Annual operational carbon shall be estimated using an energy simulation tool (as defined in ECBC 2017).

IGBC Net Zero Carbon

Operations Phase

IGBC Net Zero Carbon

Operations Phase - Checklist

Module		Credit Points
MR 1	Whole Building Life Cycle Analysis	Required
Operational Carbon		
OC MR 1	Integrated Approach to Net Zero	Required
OC CR 1	Passive Architecture	10
OC CR 2	Energy Efficiency	25
OC CR 3	Water Use Performance	15
OC CR 4	Green Procurement	10
OC CR 5	Net Zero Waste to Landfill	10
OC CR 6	Offset Operational Carbon	30
	Total	**100**

Certification Level	Criteria	Minimum Points to Comply
Near Net Zero Carbon	Offset at least 75% of the total operational carbon	40
Net Zero Carbon	Offset at least 75% of the total operational carbon	60

Whole Building Life Cycle Analysis

Mandatory Requirement 1

Intent:

Ensure project carries out whole building life cycle analysis to improve building performance and reduce carbon emissions by using low carbon materials and technologies.

Compliance Options:

Perform whole building Life Cycle Analysis (LCA) to estimate carbon emissions as per ISO standard 14040, and report the following for the overall built-up area of the project:

- Embodied carbon in kg CO_2e per square meter
- Operational carbon in kg CO_2e per year considering a minimum building lifespan 50 years.

Notes:

- *The LCA shall be carried out using a standard recognised software tool.*
- *The proposed case embodied carbon (in kg of CO2e per square meter) shall be calculated considering all the proposed civil materials as per the Bill of Quantities (BOQ).*
- *The illustrative list of civil materials for core and shell structure shall include cement, steel, concrete, glass, aluminium, Blocks / bricks, RMC, sand, tiles, stones/ marble.*
- *Carbon owing to material transportation from manufacturing plant to project site shall also be considered while calculating the embodied carbon for the respective material.*

<u>Methodology to calculate Proposed case Embodied Carbon:</u>

- The project team shall use Life Cycle Analysis (LCA) tools to calculate the embodied carbon of each material considering embodied carbon of the respective materials and embodied carbon resulting from transportation from the manufacturing plant to the project site.
- The embodied carbon of respective materials can be sourced from Environmental Protection Declarations (EPDs) or Eco-labelling programmes such as GreenPro or equivalent.
- The embodied carbon of all the civil materials shall be considered to calculate the aggregate design case embodied carbon.

Operational Carbon

(Operations phase)

Integrated Approach to Net Zero

Mandatory Requirement 1

Intent:

Use holistic and integrated approach considering efficient use of energy, water, and consumable materials in operations to reduce carbon emissions.

Compliance Options:

Demonstrate that the project complies with the following criteria, based on the measures implemented during design and operations phase:

- Energy Efficiency
  - Demonstrate that the proposed case EPI ratio of the project is less than or equal to 0.95, as per the criteria defined in the IGBC Net Zero Energy rating system using whole building energy simulation approach.
- Water Use Performance
  - Demonstrate that the project achieves Water Performance Ratio (WPR) of at least 10%, as per the criteria is defined in IGBC Net Zero Water rating system.
- Waste Management
  - Demonstrate that the waste sent to landfill is less than or equal to 60% of the total waste generated during operations, as defined in IGBC Net Zero Waste to Landfill (Operations) rating system.

Passive Architecture

Credit 1 **Points: 10**

Intent:

Adopt passive architectural design features to minimise associated negative environmental impacts.

Compliance Options:

- **Prescriptive Approach**

  Demonstrate that the project has implemented at least one of the following Climate Responsive Passive Design measures as listed in following table: *(2 points for each passive design measure; maximum 10 points)*

Concept	Criteria
Orientation & Internal zoning	Zoning of buffer areas and regularly occupied areas as per the Sun path analysis.
Courtyard	Design building with at least one courtyard. The courtyard's shorter side should not be more than 2.5 times the height of the abutting walls to ensure self-shading while permitting diffused light.
Shading corridors	Design corridors that are exposed to ambient climatic conditions to achieve 75% shading during daytime
Exterior Openings	At least 75% of the exterior openings (fenestration) have a Projection Factor* of 0.3 or more (with overhangs or vertical fins) as per climatic zone and orientation.
Light shelves	Design light shelves for 50% of the windows/ glazed areas, as per climatic zone and orientation
Walls	Design 50% of the external walls (Trombe wall, High thermal mass, Cavity walls, Hollow brick walls) by surface area as per climatic zone
Roof garden	Design 50% of net roof area with roof garden to mitigate UHI effect.
Vertical landscaping on exterior building walls	Design 25% of the exterior building walls, excluding glazing, with vertical landscaping
Cross ventilation	Design 50% of the unconditioned regularly occupied spaces so as to achieve cross ventilation. *Note: This criterion is applicable only for naturally ventilated buildings.*
Passive Cooling / Heating Technologies	Wind tower, Earth tunnel, Geothermal technologies, etc.

(OR)

❖ **Simulation Approach**

Demonstrate that the passive architecture measures implemented in the project has resulted in atleast 1% 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 passive concepts and design features

  (E.g., orientation, courtyard, shaded corridors, skylights, light shelves, shading devices, pergolas, punched windows, bay windows, Trombe wall, high thermal mass, cavity walls, hollow brick walls, roof garden, vertical landscaping on exterior building walls, cross ventilation)

- Passive cooling / heating technologies
  (E.g., wind tower, earth tunnel, geothermal technologies)

Points are awarded as below:

Percentage of Energy Savings achieved through Passive Architecture	Points
≥ 1%	2
≥ 2%	3
≥ 3%	5
≥ 4%	7
≥ 5%	10

Energy Efficiency

Credit 2 **Points: 25**

Intent:

Ensure excellence in energy efficiency in building operations to reduce associated environmental impacts from excessive energy use.

Compliance Options:

Demonstrate that the project reduces the Energy Performance Index Ratio (EPI Ratio) by improving the energy performance of the facility.

Calculate the Energy Performance Index Ratio (EPI Ratio) as below:

$$\text{Energy Performance Index Ratio (EPI Ratio)} = \frac{Actual\ Energy\ Performance\ Index}{Standard\ Energy\ Performance\ Index}$$

The Energy Performance Index (EPI) of a building is its annual energy consumption in kWh per square meter of the building. While calculating the EPI of a building, the area of unconditioned basements shall not be included. EPI can be determined by:

$$\text{Energy Performance Index (EPI)} = \frac{Annual\ energy\ consumption\ (in\ kWh)}{Total\ Builtup\ Area\ (in\ Squre\ meters)}$$

Actual Energy Performance Index (EPI):

Actual EPI shall be calculated considering the preceding one year of utility bills and renewable energy generation report. Project team can also perform calibrated energy simulation to arrive actual energy consumption in case of utility bills are not available for project.

Standard Energy Performance Index:

- Standard EPI shall be calculated with the support of calibrated energy simulation while considering ECBC 2017 as a baseline for commercial typology.
- All other typologies shall follow respective IGBC rating's minimum energy performance requirement to calculate or arrive standard EPI.

Points are awarded as below:

EPI ratio	Points
≤ 0.9	3
≤ 0.85	6
≤ 0.8	9
≤ 0.75	12
≤ 0.7	16
≤ 0.65	20
≤ 0.6	25

Water Use Performance

Credit 3 **Points: 15**

Intent:

Use of alternate water for various water end use, to reduce raw water demand.

Compliance Options:

Demonstrate that the project achieves Water Performance Ratio (WPR) of at least 20%, as per the criteria is defined in IGBC Net Zero Water rating system.

$$Water\ Performance\ Ratio = \frac{Alternate\ Water\ Consumption}{Total\ Water\ Consumption}$$

Points are awarded as below:

Water Performance Ratio	Points
20%	2
30%	4
40%	6
50%	9
60%	12
70%	15

Green Procurement

Credit 4 **Points: 10**

Intent

Procure green products and materials for construction of buildings to reduce embodied carbon emissions.

Compliance Options:

- Develop a green procurement policy for procuring green materials and products during operations. The policy shall cover consumables used for building operations.
  - Communicate the green procurement policy to the entire facility team involved in operations for considering green material & products by design. The project team shall specify the green material & products as part of procurement requirement.
  - The project team shall have a combination of the following materials & products or any other green materials:
    - Facility maintenance products: GreenPro or equivalent eco-labelled certified or biodegradable housekeeping chemicals, office consumables
    - Eco-friendly packaging: Paper bag, Cloth bag or equivalent
    - 100% recycled papers - chlorine-free, acid-free or equivalent
    - Biodegradable printing inks

(And)

- Demonstrate at least 10% of the total cost of the suggested green products and materials to the total cost of the products and materials procured during operations.

  Points are awarded as below:

% Cost of Green Materials & Products	Points
> 10%	1
≥ 20%	3
≥ 30%	5
≥ 40%	7
≥ 50%	10

Net Zero Waste to Landfill

Credit 5 **Points: 10**

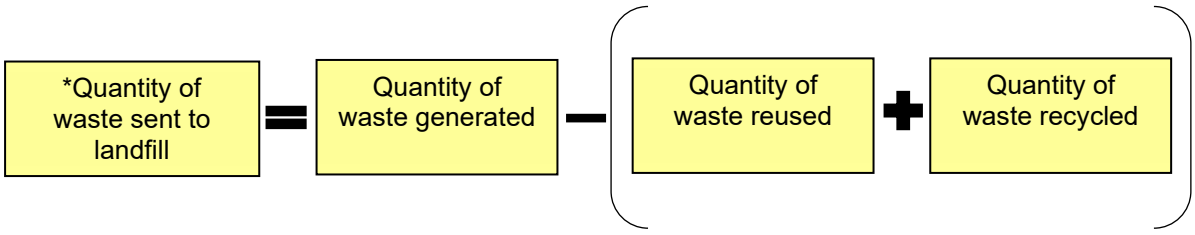
Intent:

Ensure that the quantity of waste diverted from landfill is maximized to reduce the associated environmental impacts.

Compliance Options:

- Conduct a waste audit and demonstrate that the waste sent to landfill is less than or equal to 50% of the total waste generated during operations, as per the equation given below:

$$\%\ \textbf{of quantity of waste sent to landfill} = \frac{*\textbf{Quantity of waste sent to landfill}}{\textbf{Total quantity of waste generated}} \boldsymbol{X100}$$



Points are awarded as below:

% of Waste Reduction to Landfill	Points
50%	1
40%	2
30%	3
20%	5
10%	7
5%	10

Offset Operational Carbon

Credit 6 **Points: 30**

Intent:

Use renewable energy sources and carbon sequestration measures to reduce carbon emissions.

Compliance Options:

Project shall have onsite and/or offsite renewable energy sources and/or carbon sequestration measures such as plantation to offset at least 75% of the project's annual operational carbon associated with building operations.

Criteria	Points
Offset at least 75% of operational carbon	20
Offset at least 90% of operational carbon	30

Methodology:

- Operational carbon shall include electricity and fuel consumption (such as petrol, diesel, CNG, LPG etc.) in building operations and its associated environment within the project boundary.
- Annual operational carbon shall be calculated using calibrated energy simulation.

Annexure I - Glossary

Carbon sequestration is the process of capturing and storing atmospheric carbon dioxide.

Embodied carbon is the result of supply chain (transport), extraction, processing, and manufacturing of building materials, prior to construction and during construction or renovation activities.

Operational carbon is from the use of energy, materials, and generation of waste during building operations and renovations.

Life Cycle Analysis systematic analysis of the potential environmental impacts of projects during their entire life.

Annexure II – Measures not addressed

The pilot version of the IGBC Net Zero Carbon rating system is developed based on the Life Cycle Analysis approach at the project level and the present industry practices & benchmarks. Considering the feedback from the projects and subject matter experts, certain measures are not addressed in the pilot version due to the limitations or constraints in adopting such measures and/ or strategies.

The measures not addressed in the pilot version are as listed below:

Projects in Design and Construction phase

- Embodied carbon of interior and finishing materials, and equipment and systems.
- Embodied carbon on account of construction activities including the use of electricity, DG sets, and construction equipment.
- Embodied carbon resulting from diversion of construction waste.
- Embodied carbon resulting from transportation of any other activities, other than building materials & products, such as sourcing water for construction activities.
- Movement of labour and employees within or outside the project site.
- Carbon credit certificates and Renewable Energy Certificates (RECs).

Projects in Operations phase

- Embodied carbon of materials & products used during construction, operations and renovation phase.
- Embodied carbon of equipment used during construction and operations/ renovation phase.
- Embodied carbon resulting from diversion of domestic and retrofit construction waste.
- Movement of labour and employees within or outside the project site.
- Carbon credit certificates and Renewable Energy Certificates (RECs).
- End-of-life carbon.

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.

For more than 125 years, CII has been engaged in shaping India's development journey and works proactively on transforming Indian Industry's engagement in national development. With its extensive network across the country and the world, CII serves as a reference point for Indian industry and the international business community.

As India strategizes for the next 25 years to India@100, Indian industry must scale the competitiveness ladder to drive growth. CII, with the Theme for 2023-24 as 'Towards a Competitive and Sustainable India@100: Growth, Inclusiveness, Globalisation, Building Trust' has prioritized 6 action themes that will catalyze the journey of the country towards the vision of India@100.

About IGBC
(Indian Green Building Council)

The Indian Green Building Council (IGBC), part of the Confederation of Indian Industry (CII) was formed in the year 2001. The vision of the council is, "To enable a sustainable built environment for all and facilitate India to be one of the global leaders in the 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. The council also closely works with several State Governments, Central Government, World Green Building Council, bilateral multi-lateral agencies in promoting green building concepts in the country.

IGBC

Confederation of Indian Industry

Confederation of Indian Industry
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