IGBC

Confederation of Indian Industry

IGBC Net Zero Waste Rating System

for

Buildings & Built-Environment

Pilot Version

November 2021

www.cii.in

www.igbc.in

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Foreword : Indian Green Building Council (IGBC)

India is witnessing tremendous growth in infrastructure and construction sector. The construction industry 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 construction industry 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 2,000 committed members. The Council encourages, builders, developers, owners, architects and consultants to design & construct 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 Carbon 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 and Water.

The development of IGBC Net Zero Waste Rating System for Buildings & Built Environment® Rating System is another important step in this direction. The rating system has been developed based on consensus and support of all the relevant stakeholders.

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Acknowledgment

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The pilot version was developed by the technical committee on IGBC Net Zero Waste Rating System for Buildings & Built-Environment formed by IGBC.

We thank the following core committee members for their contribution towards developing this rating system.

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Introduction

India produces more than 277 million tonnes of solid waste every year, which is likely to touch 387 million tonnes by 2030*. Of the total collected waste, only 20 per cent (55 MT per year) is processed and the remaining 80 per cent (221 MT per year) is dumped as landfill. The country also generates 150 million tonnes per year of construction and demolition (C&D) waste. The existing recycling capacity is only a meagre 2.3 million tonnes per year which is about 1.5 per cent.

With the limited usable land area available in the country, the increased landfill becomes a major challenge. The landfill leads to land, air and water pollution which affects the health and well-being of people in the surroundings. The landfill also leads to emission of methane and other greenhouse gases which contributes to global warming and climate change. There is an imminent need for addressing the issues related to waste generation and their landfill.

There are multiple challenges associated in addressing the waste generation, handling and diversion to landfill. Some of the challenges include the nature of the sector, which is largely unorganised, lack of segregation of waste at source, non-availability of recycling facilities, financial viability and the people mindset.

Against this background, IGBC's mission on Net Zero aims at addressing the issues related to waste generation during construction, operation and maintenance of the buildings and built environment through Net Zero Waste Rating System initiative. This rating system on Net Zero Waste Rating System is a tool to facilitate buildings and built environment to adopt 3R (reduce, reuse, recycle) principles to address waste generation and avoid waste being sent to landfill.

**Source: (CPCB Report 2017, Agencies: Building Material Promotion Council (BMTC)*

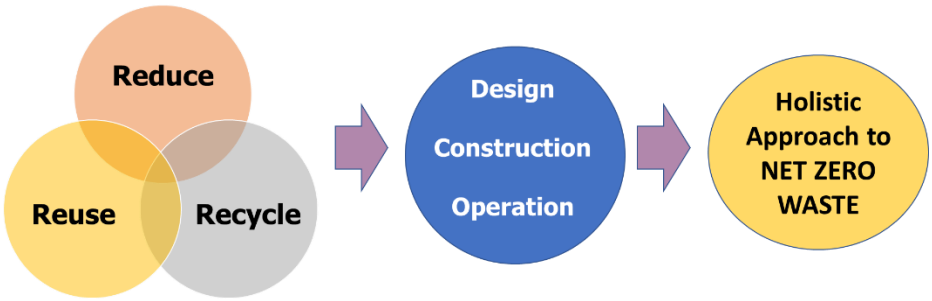
IGBC Net Zero Waste - Definition

A Net Zero Waste for Buildings & Built Environment is one which eliminates the diversion of waste being sent to landfills, by a multi-pronged approach - nature-centric design, reducing debris during construction, responsibly handling waste during operation, reusing the waste as much as possible and recycling the remaining waste.

- *Indian Green Building Council*

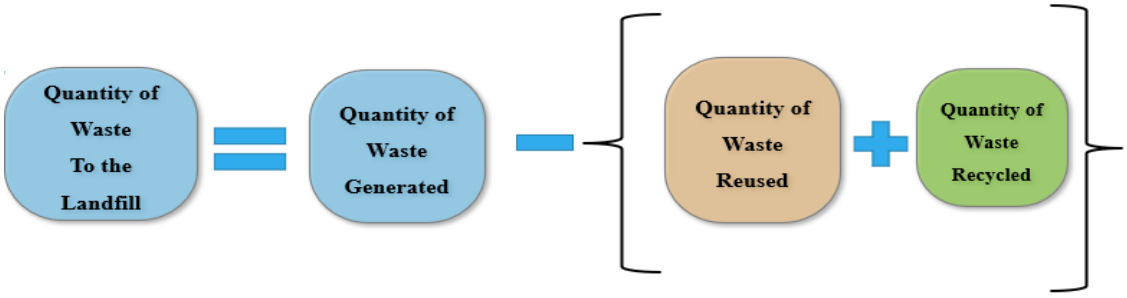
Approach

The holistic approach to Net Zero Waste Rating System involves application of 3R principles in the design, construction and operation of buildings & built environment. As a first step, efforts should be made to reduce the waste generation to the maximum extent possible in all the three stages of construction of buildings.



After reducing the waste, various options for reusing the waste as a resource within the building can be explored. The remaining waste need to be responsibly handled and handed over to authorized recyclers for recycling or disposed in an environment friendly manner.

A building or a built environment has to demonstrate that the total quantity of waste generated during construction and operation is equal to the quantity of waste reused within the premises and the quantity of waste recycled, so that the net quantity of waste sent to the landfill is ‘Zero’.



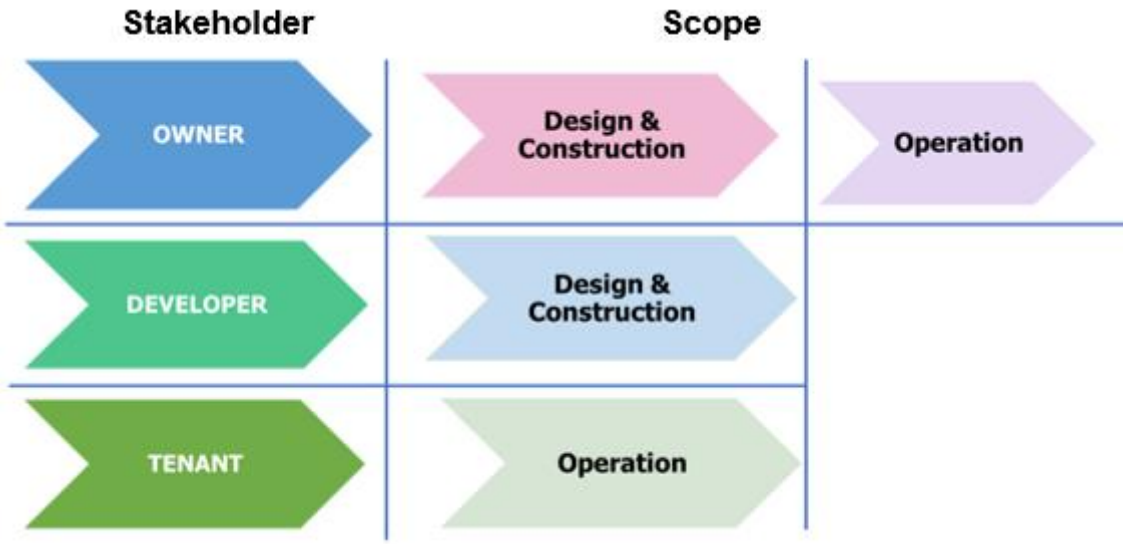
Scope

The Net Zero Waste Rating system for buildings & built environment can be applied on all building typologies including residential, commercial, factories, interior fitouts, healthcare, education institutions, retail shops, transit buildings, townships and cities.

This rating system can be adopted for both New & Existing forms of built environment.

Depending on the project proponent aspiring to achieve Net Zero Waste rating for their building, the scope can be limited to **Design & Construction (or) operation**.

The suggested scope for the project proponents is as below:



Benefits:

Key benefits of adopting Net Zero Waste Rating System are as below:

- Complying to National and International standards on quality and environmental performance related to products and materials.
- Increased use of green products & materials, thereby improving resource efficiency and health benefits.
- Reduction in material consumption and thereby reduction in cost of construction.
- Increase in reuse of waste resulting in reduction in procurement of additional materials.
- Reduction in cost associated with waste handling and disposal.
- Opportunity to convert waste to energy or other value-added products.
- Brand image of being environmentally conscious

Overview and Process

a) When to use IGBC Net Zero Waste Rating System

IGBC Net Zero Waste for buildings & built Environment Rating System can be adopted either during design & construction (or) during operation stage of a building. In case of design & construction, it is advisable to adopt the rating right from the design stage for gaining the maximum benefits. The project can adopt the rating at any stage once it commences its operation.

For achieving the maximum benefits, the project proponent can adopt any Net Zero rating systems (Energy, Water, Waste, Carbon) in combination with IGBC Green Building Rating Systems.

b) Registration

Organisations interested in registering their projects under IGBC Net Zero Waste Rating System are advised to first register on IGBC website (www.igbc.in) under 'IGBC Net Zero Waste 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 Net Zero Waste Rating System registration & certification - process, schedule and fee. The rating system can be taken up independently or in combination with IGBC Green Building Rating System.

c) Certification

To achieve the IGBC Net Zero Waste Rating System, the project must satisfy all the mandatory requirements and demonstrate that the net diversion of waste to landfill is zero.

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, 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.

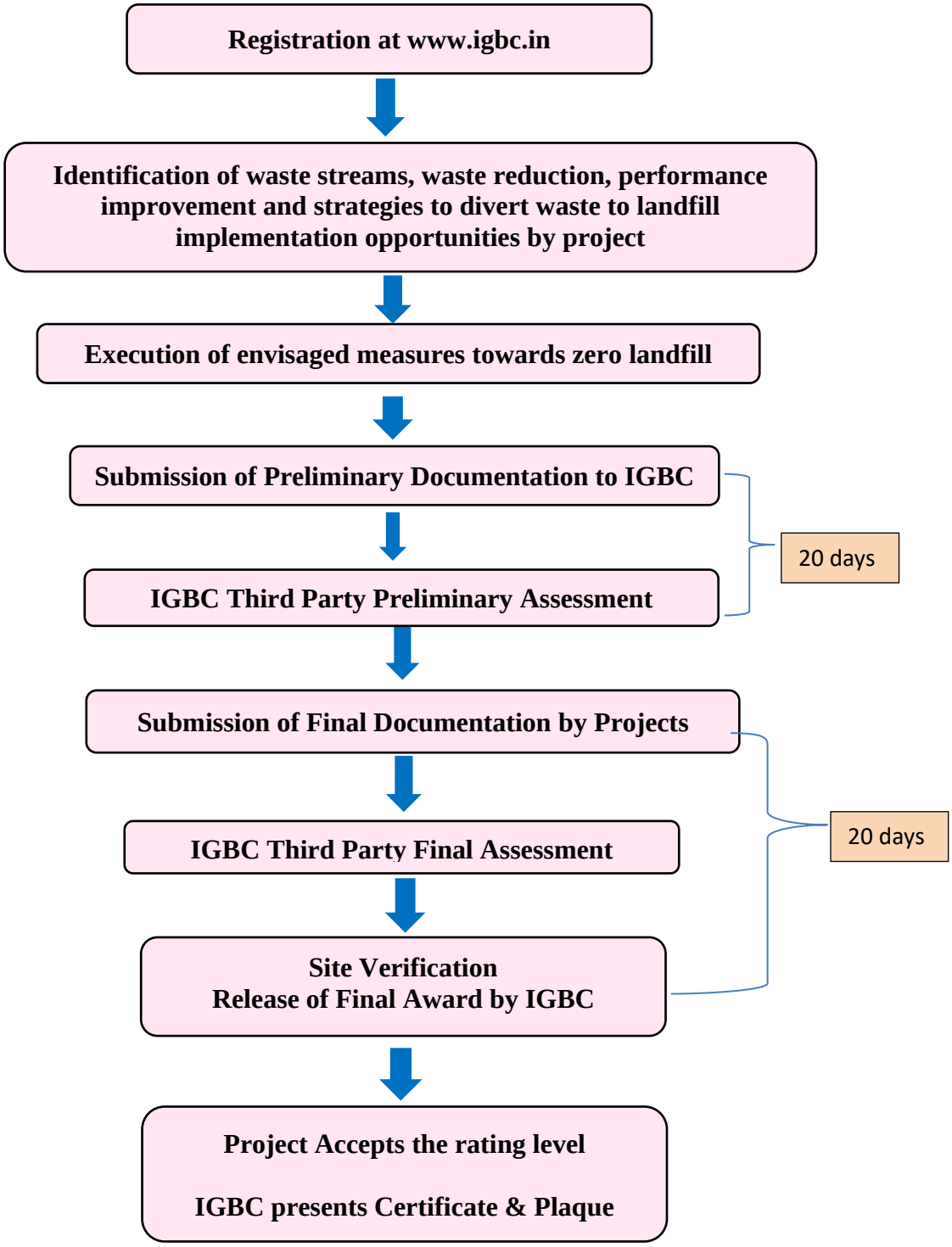
It is important to note that the mandatory requirements and credits earned at the preliminary review are only considered as expected. These mandatory requirements and credits are not awarded until the final documents are submitted, along with additional documents showing implementation of design features.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

The project should be recognised depending upon the number of credits they achieve. The certification level and the required threshold are as below:

Certification Level	Avoided % of Waste to Landfill	Points Range	Recognition
Near Net Zero Waste	75 - 84	30 - 34	Outstanding Performance
Net Zero Waste	85 - 94	35 - 39	National Excellence
Net Zero Waste Platinum	95 and above	40 - 50	Global Leadership

IGBC will recognise all buildings that achieve one of the rating levels with a formal letter of certification and a mountable plaque.

Certification Process



IGBC Net Zero Waste Rating System

for

Buildings & Built Environment

Design & Construction

IGBC Net Zero Waste Rating System

for

Buildings & Built Environment

Design & Construction

Checklist

Design & Construction Phase - Mandatory Requirements		
MR 1	Green Procurement	Required
MR 2	Segregation of Construction Waste	Required
Design & Construction Phase		**Credit Points**
DC Credit 1	Design Philosophy	4
DC Credit 2	Sustainable Demolition	3
DC Credit 3	Green Procurement	6
DC Credit 4	Reduce	8
DC Credit 5	Reuse	8
DC Credit 6	Recycling of Construction Waste	10
DC Credit 7	Net Zero Waste	10
DC Credit 8	Awareness	1
	Grand Total	**50**

Certification Level	Avoided % of Waste Going to Landfill	Points Range
Near Net Zero Waste Building	75 - 84	30 - 34
Net Zero Waste Building	85 - 94	35 - 39
Net Zero Waste Platinum	95 and above	40 - 50

Green Procurement

Mandatory Requirement 1

Intent:

Encourage procurement of green products and materials for construction of buildings so as to reduce the quantity of virgin materials going to landfills

Compliance option:

- Develop a green procurement policy at organisational level for procuring green products and materials for construction of buildings.
- Communicate the green procurement policy to the architectural firm involved in design for considering green products and materials by design. Architect to specify the green products and materials as part of BOQ.
- The project team to have combination of the following materials or any other green materials to the extent of at least 10% of the total material cost for construction:
  - **Eco-labelled Products:** GreenPro or equivalent Eco-labelled products.
  - **C & D waste products:** Products and materials made up of construction & demolition (C & D) waste.
  - **Rapidly renewable materials:** Wood based materials that can harvested within a cycle of 5-10 years. E.g. bamboo, bagasse, eucalyptus.
  - **Salvaged materials:** Materials that have lived their life and about to be sent to landfill.
  - **Recycled materials:** Materials with more than 25% recycled content or industrial waste.
  - **Alternative materials:** Alternative construction materials which conserve natural resources and thereby reduce environmental impacts.E.g., M Sand, Engineered wood.
  - **Bio based materials:** Materials made of agri or Bio-waste. E.g. pulp and paper, agro-waste, coconut fibres.

Documentation Required:

1. Green procurement policy for purchasing products and materials. The procurement policy can be an independent policy (or) part of environment policy of organisation.
2. Signed BOQ from the architect highlighting green products and materials suggested for construction and their cost.

Segregation of Construction Waste

Mandatory Requirement 2

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 option:

- Appoint a dedicated team to develop and implement construction and demolition waste management plan at the project level.
- Allocate a designated waste yard to segregate and store construction and demolition waste.

(OR)

- If sufficient space is not available at project site, have an off - site facility for segregation and storage.

Documentation Required:

1. Conceptual site plan showing the location of proposed waste yard on site or off-site.
2. List of segregated waste streams and supporting photographs.

Design Philosophy

DC Credit 1 **Points: 4**

Intent:

Incorporate modularity and recyclability by design so that the quantity of materials sent to landfill are minimised, thereby reducing environmental impacts.

Compliance Options:

- Incorporate modularity in design:

  Use Modular and/ or Prefabricated structure as part of design construction.

% cost of Modular / Prefabricated components of the total cost of materials	Points
≥ 2.5	1
≥ 5	2

- Recycled content & Recyclable Materials:

  Use recycled or recyclable materials in construction.

% cost of recycled or recyclable materials of the total cost of materials	Points
≥ 15	1
≥ 25	2

Documentation required:

1. A narrative elaborating the project design philosophy to address modularity and recyclability in buildings.
2. Supporting documents and the related calculations for meeting the compliance options.

Exemplary Performance:

More than 7.5 % of Modular / Prefabricated components of the total cost of materials, 35 % recycled or recyclable materials is eligible for an innovation. *Applicable in lieu of Sustainable Demolition credit 2 for new projects.*

Sustainable Demolition

DC Credit 2 **Points: 3**

Intent:

Demolish old existing structure sustainably and maximise resource recovery, thereby reducing the quantity of waste sent to landfill.

Compliance option:

- This credit is applicable only if the project site has an old existing structure and there is a need for demolishing the same.
- Demonstrate maximum resource recovery and utilise the recovered products and materials in the proposed new construction.
- Project to have a sustainable deconstruction plan to recover maximum resource from the existing structure. Components that can be recovered include doors & windows, frames, movable partition, hardware, appliances, fixtures, etc.
- The remaining demolition waste to be handed over to the recyclers.

Criteria	Points
Sustainable Demolition plan	1
Recovery of materials upto 10% of total demolition area / volume	1
Handing over Waste to Recyclers	1
Total	**3**

Documentation Required:

1. A detailed narrative describing the sustainable demolition plan envisaged and implemented in the project & on-site photographs
2. List of products recovered from sustainable demolition.
3. Details of materials handed over to recyclers and the supporting document.

***Projects not eligible for Sustainable Demolition, alternatively can attempt for exemplary performance under other credits viz., DC Credit 1 (Applicable for this credit)*

Green Procurement

DC Credit 3 **Points: 6**

Intent:

Encourage procurement of green products and materials for construction of buildings so as to reduce the quantity of virgin materials going to landfills.

Compliance option:

- Develop a green procurement policy at organisational level for procuring green products and materials for construction of buildings.
- Communicate the green procurement policy to the architectural firm involved in design for considering green products and materials by design. Architect to specify the green products and materials as part of BOQ.
- The project team to have combination of the following materials or any other green materials.
  - **Eco-labelled Products:** GreenPro or equivalent Eco-labelled products.
  - **C & D waste products:** Products and materials made up of construction & demolition (C & D) waste.
  - **Rapidly renewable materials:** Wood based materials that can harvested within a cycle of 5-10 years. E.g. bamboo, bagasse, eucalyptus.
  - **Salvaged materials:** Materials that have lived their life and about to be sent to landfill.
  - **Alternative materials:** Alternative construction materials which conserve natural resources and thereby reduce environmental impacts. E.g., M Sand Engineered wood.
  - **Bio based materials:** Materials made of agri or Bio-waste. E.g. pulp and paper, agro-waste, coconut fibres.

- The project team to demonstrate the total cost of the suggested green materials as a percentage of the total cost of the products and materials used for construction as below to gain the credit points.

% Cost of Green Products & Materials	Points
> 10 %	1
≥ 15 %	2
≥ 20 %	3
≥ 25 %	4
≥ 30 %	5
≥ 35 %	6

Documentation Required:

1. Green procurement policy for purchasing products and materials. The procurement policy can be an independent policy (or) part of environment policy of organisation.
2. Signed BOQ from the architect highlighting green products and materials suggested for construction and their cost.

Exemplary Performance:

More than 40% of cost of green procurement material is eligible for an innovation. *Applicable in lieu of Sustainable Demolition credit 2 for new projects.*

Reduce

DC Credit 4 **Points: 8**

Intent:

Encourage practices that reduce waste generation during material handling and construction so as to avoid waste being sent to landfills.

Compliance option:

- Project should implement strategies and measures for reducing waste generation during material handling and construction.
  - Ensure that the waste generation is within the specified threshold limits

Table: Baseline for allowable construction waste

S.No	Material	Allowable %
1	Reinforcement Steel	10 %
2	Sand	10 %
3	Stone	10 %
4	Tiles	10 %
5	Coarse Aggregate	5 %
6	Bricks	5 %
7	Cement	5 %
8	Concrete	3 %
9	Plywood/ MDF boards	3 %
10	Paint	3 %
11	Glass	3 %
12	Aluminum	3 %
13	Gypsum Boards	3 %
14	POP	3 %
15	Timber	1 %
16	PVC Pipes	1 %

Baselines met for number of product categories	Points
2 – 16 materials *(1 point for every two of the listed materials)*	8

Documentation required:

1. A narrative describing the proposed strategies to reduce waste generation during material handling and construction.
2. Calculations and related supporting documents demonstrating that the waste generation is maintained within the allowable limit.

Reuse

DC Credit 5 **Points: 8**

Intent:

Encourage reuse of the waste materials generated within the project so as to avoid waste being sent to landfills and associated environmental impacts.

Compliance option:

- Project team to explore the possibility of reusing the construction waste materials as much as possible within the project or in any other project.
- Demonstrate the reuse of waste materials identified in the DC credit 4.

Number of Waste Materials Reused	Points
2 - 16 materials *(1 point for every two listed materials DC credit 4)*	8

Documentation required:

1. A narrative describing the innovative methods used for reusing the waste materials within or any other project.
2. Supporting documents and photographs of reuse applications.

Recycling of Construction Waste

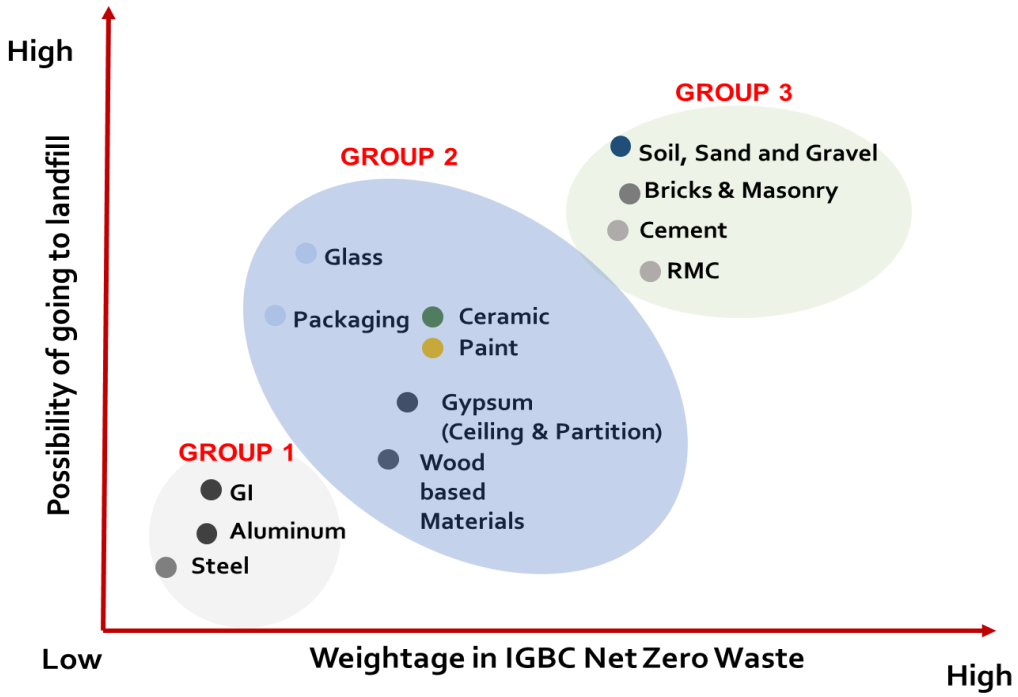
DC Credit 6 **Points: 10**

Intent:

Facilitate recycling of construction & demolition waste through responsible handling so as to reduce waste going to landfill and related environmental impacts are avoided.

Compliance option:

- Encourage responsible handling of construction waste and recycling of the waste materials through authorised recyclers.
- Handover the remaining waste products and materials after reuse to the authorised recyclers.



Identified recyclers for materials	Points
Group 1 – 50%, 75%, 95 %	1 - 3
Group 2 – 25%, 50%, 75%	1 - 3
Group 3 – 25%, 50%, 75 %, 95 %	1-4
Total points	**10**

Documentation required:

1. A narrative describing the strategies implemented to handle construction waste and development of recyclers.
2. Details of the waste handed over to authorized recyclers for recycling.

Net Zero Waste

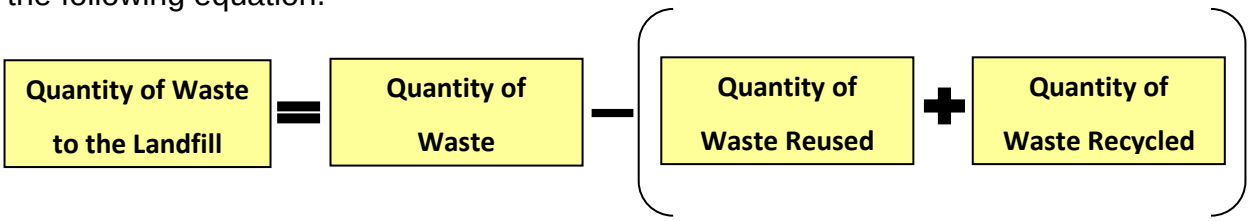
DC Credit 7 **Points: 10**

Intent:

To demonstrate that the quantity of waste sent to the landfill is 'Zero', thereby avoiding environmental damage.

Compliance option:

- Demonstrate through a waste audit that waste being sent to landfill is 'Zero' through the following equation.



- The waste audit may be conducted by a third-party agency or a capable internal team who are not involved in waste management at the site.
- Project to demonstrate the waste to landfill for each of the waste streams or product category identified as per DC Credit 4.

Waste Balance Chart						
Material	Actual Quantity of Material Procured	Actual BOQ Rates	Waste Generated	Waste Diverted		
				Reused	Recycled	Landfill
	Quantity (Kgs)	Cost (Rs.)	Quantity (Kgs)	Quantity (Kgs)	Quantity (Kgs)	Quantity (Kgs)
Reinforcement Steel						
Sand						
Stone						
Tiles						
Coarse Aggregate						
Bricks						
Cement						
Concrete						
Plywood/ MDF boards						
Paint						
Glass						
Aluminum						
Gypsum Boards						
Total Quantity (Kgs)						
%						
	% of Net Zero to landfill					

The percentage of quantity of waste sent to landfill	=	**Quantity of waste sent to landfill / Total quantity of waste generated**

- The project to demonstrate that the percentage of waste sent to landfill is as minimum as possible. The project gain credits depending upon the percentage of waste sent to landfill.

% of Waste going to Landfill	Credit points
25.0 – 22.0 %	1
22.5 – 20.5%	2
20.0 – 17.0 %	3
17.5 – 15.5 %	4
15.0 – 13.0 %	5
12.5 – 10.5 %	6
10.0 – 8.0 %	7
7.5 – 5.5 %	8
5.0 - 3.0 %	9
2.5 - 0 %	10

Documentation Required:

Waste audit report highlighting quantities of waste generated, reused applications, recycling, handed over to recyclers and sent to landfill.

Awareness

DC Credit 8 **Points: 1**

Intent:

Initiate a sense of awareness amongst occupants, workmen and stakeholders on the need for responsible handling of waste.

Compliance option:

- Conduct awareness programs to educate occupants and workforce.
- Install signages highlighting the impacts of waste generation and the best practises related to reduce, reuse and recycling of waste.

Documentation required:

1. Efforts towards enhancing awareness, supported by photographs.
2. Photographs of signages displayed in construction site, as applicable.

IGBC Net Zero Waste Rating System

for

Buildings & Built Environment

Operation

IGBC Net Zero Waste Rating System

for

Buildings & Built Environment

Operation

Checklist

Operation - Mandatory Requirements		
MR 1	**Green Procurement Policy**	Required
MR 2	**Segregation of Waste: (Bio-degradable & Non-Biodegradable)**	Required
Operation - Credits		**Credit Points**
OP Credit 1	**Green Procurement**	10
OP Credit 2	**Reduce**	10
OP Credit 3	**Recycling of Waste**	18
OP Credit 4	**Net Zero Waste**	10
OP Credit 5	**Awareness**	2
	Total Points	**50**

Certification Level	Avoided % of Waste Going to Landfill	Points Range
Near Net Zero Waste	75 – 84	30 - 34
Net Zero Waste	85 – 94	35 - 39
Net Zero Waste Platinum	95 & above	40 - 50

Green Procurement Policy

Mandatory Requirement 1

Intent

Have a green procurement policy at the project level, so as to reduce environmental impacts by design

Compliance option:

- ❖ Develop a green procurement policy at organisational level for procuring green products and materials during operation and maintenance of buildings.
- ❖ Communicate the green procurement policy to the facility management team involved in operation phase for considering green products and materials for e.g.
    - Ecolabelled products: Green Housekeeping chemicals, Office consumables
    - Facility maintenance products which are GreenPro, Ecolabelled and Star labelled appliances
    - Eco- friendly Packaging: Paper bag, Cloth bag
    - 100% recycled & chlorine-free papers
    - Biodegradable printing inks

Documentation Required:

Green procurement policy for purchasing products and materials.

Segregation of Waste

Mandatory Requirement 2

Intent:

Facilitate segregation of waste at source to encourage reuse or recycling of materials, thereby avoiding waste being sent to landfills, and associated environmental impacts

Compliance Options:

The project should have a dedicated team to segregate waste at building level and site level through following compliance:

- **Building Level**

  Provide color coded bins to collect bio-degradable & non-biodegradable waste at all the floors and common areas of the building, as per the different categories of waste.

Table :Types of Waste at Building Level

Color Bin	Name of the bin	Examples of Waste
	Paper Recycling	Office paper, clean cardboard, newspaper, milk & juice cartons, disposable coffee cup-lids only
	Organic Recycling	Food, pruning's, fruit & vegetables, plate scrapings including meat, fish & leftovers, coffee grounds, flowers
	Hazardous waste	Sanitary napkins, diapers, used syringes blades, bandages, expired medicine
	Mixed recycling	Glass bottles, aluminum cans
	Soft plastic recycling	Bread bags, pasta & rice bags, cling wrap, plastic bags, biscuit packets, frozen food bags, bubble wrap
	E-waste	CFL, tube light, printer cartridges, batteries

❖ **Site Level**

Allocate centralized facility to store, segregate and handover collected waste to the identified recycle vendors.

Notes:
**Biodegradable waste not limited to food waste, paper waste, or any other waste which can be degradable*

**Non-biodegradable waste not limited to Glass, metals, electronic devices, computer parts, batteries, medical waste, plastic bags, plastic bottles, tetra packs.*

Documentation Required:

1. Conceptual site plan showing the location of proposed waste collection at building level and site level.
2. Explain strategies envisaged to divert other waste such as E-waste, medical waste, and hazardous waste; as applicable.
3. List of segregated waste streams and supporting photographs.

Green Procurement

OP Credit 1 **Points: 10**

Intent

Encourage procurement of green products and materials, so as to reduce the quantity of virgin materials going to landfills, by design

Compliance option:

The facility management team to purchase green products and materials to the extent of at least 5% of the total annual procurement cost for operation and maintenance:

Materials with Low Impact	Points
5 – 50% *(1 point for every 5 % incremental)*	1 to 10

Examples *(not limited to)*

- Ecolabelled products: Green Housekeeping chemicals, Office consumables
- Facility maintenance products which are GreenPro, Ecolabelled and Star labelled appliances
- Eco- friendly Packaging: Paper bag, Cloth bag
- 100% recycled & chlorine-free papers
- Biodegradable printing inks

Documentation Required:

Supporting document for purchase of green products and materials during operation and maintenance.

Reduce

OP Credit 2 **Points: 10**

Intent:

Encourage practices that reduce waste generation during operation so as to avoid waste being sent to landfills.

Compliance Options:

- Project should implement strategies and measures for reducing waste generation during operation phase.
- Ensure that the waste generation is within the specified baseline.

Building Type	Baseline for Typical Solid Waste Generation in Kgs
Residential Apartments	**0.25 kg per person** *(As per IGBC Green Homes Ver 3 or local byelaw whichever is stringent)*
Office Buildings	**0.1 kg per occupant** *(As per IGBC Green New Building Rating or local byelaw whichever is stringent)*
Cafeterias	**0.45 kg per meal served** *(Source: National Solid Waste Management Association, UK)*
Hospitals	**7.25 kg per occupied bed** *(Source: National Solid Waste Management Association, UK) or local bye-law whichever is stringent*
Hotels – First Class	**1.45 kg per room** *(Source: National Solid Waste Management Association, UK) or local bye-law whichever is stringent*
Hotels - Economy	**0.75 kg per room** *(Source: National Solid Waste Management Association, UK) or local bye-law whichever is stringent*
Manufacturing	*(Source: National Solid Waste Management Association, UK) or local bye-law whichever is stringent*
100 to 399 employees	1.36 kg per person
400 to 1,000 employees	3.17 kg per person
Restaurants	**0.68 kg per meal served** *(Source: National Solid Waste Management Association, UK) or local bye-law whichever is stringent*
Schools	**0.45 kg per person with cafeteria (0.5 without)**

	(Source: National Solid Waste Management Association, UK) or local bye-law whichever is stringent
Shopping Centres / Malls	**1.14 kg per square feet** *(Source: National Solid Waste Management Association, UK) or local bye-law whichever is stringent*
Warehouse	**0.45 kg per 100 square feet** *(Source: National Solid Waste Management Association, UK) or local bye-law whichever is stringent*

*For the typical solid waste generation, kindly refer the relevant IGBC Building Rating Systems wherever applicable.

Points are awarded as below:

% Lower than the Baseline	Points
2.5%, 5%, 7.5%, 10%, 12.5 %, 15%, 17.5%, 20%, 22.5% & 25% less than baseline criteria *(1 point for every incremental 2.5%)*	1 - 10

Documentation required:

1. A narrative describing the proposed strategies to reduce waste generation during operation phase.
2. Calculations and related supporting documents demonstrating that the waste generation is maintained within the specified baseline.

Recycling of Waste

OP Credit 3 **Points: 18**

Intent:

Facilitate recycling of waste generated during operation through responsible handling, so as to reduce waste going to landfill and related environmental impacts.

Compliance Options:

A. Bio-degradable Waste:

1. Install on-site Waste Treatment System approved by Swachh Bharat Mission Urban to treat 100% of organic waste generated at building level and use as manure either on site or at any other site. *(max. points - 5)*

2. Demonstrate generation of energy from the organic waste generated and utilisation of the same within the premises. *(max. points - 5)*

B. Non-Biodegradable Waste:

1. Demonstrate recycling of non-bio-degradable waste through responsible handling and handing over of the same to the respective recyclers. (max. points - 3)
2. Any other innovation strategies to recycle, reuse of dry waste, wet waste and e-waste during post occupancy with long term contract agreement with vendors, thereby diverting from landfill (max. points -5)

Documentation Required:

1. A narrative describing the strategies implemented to handle waste generated during operation and maintenance.
2. Efforts taken to identify and develop recyclers.
3. Supporting documents and photographs related to the systems installed for treating the bio-degradable waste and energy generation
4. Details of the waste handed over to authorized recyclers for recycling.

Net Zero Waste

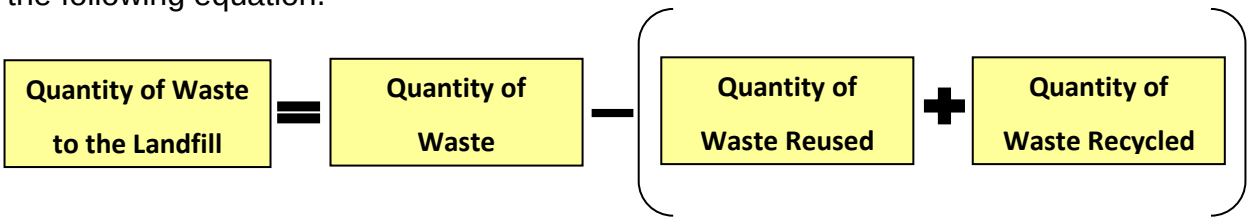
OP Credit 4 **Points: 10**

Intent:

To demonstrate that the quantity of waste sent to the landfill is 'Zero' , thereby avoiding environmental damage.

Compliance option:

- Demonstrate through a waste audit that waste being sent to landfill is 'Zero' through the following equation.



- The waste audit may be conducted by a third-party agency or a capable facility team who are not involved in waste management at the site.

$$\text{The percentage of quantity of waste sent to landfill} = \frac{\text{Quantity of waste sent to landfill}}{\text{Total quantity of waste generated}}$$

- Project to demonstrate that the percentage of waste sent to landfill is as minimum as possible. The project gain credits depending upon the percentage of waste sent to landfill.

% of Waste going to Landfill	Credit points
25.0 – 22.0 %	1
22.5 – 20.5%	2
20.0 – 17.0 %	3
17.5 – 15.5 %	4
15.0 – 13.0 %	5
12.5 – 10.5 %	6
10.0 – 8.0 %	7
7.5 – 5.5 %	8
5.0 - 3.0 %	9
2.5 - 0 %	10

Documentation Required:

1. Waste audit report highlighting quantities of waste generated, reused applications, recycling, handed over to recyclers and sent to landfill.
2. Supporting photographs for both Reuse and Recycling applications

Awareness

OP Credit 5 **Points: 2**

Intent:

Initiate a sense of awareness amongst occupants and stakeholders on the need for responsible handling of waste.

Compliance option:

- Conduct awareness programs to educate occupants and facility team.
- Install signages highlighting the impacts of waste generation and the best practises related to reduce, reuse and recycling of waste.

(1 point for each measure)

Documentation required:

1. Details of awareness programs conducted along with photographs.
2. Photographs of the signages displayed in facility, as applicable.

Glossary

Alternate Building Materials: Sustainable solution over conventional materials being used presently having building technologies like energy conservation; minimizing the use of high energy materials; environment-friendly technologies; minimizing transportation and maximize the use of local materials and resources; decentralized production and maximum use of local skills; utilization of industrial and mine wastes for the production of building materials; recycling of building wastes, and use of renewable energy sources.

Agrifiber products are made from agricultural fiber. Examples include particleboard, medium-density fibreboard (MDF), plywood, oriented-strand board (OSB), wheatboard, and strawboard.

Built Environment: the term-built environment, or built world, refers to the human-made environment that provides the setting for human activity, including homes, buildings, zoning, streets, sidewalks, open spaces, transportation options, and more. It is defined as "the human-made space in which people live, work and recreate on a day-to-day basis

Biodegradable waste includes any organic matter in waste which can be broken down into carbon dioxide, water, methane or simple organic molecules by micro-organisms and other living things by composting, aerobic digestion, anaerobic digestion or similar processes**.**

Bio-based material is a material intentionally made from substances derived from living (or once-living) organisms. Bio-based materials or biomaterials fall under the broader category of bioproducts or bio-based products which includes materials, chemicals and energy derived from renewable biological resources. Bio-based materials are often biodegradable, but this is not always the case. Examples include: engineered wood — products such as oriented strand board and particle board

Bill of quantities is a document used in tendering in the construction industry in which materials, parts, and labour are itemized. It also details the terms and conditions of the construction or repair contract and itemizes all work to enable a contractor to price the work for which he or she is bidding. The quantities may be measured in number, area, volume, weight or time. Preparing a bill of quantities requires that the design is complete and a specification has been prepared

Biodiversity: The variety of life in all forms, levels and combinations, including ecosystems diversity, species diversity, and genetic diversity.

Built-up-Area: Built-up area is the carpet area plus the thickness of outer walls, common areas such as the lobby, lifts shaft, stairs, etc. The plinth area along with a share of all common areas proportionately divided amongst all unit owners makes up the super built-up area.

Blackwater is wastewater from toilets and urinals is always considered blackwater

Construction and demolition (C&D) materials are generated when new building and civil-engineering structures are built and when existing buildings and civil-engineering structures are renovated or demolished (including deconstruction activities)

Circular economy, United Nations definition: "The circular economy is a system of production, exchange and sharing allowing social progress, the preservation of natural capital and economic development as defined by the Brundtland commission

Cradle-to-cradle design (also referred to as 2CC2, C2C, cradle 2 cradle, or regenerative design) is a biomimetic approach to the design of products and systems that models human industry on nature's processes, where materials are viewed as nutrients circulating in healthy, safe metabolisms. The term itself is a play on the popular corporate phrase "cradle to grave", implying that the C2C model is sustainable and considerate of life and future generations—from the

birth, or "cradle", of one generation to the next generation, versus from birth to death, or "grave", within the same generation

Composting is another most frequently used waste disposal or treatment method which is the controlled aerobic decomposition of organic waste materials by the action of small invertebrates and microorganisms. The most common composting techniques include static pile composting, vermin-composting, windrow composting and in-vessel composting.

Contaminant is an unwanted waterborne constituent that may reduce quality of the water.

Drain- A system or a line of pipes, with their fittings and accessories, such as manholes, inspection chambers, traps, gullies, floor traps used for drainage of building or yards appurtenant to the buildings within the same cartilage; and includes an open channel for conveying surface water or a system for the removal of any wastewater.

Dwelling- A building or a portion thereof which is designed or used wholly or principally for residential purposes for one family.

Environmental impact is defined as any change to the environment, whether adverse or beneficial, resulting from a facility's activities, products, or services.[2] In other words it is the effect that people's actions have on the environment. For example, when volatile organic compounds are released into the environment, the effect or impact is pollution in the form of smog, in this case being negative. It can go the other way, as a person picking up litter can have a beneficial impact on the local environment.

E-waste: It includes discarded materials from a range of electronic devices such as computers, refrigerators, televisions, air-conditioners, personal stereos, mobile phones etc.

Ecolabelling is a voluntary method of environmental performance certification and labelling that is practised around the world. An ecolabel identifies products or services proven to be environmentally preferable within a specific category.

Ecolabels are seals of approval given to products that are deemed to have fewer impacts on the environment than functionally or competitively similar products. The rationale for basic labelling information at the point of sale is that it links fisheries products to their production process. (Greenpro | Home (ciigreenpro.com)

Environmental management system is a set of processes and practices that enable an organization to reduce its environmental impacts and increase its operating efficiency.

Eco-friendly packaging is any packaging that's easy to recycle, safe for individuals and the environment, and is made out of recycled materials. It uses materials and manufacturing practices with minimal impact on energy consumption and natural resources

Facilities management can be defined as the tools and services that support the functionality, safety, and sustainability of buildings, grounds, infrastructure, and real estate

Fit for Occupancy Certificate: A certificate of occupancy is a legal binding document that permits the construction of a building. It indicates that the building complies with the building codes set by the law. The building is termed as fit for occupancy. The certificate is mandatory in the case a new building is constructed

Fly Ash: The solid residue derived from incineration processes. Fly ash can be used as substitute for Portland cement in concrete.

GreenPro is a Type – 1 Ecolabel which enables the end users in the building sector and manufacturing sector to choose sustainable products, materials and technologies for reducing the environment impacts during the construction, operation and maintenance of their buildings and factories. GreenPro Ecolabel is

accredited by Global Ecolabelling Network (GEN) through GENICES – GEN's Internationally Coordinated Ecolabelling System. Product which bears GreenPro Ecolabel has lower environment impact and contributes significantly for enhancing the performance of Green Buildings and Green Companies. GreenPro empowers end users with product sustainability information and steer them towards purchasing of sustainable products. (Greenpro | Home (ciigreenpro.com)

Garbage, trash, rubbish, or refuse is waste material that is discarded by humans, usually due to a perceived lack of utility. The term generally does not encompass bodily waste products, purely liquid or gaseous wastes, nor toxic waste products. **Garbage** is commonly sorted and classified into kinds of material suitable for specific kinds of disposal.

Grey Water is wastewater from showers, bathtubs, washing machines and sinks that are not used for disposal of hazardous or toxic ingredients or wastes from food preparation

Greenhouse Gases: Gases such as carbon dioxide, methane and Chlorofluorocarbons CFCs that are relatively transparent to the higher-energy sunlight, but trap lower –energy infrared radiation.

Green procurement is the adoption of ecologically responsible practices in business activities used to meet needs for materials, goods, utilities and services. The approach is one component of sustainable procurement, along with a dedication to social responsibility and good corporate citizenship.

In-vessel composting is an industrial form of composting biodegradable waste that occurs in enclosed reactors. These generally consist of metal tanks or concrete bunkers in which air flow and temperature can be controlled, using the principles of a "bioreactor". Generally the air circulation is metered in via buried tubes that allow fresh air to be injected under pressure, with the exhaust being extracted through a bio filter, with temperature and moisture conditions monitored using

probes in the mass to allow maintenance of optimum aerobic decomposition conditions.

Local Materials are those materials which are manufactured close to the site location. For the purpose of this credit, the distance between location of site and place of manufacture is defined as 400 km.

Land fill: A waste disposal site for the deposit of solid waste from human activities

Modular construction is the future of standardized building. With potential to yield time savings of between 20 to 50 percent faster than traditional building techniques it has been regarded as a highly effective method of construction. Modular construction involves the prefabrication of 2D panels or 3D volumetric structures in off-site factories and transportation to construction sites for assembly. This process has been proven superior to traditional building in terms of both time and costs.

Net Zero Energy Building rating system is a tool that enables the project team to apply energy efficiency measures, and suggests deployment of appropriate renewable sources to achieve net zero energy performance

Net Zero Water is a voluntary and consensus-based programme. The objective of IGBC Net Zero Water Rating is to facilitate a holistic approach to make water efficient buildings and harness alternate water to meet the water requirement

Net Zero Waste: A Net Zero Waste for Buildings & Built Environment is one which eliminates the diversion of waste being sent to landfills, by a multi-pronged approach - nature-centric design, reducing debris during construction, responsibly handling waste during operation, reusing the waste as much as possible and recycling the remaining waste

Non-biodegradable waste is defined as a substance that cannot be decomposed or dissolved naturally and acts as a source of pollution. They may remain on this planet for many years without any degradation, thereby posing a critical threat to

the environment. Non-biodegradable waste examples include- plastics, metal, aluminium cans, tyres, pains, toxic chemicals, toxic chemicals, polystyrene, etc.

National Solid Waste Association of India (NSWAI) is the only leading professional non-profit organization in the field of Solid Waste Management in India. With over 500 members worldwide, NSWAI comprises of a strong member team of national and international experts on waste management which includes all kinds of waste

Organic wastes contain materials which originated from living organisms. There are many types of organic wastes and they can be found in municipal solid waste , industrial solid waste , agricultural waste, and wastewaters. Organic wastes are often disposed of with other wastes in landfills or incinerators, but since they are biodegradable, some organic wastes are suitable for composting and land application. Organic materials found in municipal solid waste include food, paper, wood, sewage sludge , and yard waste

Prefabrication is the practice of assembling components of a structure in a factory or other manufacturing site and transporting complete assemblies or sub-assemblies to the construction site where the structure is to be located. The term is used to distinguish this process from the more conventional construction practice of transporting the basic materials to the construction site where all assembly is carried out

REDUCE Reducing the amount you buy is the most significant of all the options to manage waste. The key is to only purchase goods that we need and in the right amount. If we never generate products in the first place, we do not have to extract raw resources, manufacture goods from scratch, come up with shipping materials, utilize additional resources for shipping, and then devise ways to dispose of them. Replace Single-use Items with Reusable Ones. Say no to single-use plastics, use reusables instead

Reuse is a strategy to return materials for active use in the same or a related capacity. There are definite items in our garbage that can be reused. Reusing waste items means that instead of dumping them, we can reuse these items. The following are some examples of reuse:

- Items such as plastic containers and pickle bottles should be reused to store other things.
- We can also reuse cardboard boxes, wrapping papers, and chocolate boxes.
- We can give away old clothes to the needy people.
- It is better to use cloth bags in place of plastic bags for shopping.
- Buy such products which can be reused such as rechargeable batteries:

Recycling is the collection, reprocessing, marketing and use of materials that were diverted or recovered from the solid waste stream. Often you may find persons (the Kabariwalas) who visit our home, and to whom we sell old newspapers, bottles, tins, magazines, etc. perhaps you have never thought where these products go. These products are used as raw materials for manufacturing other items. In other words, recycling takes place in the manufacturing of these products. This is an important effort, as in this process, we not only reduce the load of garbage as well as conserve natural resources also. Recycling of some common items such as glass, metals, paper, plastics, cardboard, batteries, cans made of steel and aluminum, rubber, wooden furniture easily possible

Rapidly renewable material is defined as material considered to be an agricultural product, that takes ten years or less period to grow or rise, and to harvest in an ongoing and sustainable manner.

Recycled Materials: All materials that come from a building site for reuse are recycled building materials. This includes, wood, brick, insulation, plastics, glass,

building blocks, wall coverings, and so on. This way recycled resources are environmentally friendly and cost-efficient.

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.

Residential Building- includes a building in which sleeping and living accommodation is provided for normal residential purposes, with cooking facilities and includes one or more family dwellings, apartment houses, flats, and private garages of such buildings.

Sustainable demolition involves considering the surroundings, keeping CO2 emissions to a minimum and ensuring that as much demolition waste as possible is re-used. The university applied the Outstanding level of the BREEAM assessment method to the demolition project. This level indicates that the demolition is CO2 neutral and causes no nuisance.

Segregation of our waste is essential as the amount of waste being generated today caused immense problem. There are certain items are not Biodegradable but can be reused or recycled in fact it is believed that a larger portion of the waste can be recycled, a part of can be converted to compost, and only a smaller portion of it is real waste that has no use and has to be discarded

Solid waste management is defined as the discipline associated with control of generation, storage, collection, transport or transfer, processing and disposal of solid waste materials in a way that best addresses the range of public health, conservation, economic, aesthetic, engineering, and other environmental considerations.

Sustainable Development Goals or Global Goals are a collection of 17 interlinked global goals designed to be a "blueprint to achieve a better and more

sustainable future for all". The SDGs were set up in 2015 by the United Nations General Assembly and are intended to be achieved by the year 2030. They are included in a UN-GA Resolution called the 2030 Agenda or what is colloquially known as Agenda 2030. The SDGs were developed in the Post-2015 Development Agenda as the future global development framework to succeed the Millennium Development Goals which ended in 2015

Salvaged materials are construction materials recovered from existing buildings or construction sites / second-hand market and reused in other buildings. Commonly salvaged materials include timber frames, MS railing, door shutters, window shutters, decorative items, railway sleepers etc.

Site boundary is the portion of the project site submitted for IGBC green homes certification. For single apartment, this is the entire project scope and is generally limited to the site boundary. For multiple residential apartments, the IGBC project boundary may be a portion of the development as determined by the project team.

Sewage Treatment is a process of removing contaminants from waste water and house-hold sewage. Its objective is to produce an environmentally safe fluid waste stream suitable for disposal or reuse using advanced technology it is possible to reuse sewage affluent for drinking water (e.g. Singapore).

Swales: Low tract of land, especially one that is moist and marshy. Kind of open drain system is usually designed to manage runoff.

Topsoil conservation: The process of removing and protecting the top soil from any construction or development site for reusing it onsite later.

Tertiary treatment is the highest form of wastewater treatment that includes the removal of nutrients, organic and solid material, along with biological or chemical polishing generally to effluent limits of 10 mg/L BOD_5 and 10 mg/L TSS.

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 vaporize (become a gas) at normal room temperatures.

Waste (or wastes) are unwanted or unusable materials. Waste is any substance which is discarded after primary use, or is worthless, defective and of no use. A by-product by contrast is a joint product of relatively minor economic value. A waste product may become a by-product, joint product or resource through an invention that raises a waste product's value above zero**.**

Waste Picker: A waste picker is a person who salvages reusable or recyclable materials thrown away by others to sell or for personal consumption. There are millions of waste pickers worldwide, predominantly in developing countries, but increasingly in post-industrial countries as well.

Wastewater from kitchen sinks, showers or bathtubs may be considered grey water by state or local codes. Project teams should comply with the grey water / black water definition as established by the authority having jurisdiction in their areas.

About CII

The Confederation of Indian Industry (CII) works to create and sustain an environment conducive to the development of India, partnering industry, Government, and civil society, through advisory and consultative processes.

CII is a non-government, not-for-profit, industry-led and industry managed organization, playing a proactive role in India's development process. Founded over 125 years ago, India's premier business association has around 9000 members, from the private as well as public sectors, including SMEs and MNCs, and an indirect membership of over 300,000 enterprises from around 276 national and regional sectoral industry bodies.

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

Extending its agenda beyond business, CII assists industry to identify and execute corporate citizenship programmes. Partnerships with over 120 NGOs across the country carry forward corporate initiatives for integrated and inclusive development, in affirmative action, healthcare, education, livelihood, diversity management, skill development, empowerment of women, and water, to name a few.

The CII theme for 2020-21 is 'Building India for a New World Competitiveness, Growth, Sustainability, Technology'. As India marches towards its 75th year of Independence in 2022, CII rededicates itself to meeting the aspirations of citizens under its mission of India@75TM for a morally, economically and technologically advanced country in partnership with the Government, Industry and all stakeholders. All parts of the economic ecosystem must work in partnership to ensure the fastest possible progress under these metrics and CII as a synergistic organization is a strong connect between the various parts.

With 62 offices, including 10 Centres of Excellence, in India, and 8 overseas offices in Australia, China, Egypt, France, Germany, Indonesia, Singapore, South Africa, UAE, UK, and USA, as well as institutional partnerships with 394 counterpart organizations in 133 countries, CII serves as a reference point for Indian industry and the international business community.

About Indian Green Building Council (IGBC)

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".

IGBC is strong with membership base of more than 2000 members which is progressively increasing over the years. Members comprise of all stakeholders of the construction industry viz. Architects, Interior Designers, Landscape Consultants, MEP Consultants, Builders, Developers, Product and Equipment Manufactures, Corporate, Institutions and Government agencies.

The Council presently has 29 Chapters spread all over the country to cater to the aspirations of various states and regions. These chapters are headed by eminent Architects and Developers.

To seed the ideas of green building concepts in the minds of young people, IGBC has started Student chapters in various architectural and engineering colleges.

The council has in the past 20 years facilitated 8000 Green Buildings in the country with a footprint of 8 Billion sq.ft. covering the varied building types viz. commercial, residential, hospitals, airports, retail, factory buildings and SEZs.

The council closely works with State and Central Governments, World Green Building Council, bilateral and multi-lateral agencies in promoting green building concepts.

Vision of IGBC 'Mission on Net Zero'

To facilitate India to become on of the foremost countries in transforming to 'Net Zero' by 2050.

On Earth Day 2021, CII-IGBC has launched the 'Mission on Net Zero'. As part of this mission, so far, more than 300 signatories from Indian Building Sector have committed to achieve 'Net Zero' status for their New and Existing Building. IGBC's initiative on 'Net Zero' is supported by World GBC.

This pilot version has been printed on environment friendly, chlorine free paper sourced from a responsibly managed forest

For more information on Net Zero Buildings, please contact

Confederation of Indian Industry

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