IGBC

IGBC NET ZERO Rating Programmes

Enabling the Net Zero Movement in India!

CII – IGBC Head Quarters, Hyderabad, India in 2003

CII – IGBC Head Quarters, Hyderabad, India in 2022

IGBC

Confederation of Indian Industry

Indian Green Building Council

Greening India since 2001

About IGBC

www.igbc.in

Indian Green Building Council (IGBC)

Confederation of Indian Industry

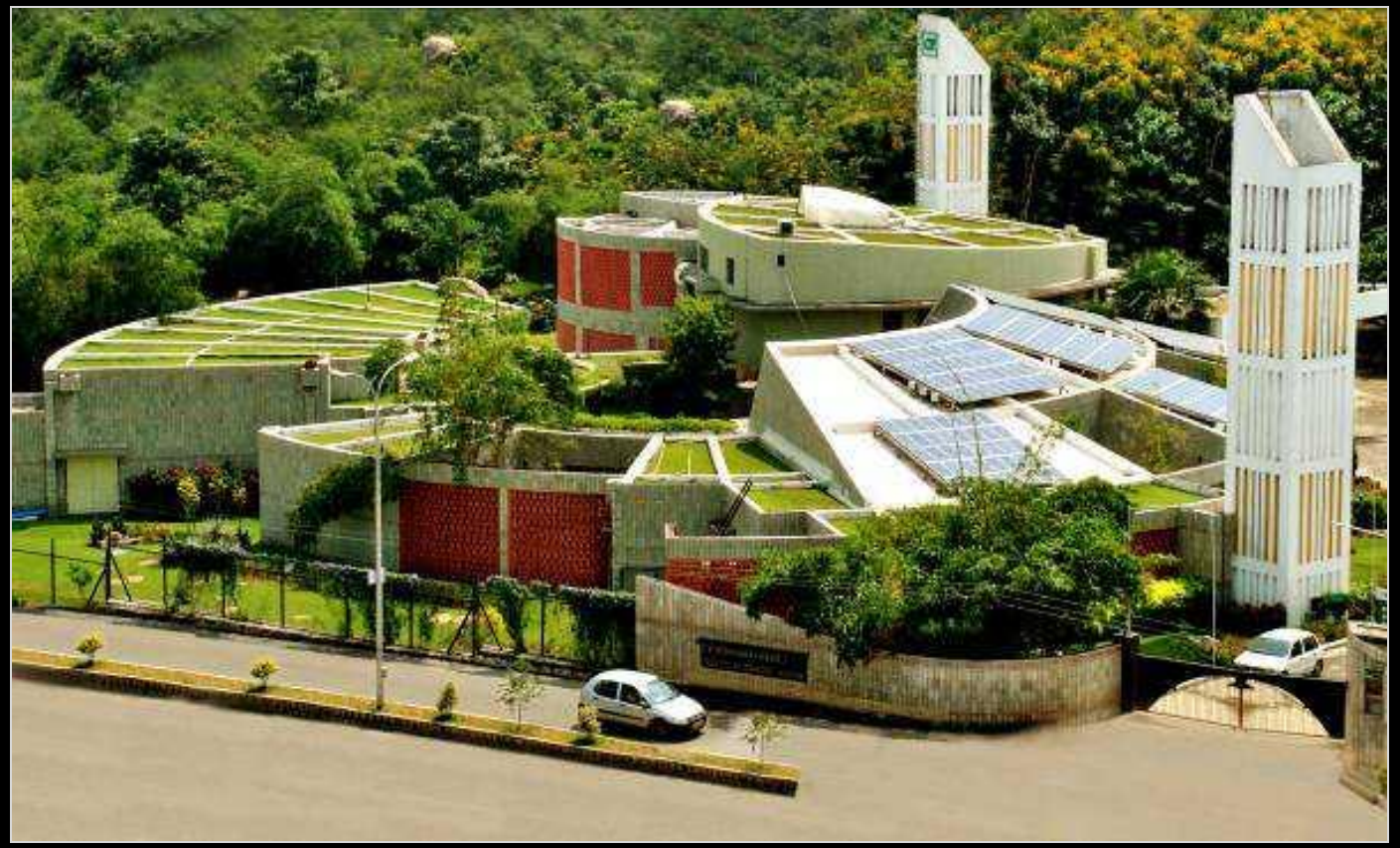
- IGBC formed by CII in 2001
- Vision of IGBC
  - Enable 'sustainable built environment for all'
  - India to be one of the global leaders in sustainable built environment by 2025
- Founding Member of WorldGBC since 2004

IGBC

WORLD GREEN BUILDING COUNCIL

21st Century Modern Green Building Movement in India

CII – Godrej Green Business Centre, Hyderabad, India



Inaugurated by H.E Dr (Late) A P J Abdul Kalam,
President of India
14 July 2004

India's First Platinum Rated Green Building & IGBC Headquarters, Hyderabad

IGBC

CII

Green Building to Green Built Environment Movement in India since 2001

In 2001,
1 Green Building
20,000 sq.ft.

8,700 + Green Projects

9.74 Billion sq. ft.

30 IGBC GREEN Rating Systems

Net Zero

1. IGBC Net Zero Energy Buildings
2. IGBC Net Zero Water
3. IGBC Net Zero Waste

- *'NZ Carbon in Pilot stage'*

Commercial

4. IGBC Green New Buildings
5. IGBC Green Existing Buildings
6. IGBC Green Interiors
7. IGBC Green Campus
8. IGBC Green Data Centers
9. IGBC Green Resorts
10. IGBC Green Service Buildings

Residential

11. IGBC Green Homes
12. IGBC Green Residential Societies
13. IGBC Green Affordable Housing

Built Environment

14. IGBC Green Cities
15. IGBC Green Existing Cities
16. IGBC Green Villages
17. IGBC Green Townships
18. IGBC Green Landscape
19. IGBC Green Hill Habitat

Transit

20. IGBC Green Metro Stations
21. IGBC Green Existing MRTS
22. IGBC Green Railway Stations
23. IGBC Green High Speed Rail

Education

24. IGBC Green Schools
25. IGBC Green Places of Worship

Industrial

26. IGBC Green Factory Building
27. IGBC Green SEZ
28. IGBC Green Logistics Parks & Warehouse

Health & Wellbeing

29. IGBC Green Healthcare Facilities
30. IGBC Health & Well-being

Places where we stay, live, learn, work, play, transit & worship - *can all go green*

IGBC

CII

Measurable Benefits in 2,215 IGBC Certified Green Projects across India

15.3 Billion kWh

(Energy savings per annum)

49.0 Billion Litres

(Water savings per annum)

12.55 Million Tons

(GHG mitigation per annum)

2,215 IGBC Certified projects – 1,170 Million sq.ft

30 IGBC GREEN Rating Systems

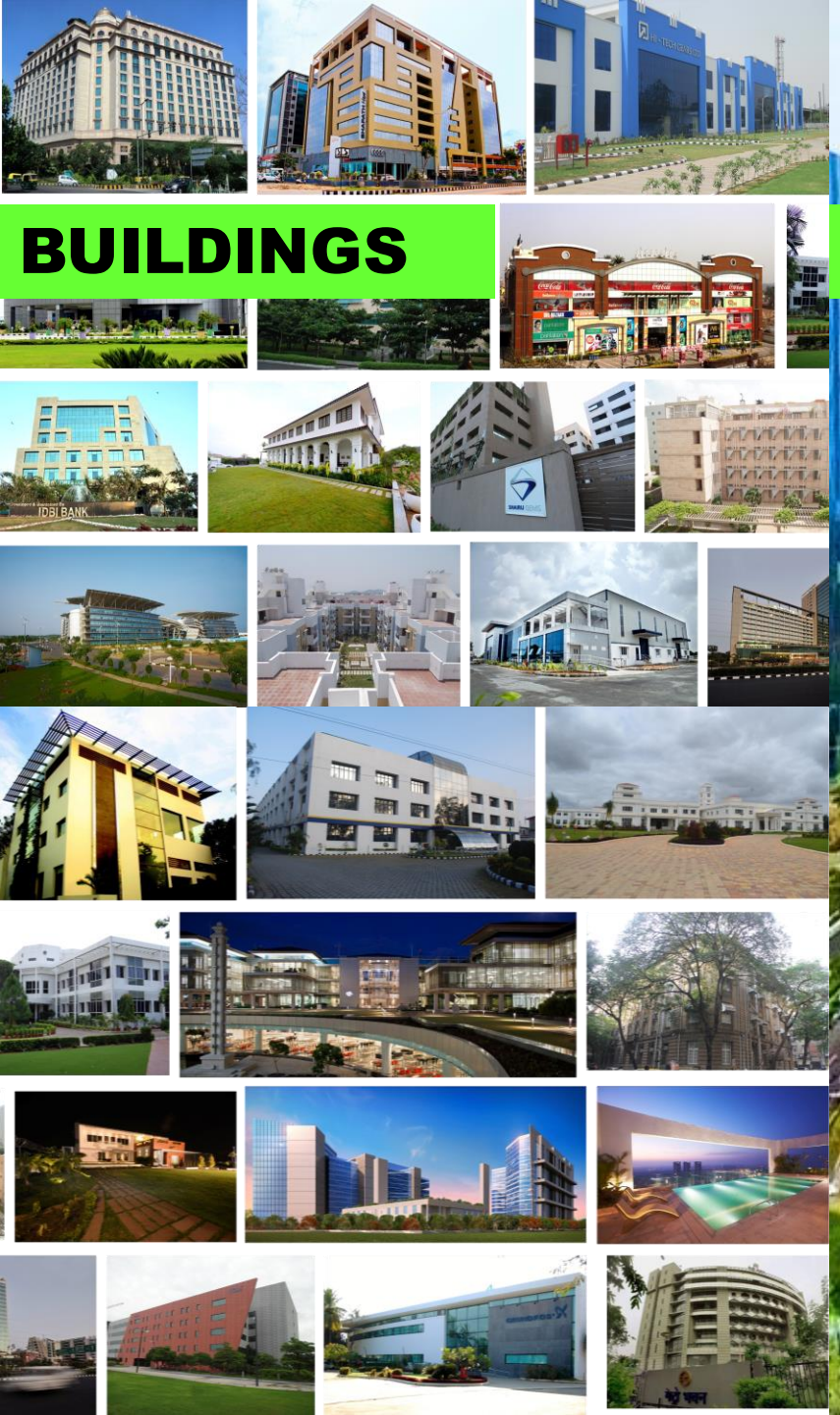
addressing Buildings to Built Environment

Now, IGBC is leading India's Net Zero Movement

IGBC

CII

BUILDINGS



BUILT ENVIRONMENT

NET ZERO

Indian Green Building Council

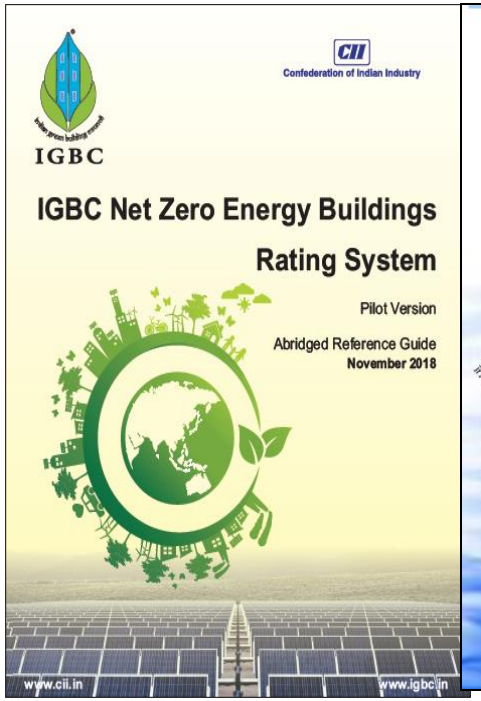
Greening India since 2001

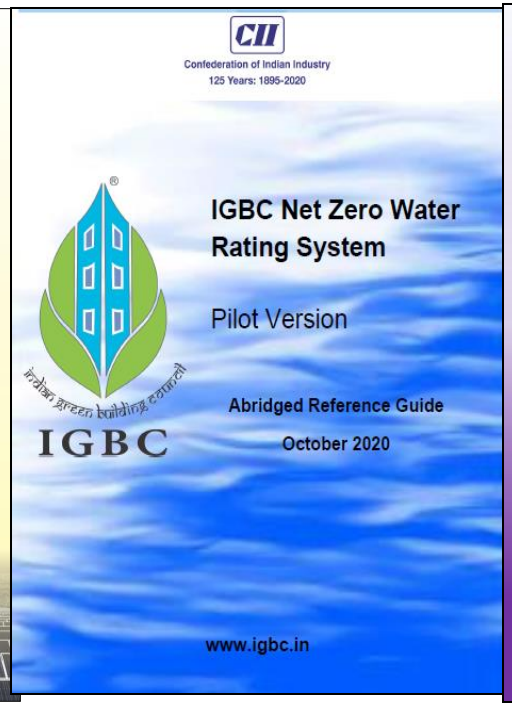
IGBC NET ZERO rating Progammes

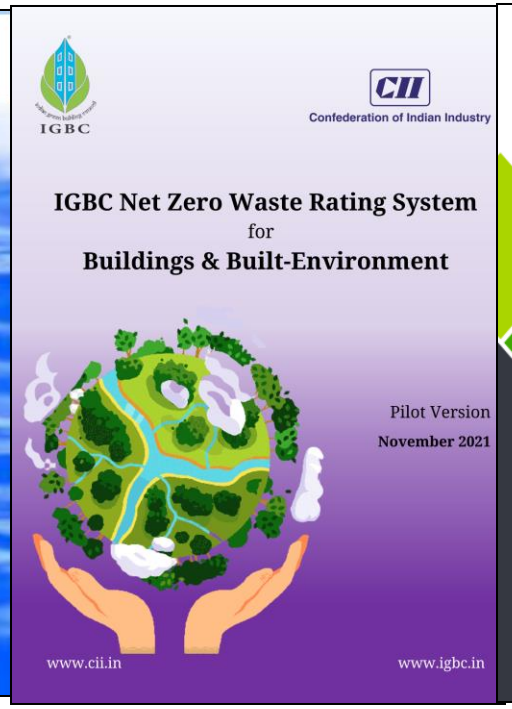
- ***Energy***
- ***Water***
- ***Waste***
- ***Carbon***

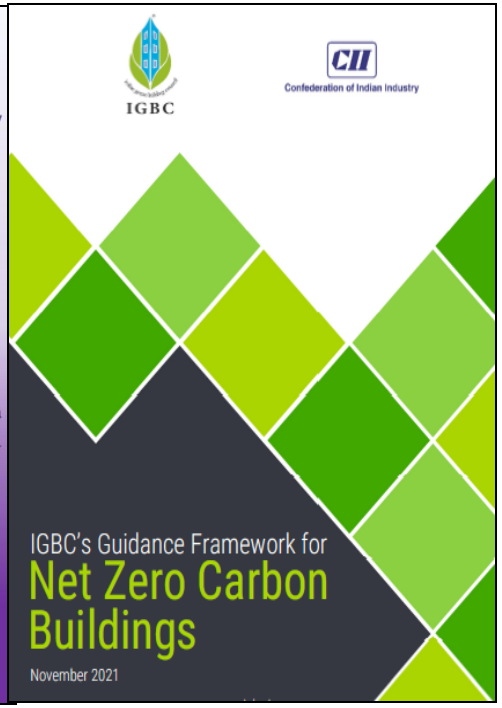
www.igbc.in

IGBC NET Zero Rating Systems







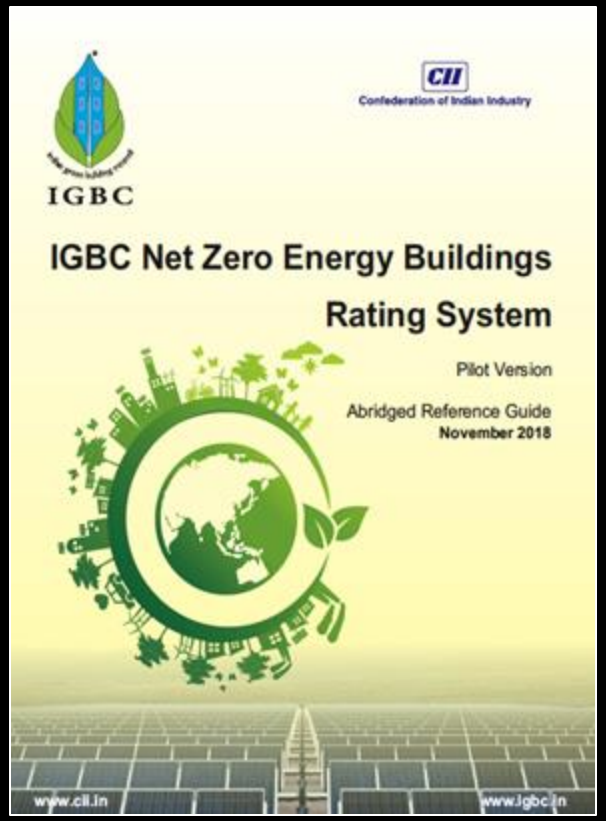


Energy | **Water** | **Waste** | **Carbon**

www.igbc.in

IGBC Net Zero Energy Rating (Launched in 2018)

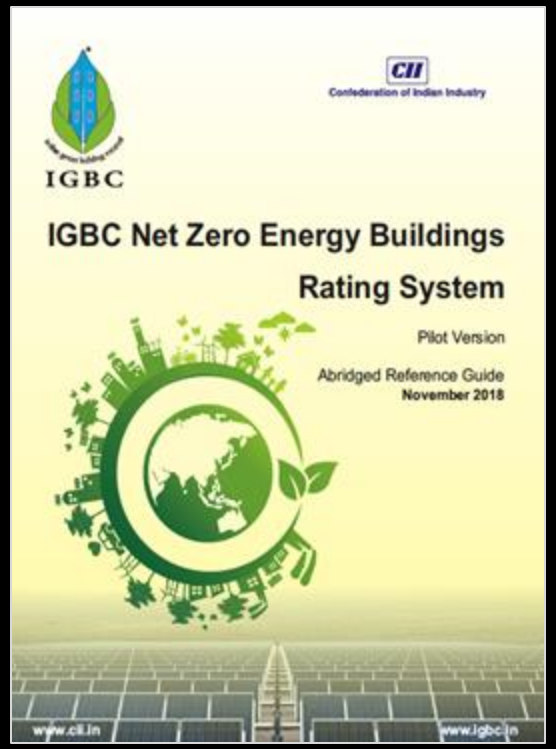
- ❖ IGBC Net Zero Energy Buildings Rating - Voluntary & consensus-based.
- ❖ The rating system evaluates a performance-based approach.
- ❖ The rating is evolved to be comprehensive and holistic.



1. IGBC Net Zero Energy Building

A Net Zero Energy buildings is one which is

- **Designed to have the *Lowest* Energy Demand**
- **High Energy Efficiency during its Operation**
- **Thereafter, Energy requirements are met through Renewable Energy (RE) sources**



Achieving 'IGBC Net Zero Energy' Status

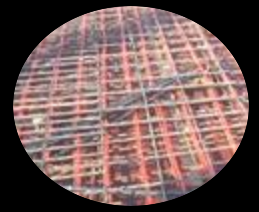
25 %

Renewable Energy

100% offsetting of grid energy use by Renewable Energy Sources

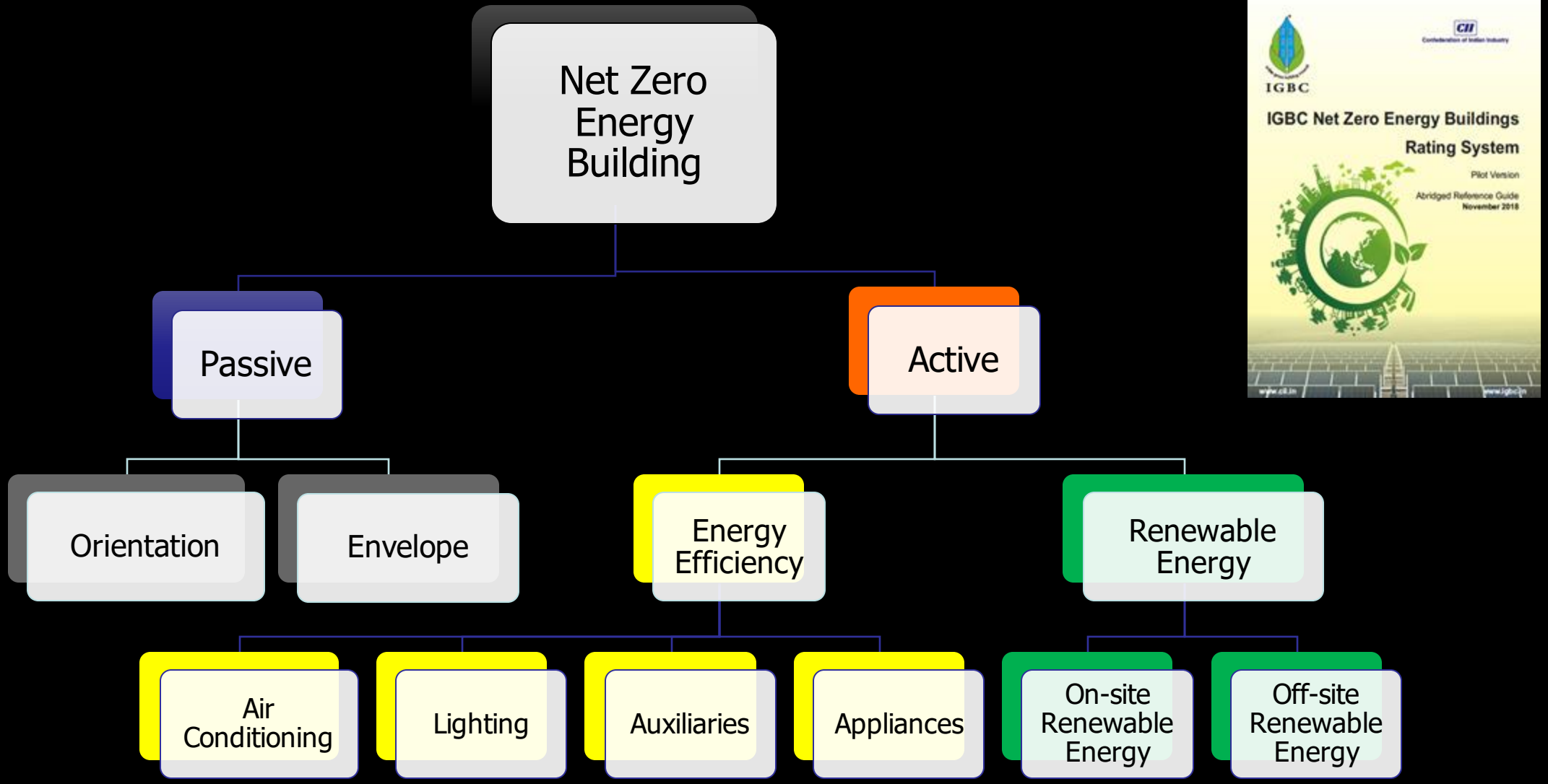
75 %

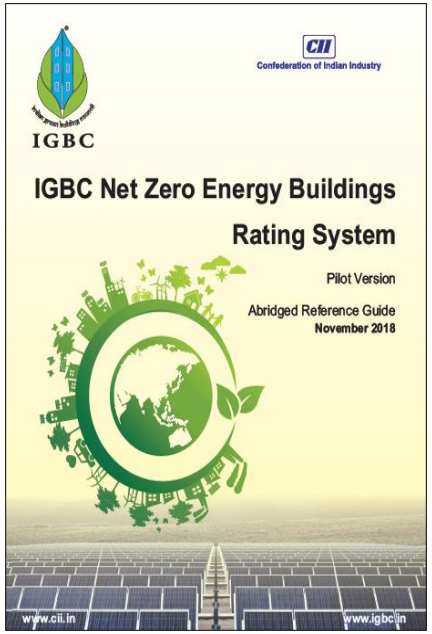
Energy Efficiency



Energy Efficiency through passive design & active energy systems, to reduce the Energy Demand

Approach for Achieving 'IGBC Net Zero Energy' Status





Key Design & Operational features

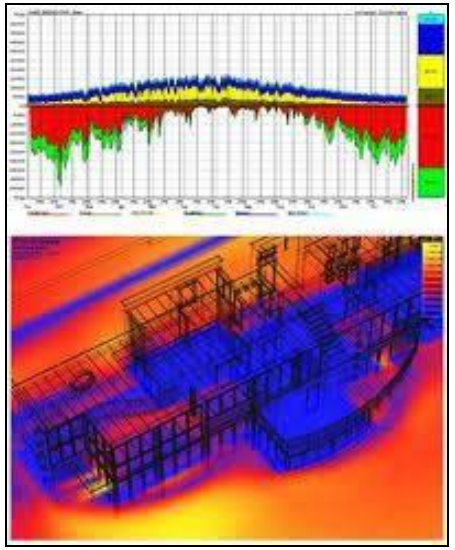
1. Building Orientation & Energy Modelling

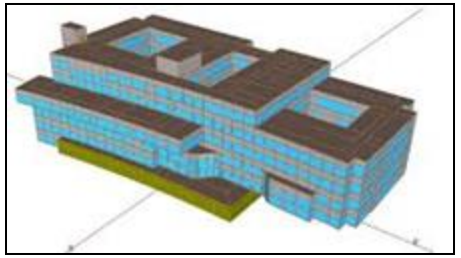
- ❖ **IGBC rating program encourages optimised building orientation - Greenfield projects**

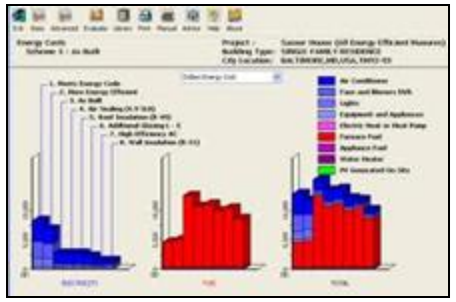
- ❖ **Energy Modelling, BIM - Reduce the excessive heat ingress in New & Existing Buildings**

- ❖ **Effective tool to develop and adopt sustainable design in building**
  - ➢ **Models, forecasts, scenario projections of proposed building**

BGRT, Bangalore



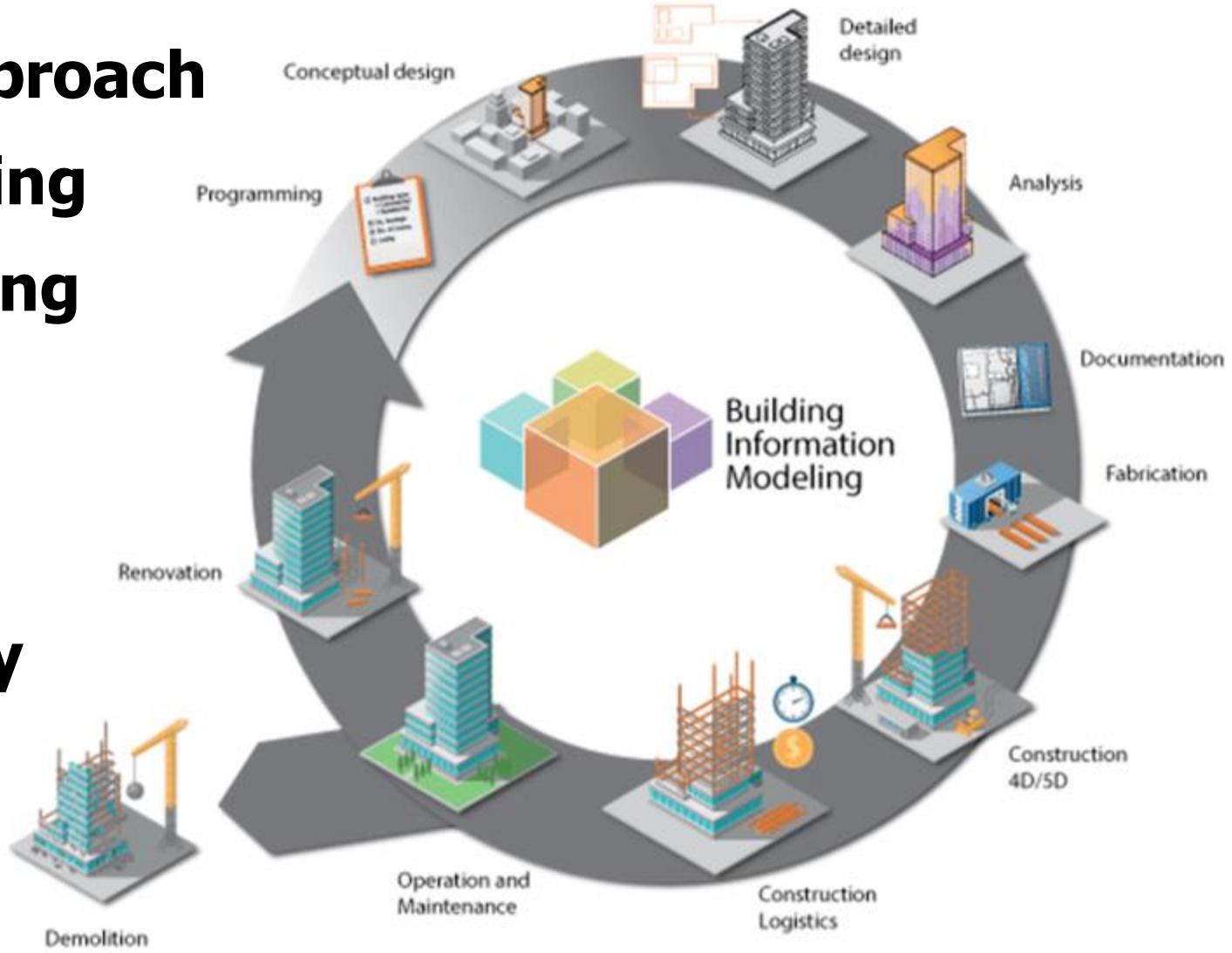




Building Orientation is key to Enhance Energy Efficiency!

Building Information Modelling (BIM)

- Highly Collaborative Approach
- Project Life-cycle planning
- Informed Decision making
- Right information at right time to all project stakeholders
- Improved overall quality
- Greater certainty over cost and time



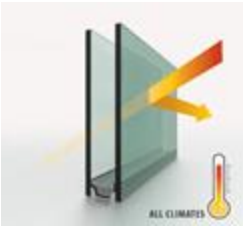
IGBC rating system encourages BIM

2. Envelope Design

Based on Holistic & Integrated Design : Well Informed Design specifications

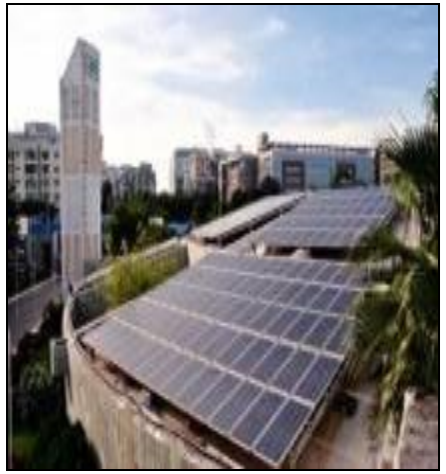
- Window Wall Ratio (WWR)
- High Performance Glass
- PV Integrated Glazing
- Vertical Fenestration

- Insulated roof / Cool Roof
- Increased use of Fly Ash blocks
- Design for 95% clear sky
- Sky light . . . .



Approach towards Enhanced HVAC

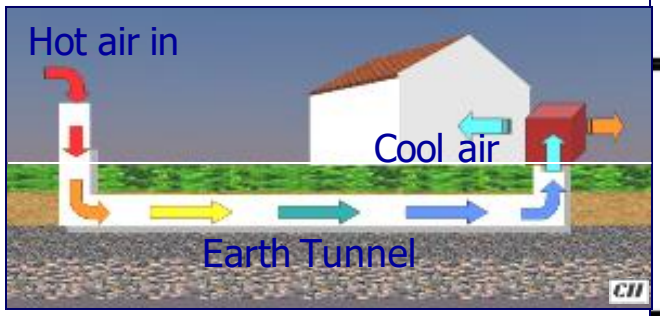
- ❖ **IGBC Rating Programmes – Encourage Passive Measures**
  - ➢ **Wind Tower System**
  - ➢ **Earth Tunnel Cooling**
  - ➢ **Geothermal Cooling**
  - ➢ **Conventional HVAC Systems**
  - ➢ **Highly Integrated & Holistic – Super Energy Efficient Systems . . .**

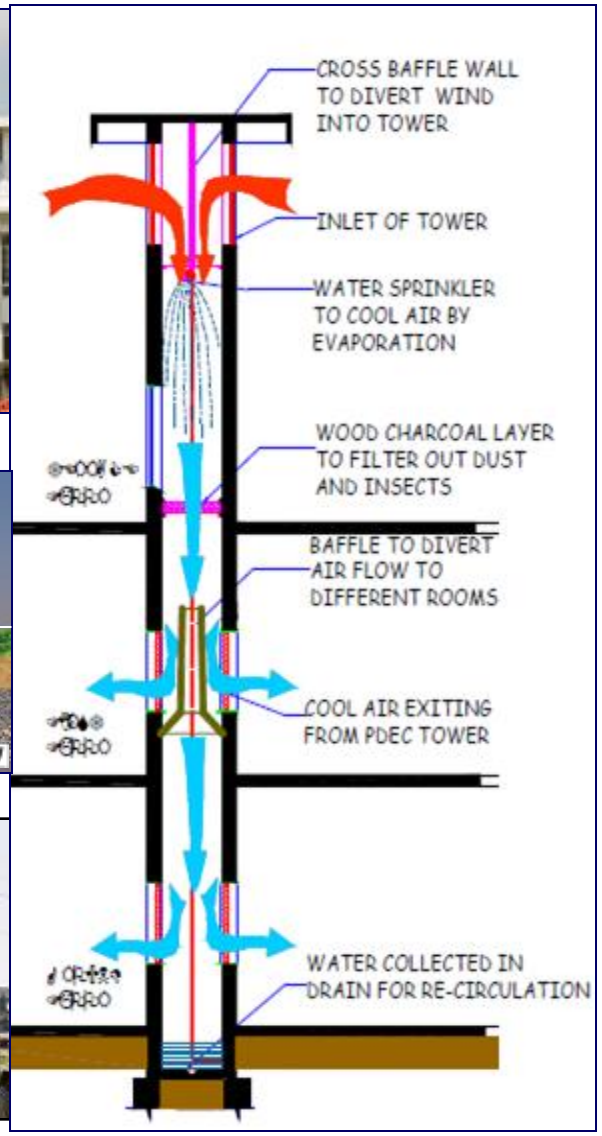


3. Heating, Ventilation & Air Conditioning (HVAC)

Passive Cooling

- ❖ **Temperature reduction up to 8-10 deg C, possible**
  - ➢ **Earth air tunnel**
  - ➢ **Geothermal cooling**
  - ➢ **Wind Towers**
  - ➢ **PDEC system (Passive Downdraft Evaporative Cooling)**

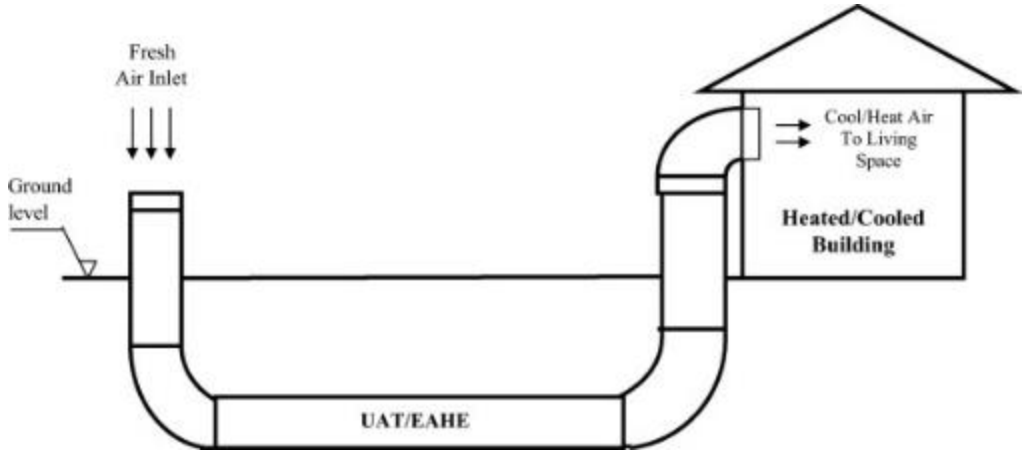




Wind tower

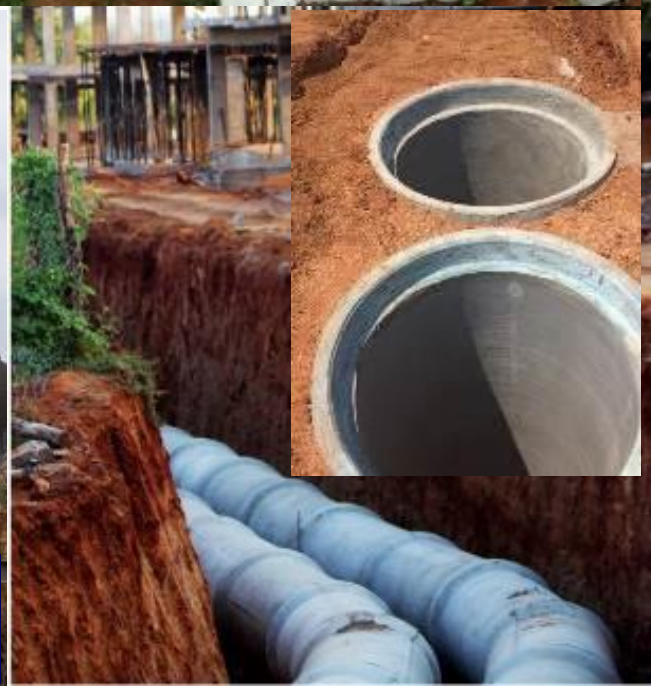
1. Earth Tunnel Air Conditioning – Office Project

- ❖ **Wonder Utilisation of Nature**
- ❖ **Earth below 4 m**
  - ❖ **Cooler - During Summer**
  - ❖ **Warmer - During Winter**



Aquamall, Dehradun IGBC Gold

Earth Tunnel Air Conditioning – Residential Project



Nandi Rurban Commune, Hyderabad
IGBC Platinum

- **Earth Tunnel used to Pre-Cool the ambient air**

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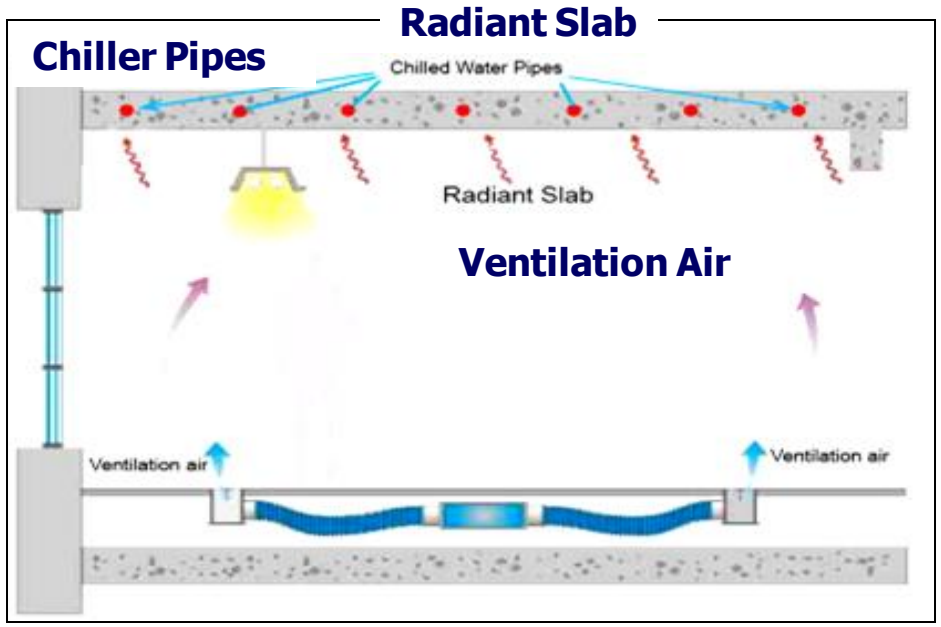
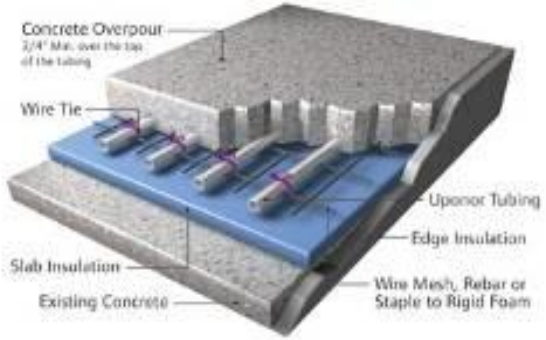
Confederation of Indian Industry

2. Radiant Cooling Technology

- **30-40% better efficiency**
  - **Possible CoP : 8**
- **Advantages**
  - **Specific cooling of person**
- **SEC – 0.3 kW/TR**
- **Infosys, Pocharam – IGBC Platinum Rated!**
  - **160,000 sq.ft**





3. Cogeneration

- 2.5 MW Gas based turbine for onsite power generation
- Co-generation where waste heat from turbine exhaust runs 1,300 TR VAM
- System integrated to National Grid
- HVAC running cost almost negligible

4. District Cooling

- Enhances performance - Overall HVAC system by design
- Centralized controls
- Lower cost of operation
- Part load and Full load - System's performance is very high
- Reduces Operating cost by 30-35% as compared to a standalone system

- *GIFT City, Gandhinagar, India*
- *Proposed HVAC Capacity (in 3 stages) : 180,000 TR*

4. Effective Usage of Recycled Water for Cooling Tower Make-up

Reuse of 100% Recycled Grey Water at Olympia Tech Park, Chennai

Cooling requirement for HVAC Make-up

Irrigation

Flushing

Zero Discharge of Grey Water

5. Lighting Energy Efficiency

Retrofitting of existing fixtures by LED fixtures

	LPD (W/ft^2)
Design Case	**1.04**
Proposed case	**0.49**

Case Study : Lighting retrofit in CII-Godrej GBC

Existing Lighting Fixtures
- **72 W/ fixture**
- **Efficacy : 60**
- **No of fixtures : 211**

Proposed Lighting Fixtures
- **38 W/ fixture**
- **Efficacy : 132**
- **No of Fixtures : <100**

6. Lighting Controls
Occupancy sensors, Daylight sensors

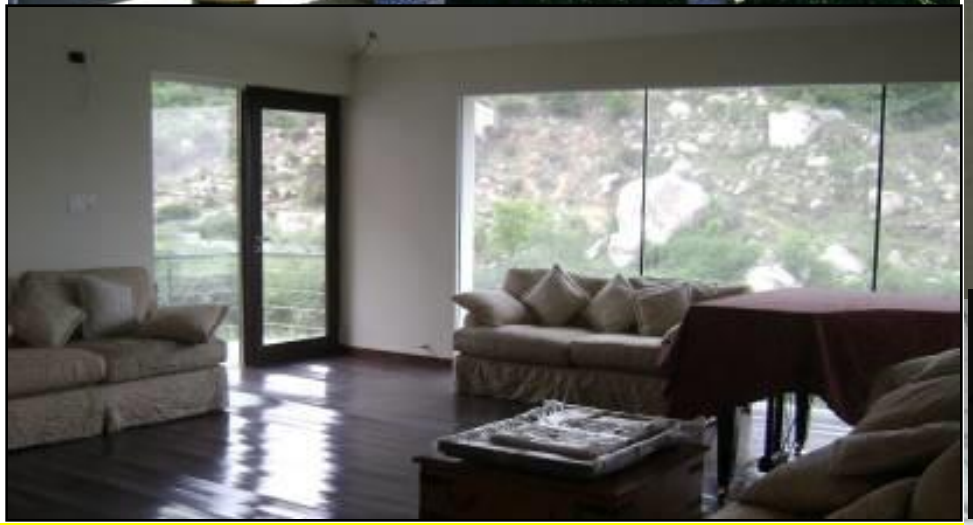
- Enhanced utilisation of daylighting
- Better lamps & controls

Lighting Power Density : 0.3 – 0.5 W/ sq.ft

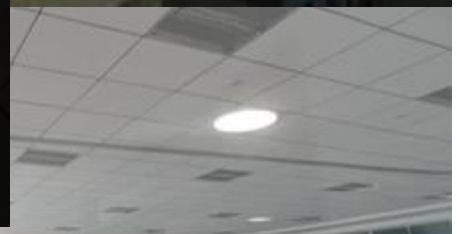
7. Daylighting and Views

SKYLIGHT

ACCESS TO DAYLIGHT & VIEWS



LIGHT PIPES



Reduced lighting energy consumption through efficient use of skylight and light pipes

8. On-Site Renewable Energy Systems

Renewable Energy & Daylight

Rooftop 1 MW Grid Integrated Solar PV*

Micro Wind Turbines

Solar Farms

Solar Farm in IMGEOS & NDEM Facility of ISRO, Shad nagar, IGBC Platinum

Solar Structures for Shading

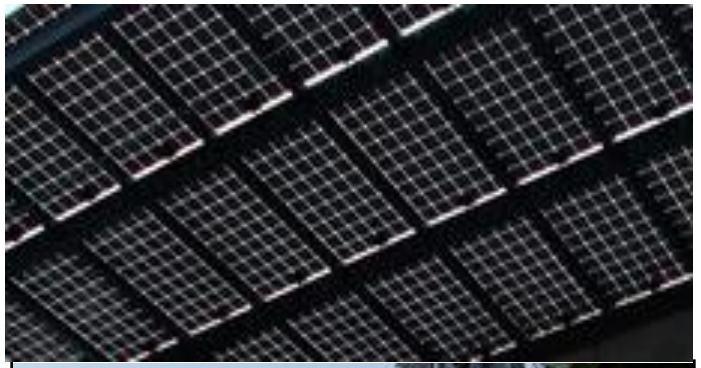
Micro Wind Turbines -Suzlon One Earth, Pune -IGBC Platinum

Renewable Energy Systems – IGBC Projects

BIPV

Delta Power, Rudrapur

CANOPY



© PUMA, Bangalore

FLOATING SOLAR PV

Renewable Energy Systems at IGBC HQ!

INDIA'S FIRST 140 kWP BIFACIAL SOLAR PV

9. Off-site Renewable Energy - Green Power

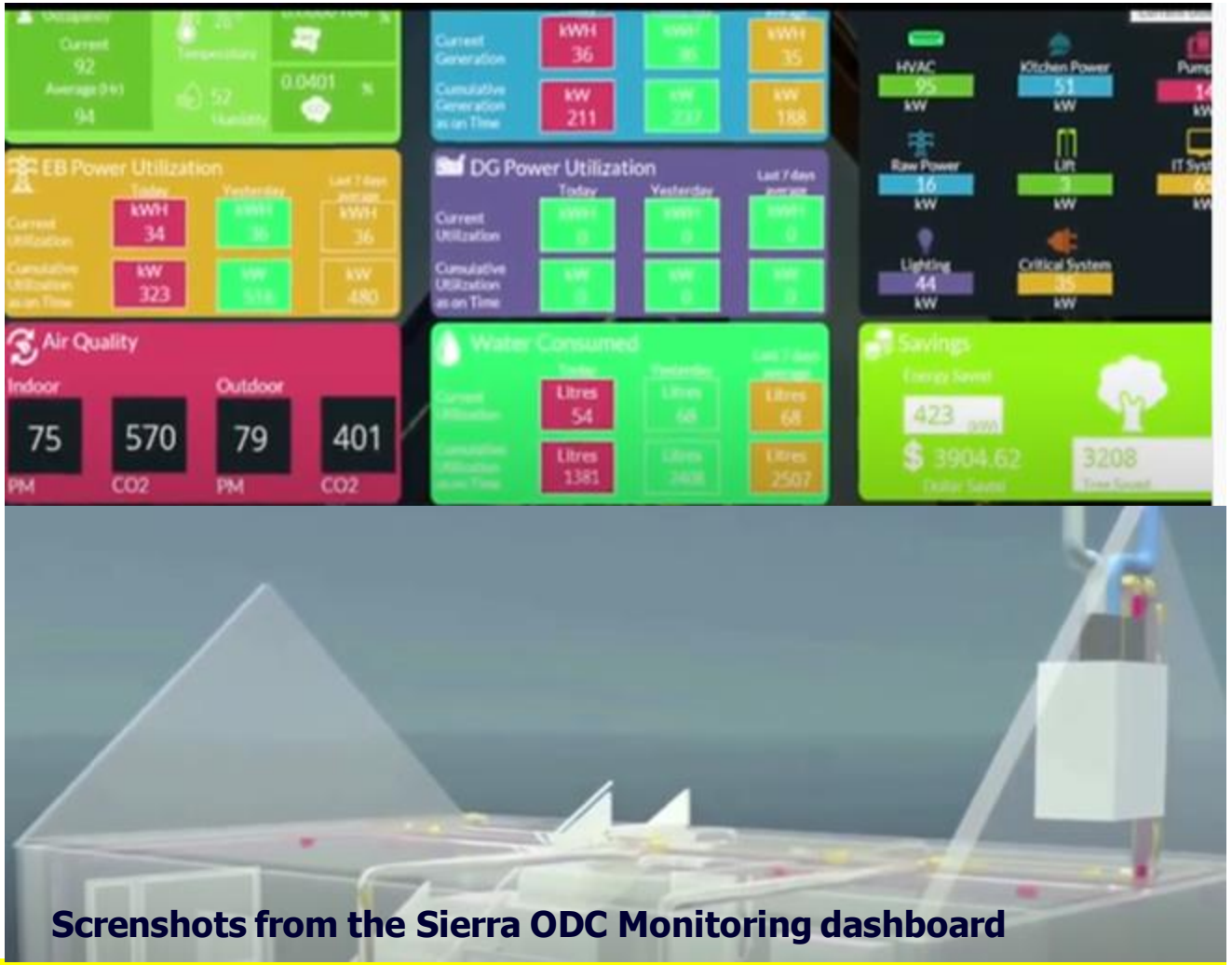
- **Building to install onsite/offsite RE system to achieve Net Zero Performance**
- **Approach**
  - Encourage onsite renewable energy generation
  - Onsite RE to cater to a minimum of 5.0 % of total building energy consumption
  - Balance to be catered through offsite renewable energy
    - **Bombay House, Mumbai**
      - Purchased RECs for 1,090 MWh
      - 75% of the total energy consumption ~14.5 lakh units per year
    - **Beary's Group Research Triangle, Bangalore**
      - 12.1 MW Wind Farm
      - Equivalent to 50% of annual energy consumption

Beary's Group Research Triangle, Bangalore

IGBC Platinum

10. Controls, BMS and AI
Sustained Excellence in Performance

- **BMS as an effective tool**
  - Variations inevitable
    - Load
    - Occupancy schedule
    - Climatic conditions
  - Human interface minimized
  - Artificial Intelligence (AI) Applications
  - IoT in buildings



Screnshots from the Sierra ODC Monitoring dashboard

What gets Measured, gets Managed !

Sierra ODC eFACiLiTY, Coimbatore – IGBC Platinum

Energy Efficiency Models for implementation

- Capex – Savings & Pay back is excellent,

  Owner can allocate own financial resour

- ESCO – Savings and pay back is excellent,

  Owner needs support for capital investm

- Rental / Lease – Savings is attractive, and

  Owner does not want to own the Asset

- BOOT Model – Pay Back is longer, investment,

  Operation control lies with Inves

CII - IndiaGBC Headquarters
Net Zero Energy Platinum Building

CII Godrej Sohrabji Green Business Centre	
Solar PV Capacity	**130 kWp**
Projected Onsite Solar Generation	220000 kWh **(108%)**
Projected Annual Energy Consumption	203000 kWh
Conditioned Area	1115 sq.m.
Total Built up Area	1858 sq.m.

Bifacial solar PV modules

- ❖ Transparent & frameless
- ❖ Backside has a power rating of at least 90% of front side
- ❖ Energy yield enhanced with higher reflectivity
- ❖ Energy yield enhanced as the elevation of the modules from the roof surface increases (20 - 30% with an elevation of 1.5 m)

To demonstrate and showcase the viability of Net Zero Energy buildings

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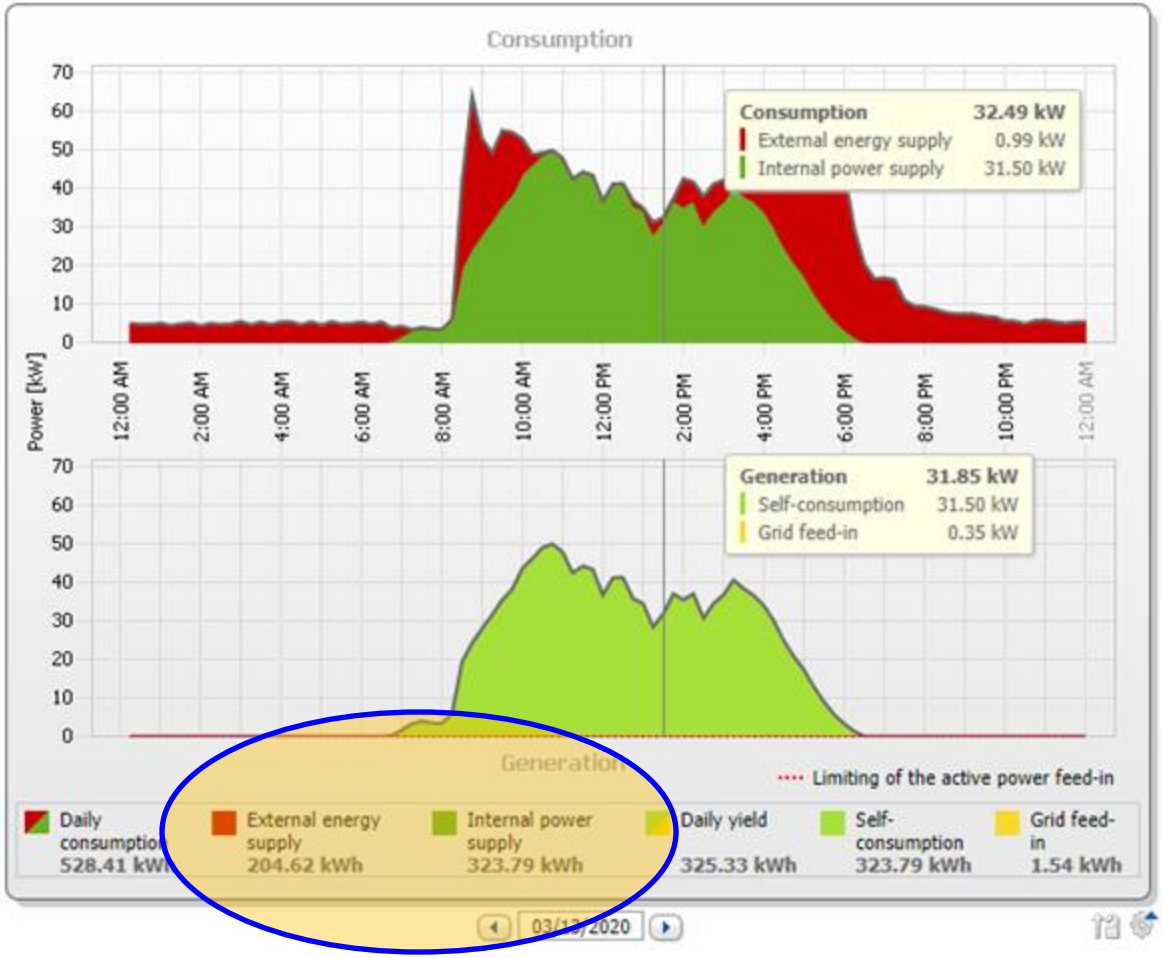
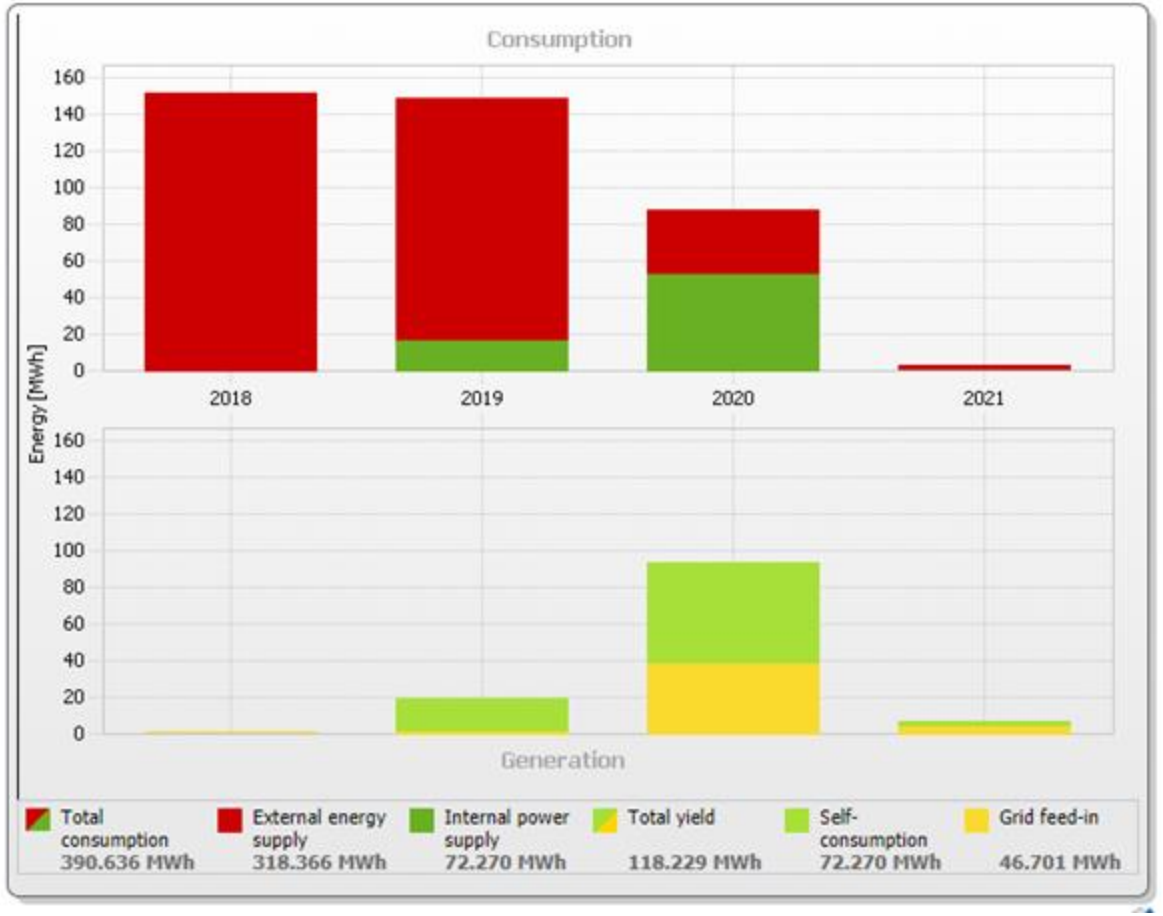
NZE – A Business Case : Study of IGBC HQ





- ❖ On-site RE System meets total energy demand
- ❖ Generated RE is utilized and extra power is fed to grid

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IGBC Net Zero Energy projects in India

More than

75 projects are working

to achieve IGBC

Net Zero Energy

certification

Plant - 13 Godrej & Boyce, Mumbai
(Office Building)

Globicon Terminals Mumbai (Warehouse)

Capgemini EPIP Campus Bangalore
(IT Campus)

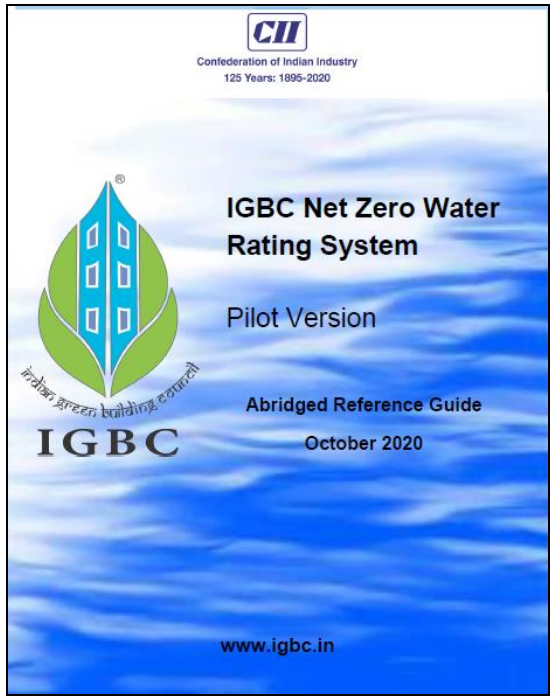
ICICI RSETI Jodhpur
(Training Institute)

IGBC

2. IGBC Net Zero Water

Net Zero Water Buildings are those

- **that consume minimum raw water**
- **produce alternate water to meet the balance requirement and give back such quantities to the original sources for use**



Net Water Consumption in a Building

Net Annual Water Consumption	=	Total Potable Water Used	[redacted]	Alternative Water Used (or) Harvested

Potable Water → **Municipal water, borewell water (even if quality is not potable), tanker water purchased**

Alternative Water → **Rainwater used (or) harvested, treated grey water, condensate water, any purchased grey water**

Ideal Scenario: *Quantity of Net Annual Water consumed should be ZERO*

Indian Green Building Council
Greening India since 2001

IGBC NZ Water – Reduce Demand

- Demonstrate reduction in water consumption
  - with respect to the Baseline - Uniform Illustrated Plumbing Code of India
- Focus areas
  - Plumbing fixtures (Sanitation and Hygiene)
  - Mechanical equipment
  - Irrigation



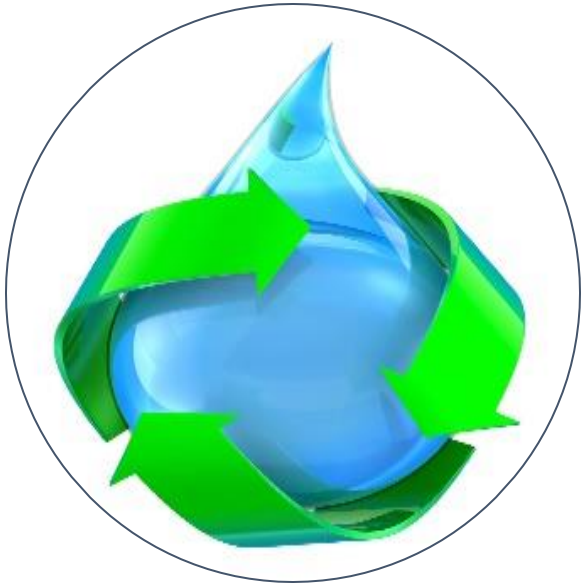

Indian Green Building Council
Greening India since 2001

IGBC NZ Water – Harness Alternate Water & Return Water Back to Source

- **Treat 100% of wastewater**
  - Treatment plant within premises or Centralised
  - Purchasing wastewater is encouraged wherever generation is lower vis-à-vis consumption
  - Maximise the utilisation of treated wastewater
- **Harvest rainwater**
  - Recharge the local aquifer
  - If water table is high or regulations do not encourage recharging, project should donate / sell treated water for reuse

Indian Green Building Council
Greening India since 2001

IGBC Impact on Water*



49 Billion litres / annum

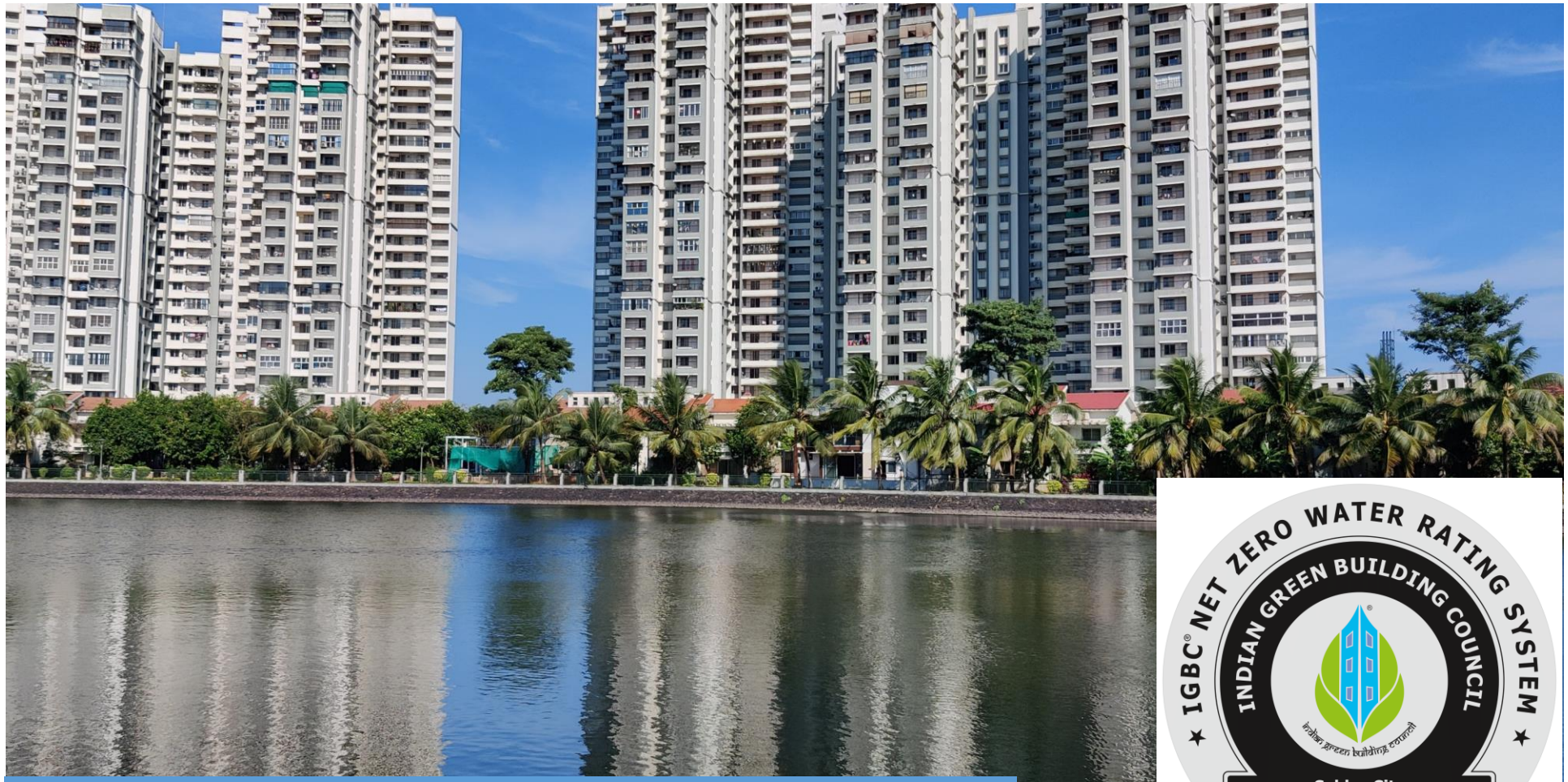
=

2 Month's Water requirement of Hyderabad

**From 2,581 certified projects with building footprint of 1,243 million sq ft*

Indian Green Building Council
Greening India since 2001

Sobha City, Thrissur, Kerala, India – 1st IGBC Net Water Positive Platinum



Artificial Lake spread over 6.5 acres with rainwater storage capacity of 191 ML - *fulfils 100% of water requirement*

IGBC® NET ZERO WATER RATING SYSTEM
INDIAN GREEN BUILDING COUNCIL
Sobha City
Thrissur, Kerala
Net Water Positive (Platinum)
2022 - 2025

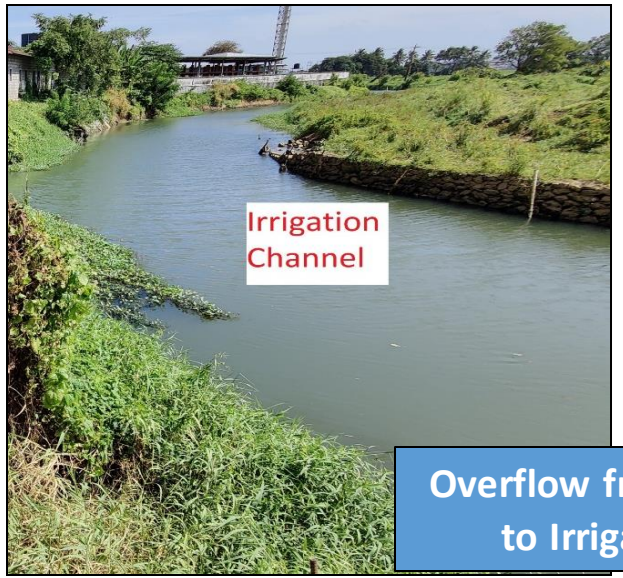
Indian Green Building Council
Greening India since 2001

Sobha City, Thrissur, Kerala, India – Key Features

Aeration Tank of STP

STP Water used for landscaping

Water meters for Domestic water (treated lake water), HVAC & treated water for irrigation



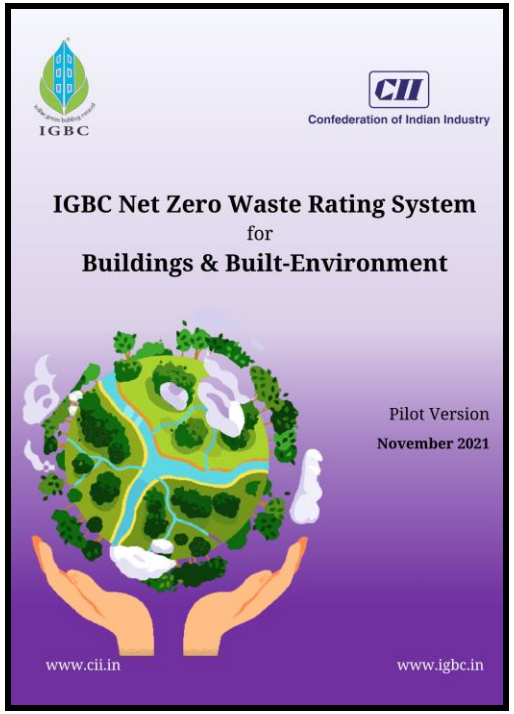
Overflow from Lake diverted to Irrigation Channel

Indian Green Building Council
Greening India since 2001

3. IGBC Net Zero Waste

Net Zero Waste Buildings are those which

- **eliminate the diversion of waste being sent to landfills by multi-pronged approaches**
  - nature-centric design
  - reducing debris during construction
  - responsibly handling waste during operation
  - recycling the remaining waste



IGBC Net Zero Waste to Landfill

Quantity of Waste To the Landfill = Quantity of Waste Generated − [Quantity of Waste Reused + Quantity of Waste Recycled]

Ideal Scenario: ***Quantity of waste sent to landfill should be ZERO***

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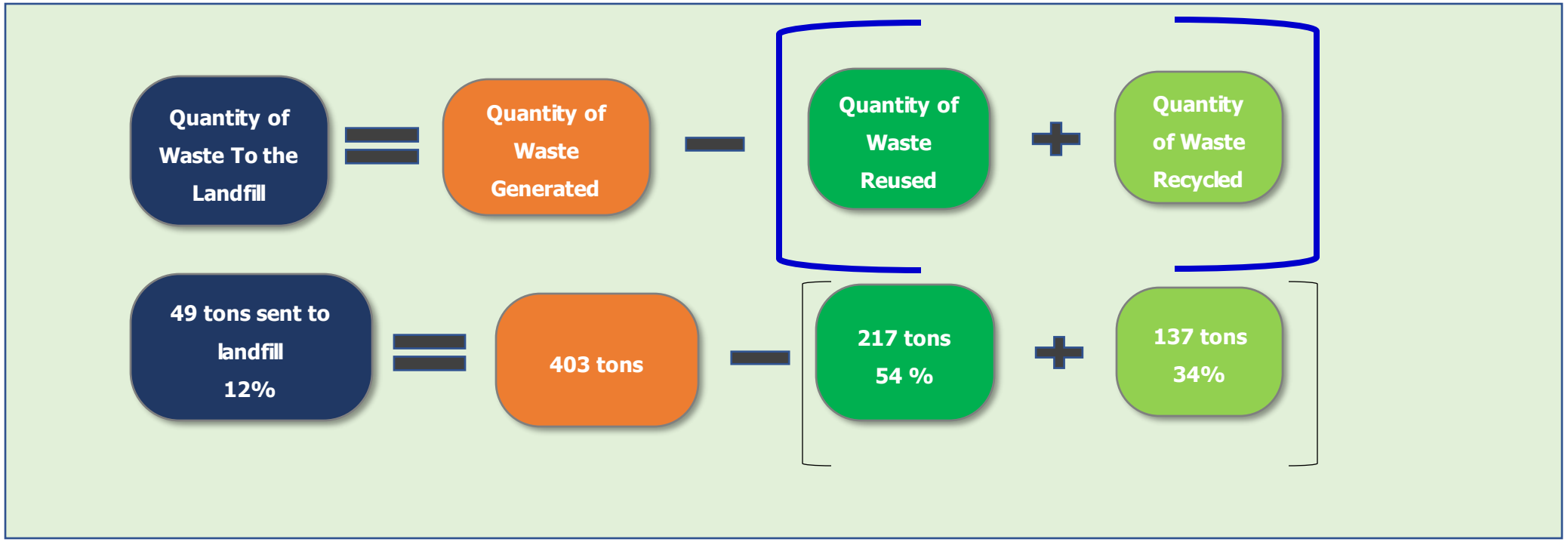
IGBC Compliance to Net Zero Waste to Landfill

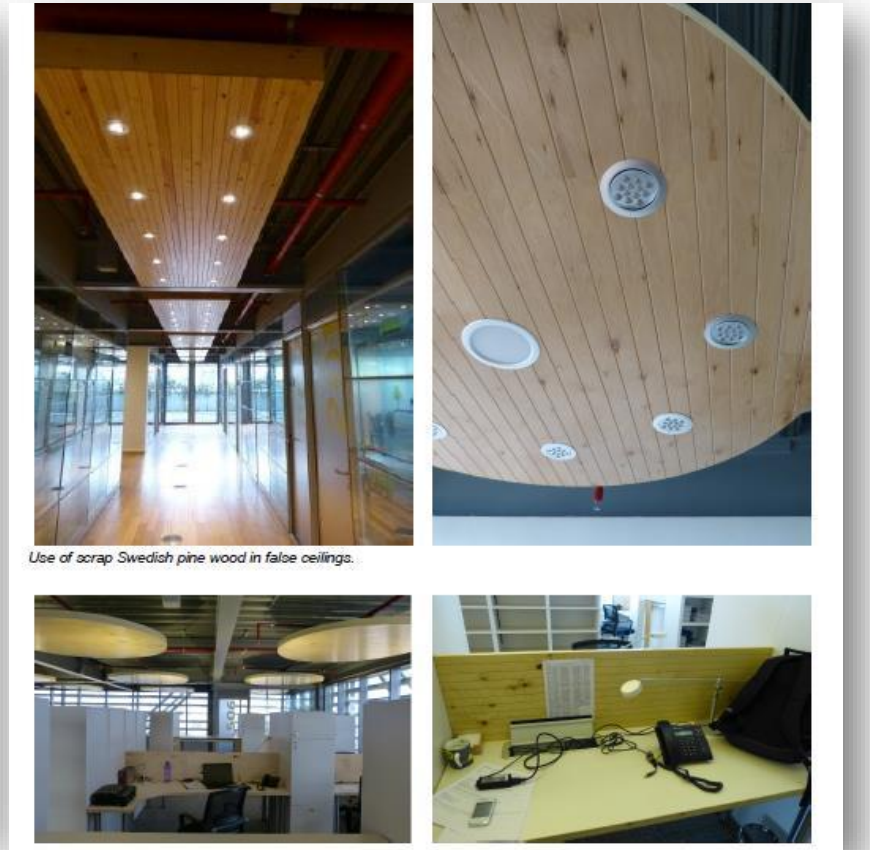
❖ **Project to appoint authorized thirty party to demonstrate waste diverted from landfill**



Ideal Scenario: Quantity of waste sent to landfill should be ZERO

Reuse of Materials (Salvaged)

Use of railway sleepers bought from railway auction

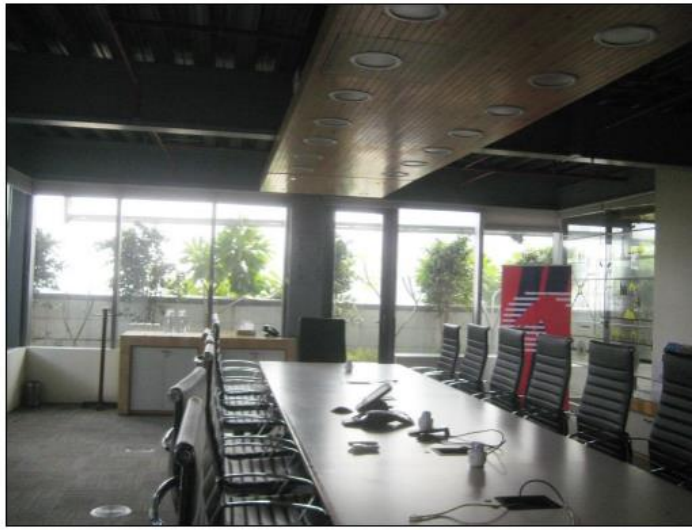


Use of scrap Swedish pine wood in false ceilings.

Furniture from salvaged Pine Wood

Courtesy: Eicher Corporate Office, Gurgaon; IGBC Platinum

Reuse of Materials…



Optimize life cycle economic performance. Smarter material use.

Courtesy: Essteam, Surat IGBC Platinum

Courtesy: Eicher Corporate Office, Noida, IGBC - Platinum

IGBC NZ Waste – Green Procurement in *Existing Projects*

- **Responsible Procurement Policy**
  - **Prefer Ecolabelled products (GreenPro)**
    - Eg: Green Housekeeping chemicals, Office consumables, etc
  - **Star labelled appliances**
  - **Eco- friendly Packaging**
    - Paper bag, Cloth bag
  - **100% recycled & chlorine-free papers**
  - **Biodegradable printing inks**

ONE PERSON USING REUSABLE BAGS OVER THEIR LIFETIME WOULD REMOVE MORE THAN **22,000** PLASTIC BAGS FROM THE ENVIRONMENT.

IGBC GreenPRO Green Certified Building Products

5,000 + building products certified

175 companies registered

25 sectors covered

www.ciigreenpro.com

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GLOBAL ECOLABELLING NETWORK TM

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GreenPro leads to *Sustainable Procurement*

Construction Materials
1. Cement
2. Ready Mix Concrete
3. Construction Aggregates
4. GGBS
5. Construction Blocks
6. Doors / Windows

Building Envelope and Facade
1. Plasters
2. Insulation
3. High Performance Glass
4. High SRI Tiles

Paints, Coatings and Chemicals
1. Construction Chemicals
2. Cleaning Chemicals
3. Paints and Coatings

Building Interiors
1. Furniture
2. Wood Polymer Composite
3. Panels and Boards
4. Ceiling Systems
5. Tiles

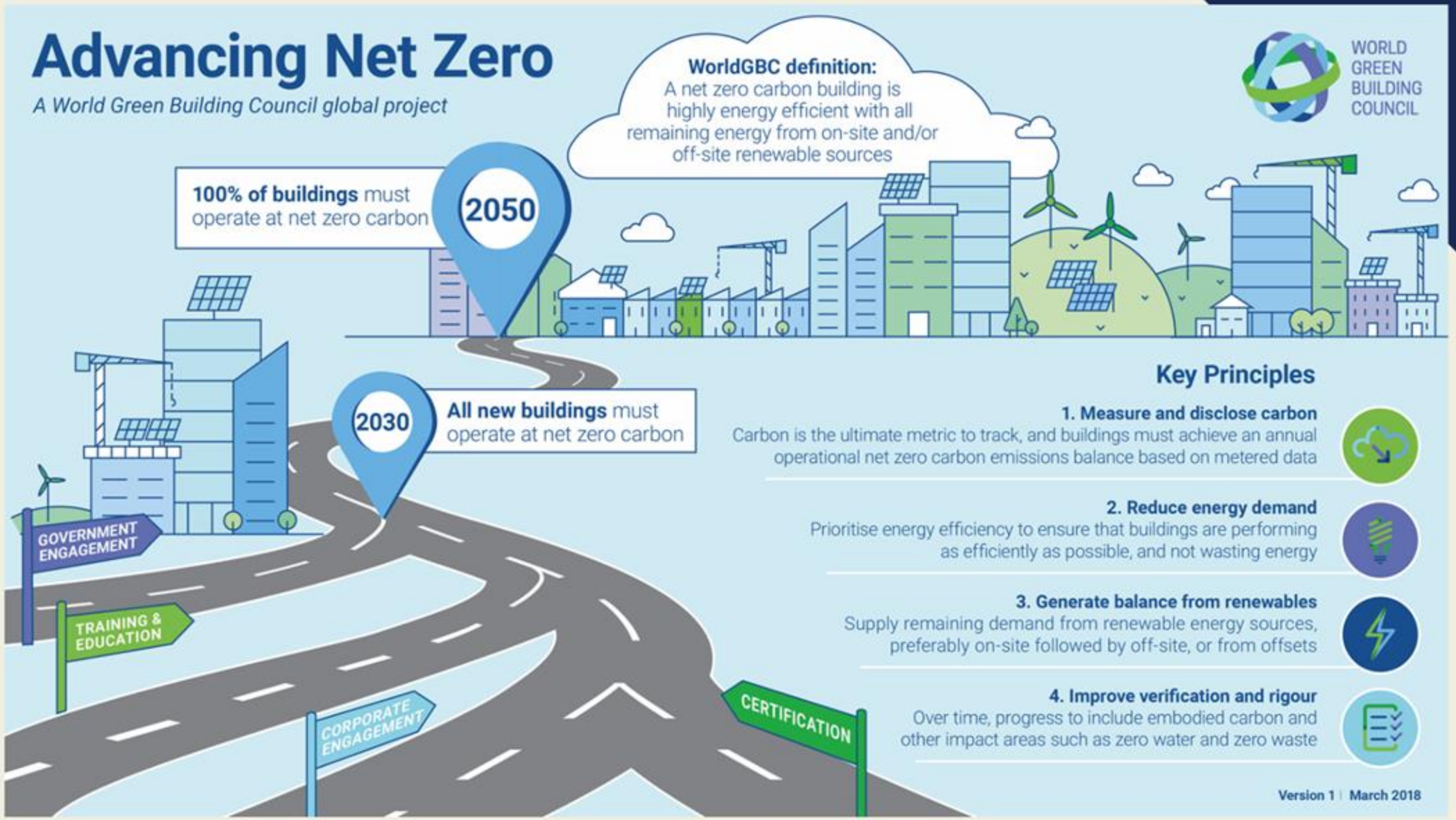
Technologies
1. IAQ Solutions
2. Rainwater harvesting
3. Solar PV
4. Plumbing Fixtures
5. Luminaries

GreenPro

Indian Green Building Council
Greening India since 2001

More than 90% Passive Building Products - certified under GreenPro

Aligned with Vision of World GBC



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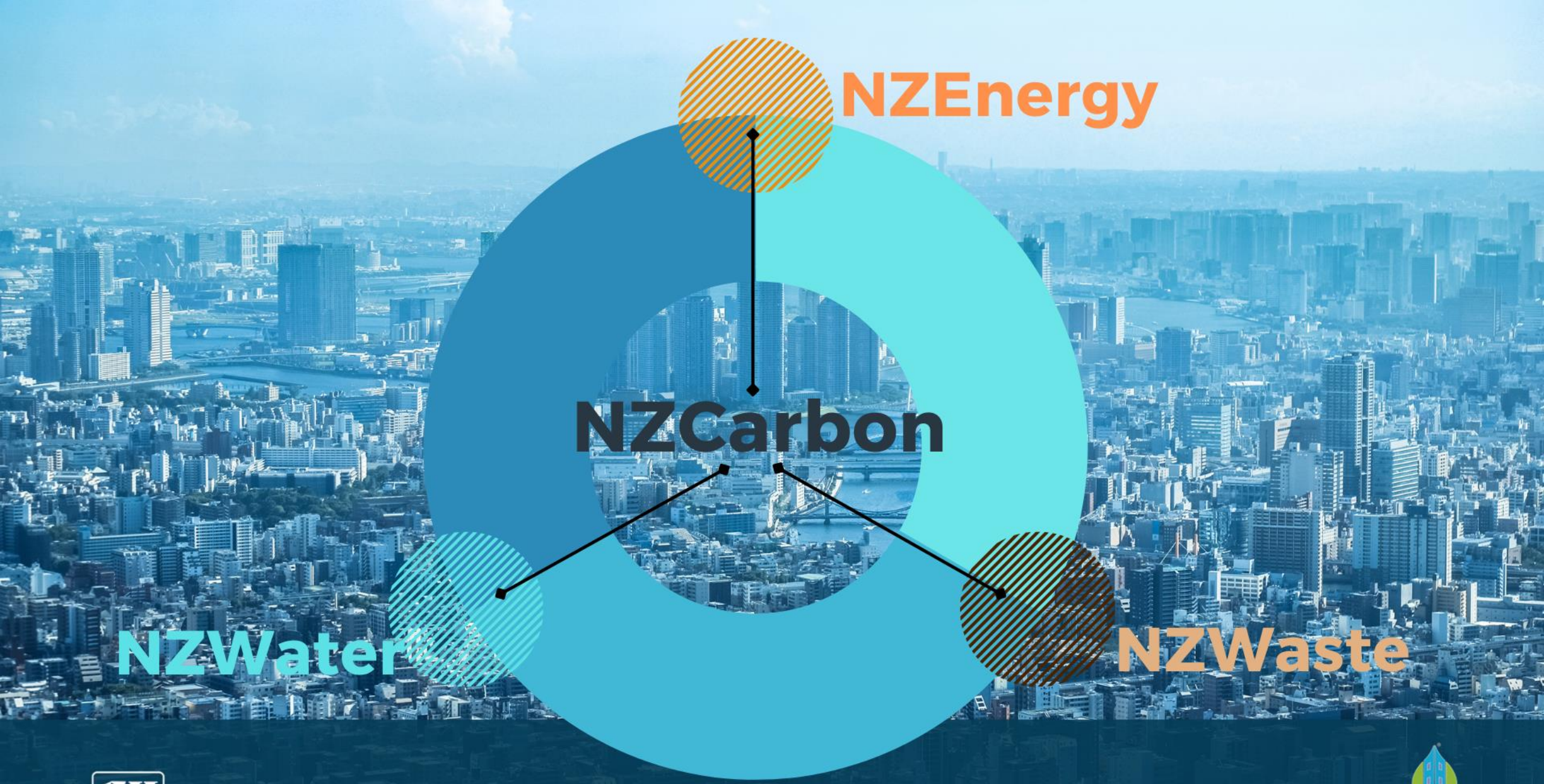

Confederation of Indian Industry

IGBC

To Sum Up

- India has huge potential to accelerate the Net Zero Movement
  - Innovative concepts, Futuristic – Products, Technologies, Solutions . . .
- Tremendous benefits
  - Tangible & Intangible
  - Society & Nation
- Instill a sense of pride

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"If we can change the way you think about building, may be what you build will change the world"

- Dr (Late) Prem Jain, Chairman, IGBC

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NET ZERO CARBON BUILDINGS ARE THE FUTURE!

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